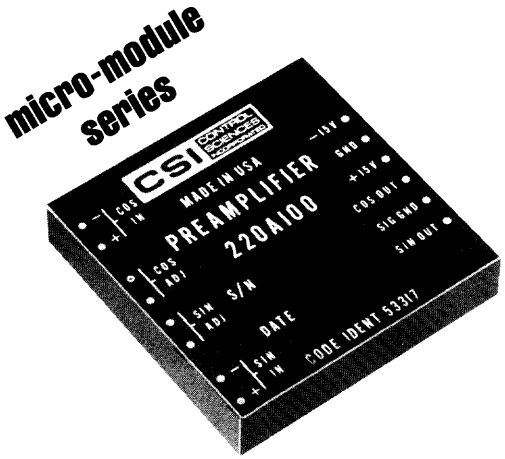
Inductosyn™ preamplifier
low noise gain 1300
series 220A100



FEATURES

- **2″ X 2″ module outline**
- **2.6 kHz to 10 kHz frequency range**
- **Phase shift $<5°$**
- **Phase match $<1°$**
- **Usable with 16-bit R/D converters**
- **Load capacity 10,000 pF**
- **Low power consumption (150 mW typ.)**

APPLICATIONS

Precision linear and rotary measurement systems, Machine tool controls.

(The 220A100 is recommended for use with the 268B300 R/D converter and the 210A100 power oscillator.)

GENERAL DATA

The outputs from an Inductosyn slider are low level signals on the order of millivolts and require amplification and buffering in order to be used as inputs to a Resolver/Inductosyn-to-digital converter. The 220A100 provides the necessary gain for this purpose. The device is a low noise amplifier which allows it to be used with up to 16-bit Resolver-to-digital converters.

Any gain mismatch between the sine and cosine outputs of the Inductosyn slider, whether it be slider or amplifier mismatch, contributes to the system error. The 220A100 with a 0.15% gain match over temperature contributes an error of 0.23 micron using a 2 mm pitch Inductosyn. Provisions are included for trimming the gains of the amplifier if it becomes necessary.

The 220A100 has an output impedance of less than 3 ohms and is capable of driving a cable capacity of 10,000 pF. This is suited to machine tool applications where the Inductosyn/Resolver-to-digital converter is remote from the measuring Inductosyn.

APPLICATION

The block diagram Inductosyn-to-digital converter shows a "hook up" with preamplifier, power oscillator and a 268B300 R/D converter with an Inductosyn.

By variation of the gain resistors and current set resistor, Inductosyn tracks up to approximately 10 feet can be accommodated.

As a rule of thumb, the user should set the current in the track to a level which outputs 2.5 Vrms maximum from the sine and cosine outputs of the preamplifier. The value of this current will depend upon the type of Inductosyn and the power oscillator excitation frequency.

INITIAL ALIGNMENT

An Inductosyn requires two trims; a gain trim and a balance trim, as follows:

1. Gain Trim (See Block Diagram)
   The Inductosyn gain depends on the spacing between the slider and the scale and also the track excitation frequency.
   a. Monitor Cosine OUT with AC DVM and move Inductosyn slider for a voltage maximum.
   b. Select R1/R2 for a reading of 2.5 Vrms ±10% and record reading.
2. Balance Trim
   a. Monitor Sine OUT and move Inductosyn slider for a voltage maximum and record reading.
   b. The output with the lower reading is the channel which needs to be trimmed.
   c. Compute the percentage difference:

$$100 - \left(\frac{\text{Lower Reading Channel}}{\text{Higher Reading Channel}} \times 100\right) = \%\ \text{Difference}$$

   d. Compute the value of required sine/cosine gain resistor:

$$R_{Gain} = \frac{33.2\ \text{Kohms}}{\%\ \text{Difference}}$$

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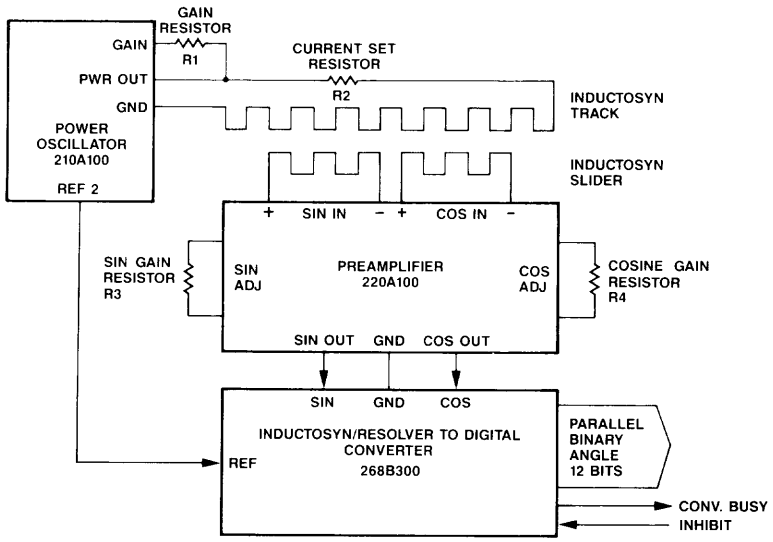
BLOCK DIAGRAM — INDUCTOSYN TO DIGITAL CONVERTER



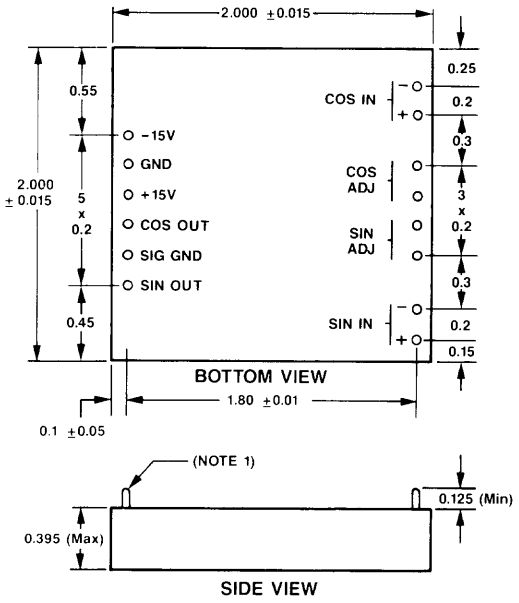
ELECTRICAL SPECIFICATIONS

Parameter	Value
Gain	1300 ±10%
Gain Mismatch	±0.15%
Phase Shift	< 5°
Phase Mismatch	< 1°
Crosstalk	0.1%
Operating Frequency	2.5 kHz to 10 kHz
Input Resistance	660 ohms differential
Output Impedance	<3 ohms
Max. Load Capacity	10,000 pF
Output Level	3 Vrms max.
Power Supplies	
Voltage	±12V to ±16.5V
Current	15 mA max.
Temperature Range	
Operating	0°C to 70°C
Storage	−55°C to +125°C
Size	2.0″ x 2.0″ x 0.395″
Weight	1.25 oz.

ORDERING INFORMATION

220A SUFFIX	FREQUENCY
100	2.6-10 kHz

MECHANICAL OUTLINE



NOTES

1. Rigid 0.025 diameter pins suitable for solder-in or plug-in applications.
2. Dimensions are in inches.