

**Trig-Tek™**

**DC200A**

**Displacement Clipper**

**User Manual**

**Publication No. 980981 A**

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# FOR YOUR SAFETY

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Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.



This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.



If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.



Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.



Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid "live" circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.
2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

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## DOCUMENT CHANGE HISTORY

Revision	Date	Description of Change
A	06/14/2011	Document Control release

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# Chapter 1

## Introduction

The DC200A Displacement Clipper, **Figure 1-1**, is designed to prevent over-modulation of an air modulator in an acoustic testing system. The clipping ratio (peak level/rms input) is established by adjustment of the front panel master gain control.

Four variations of air modulators are provided for in the DC200A for selection of the equalizer roll-off characteristics. The four variations of the DC200A Displacement Clipper are compatible with the following Ling Electronics Electropneumatic Transducers: DC200A-1 is used with the EPT-94B 110, DC-200A-2 with the EPT200, DC-200A-3 with the EPT-110, and the DC-200-4 is used with the EPT-1094 Electropneumatic transducer. The four modes of operation are selectable by moveable jumpers inside the unit.

The DC200A is installed in the signal processing system ahead of the power amplifier. This provides the proper frequency band shaping and the master gain control for the acoustic testing system. The unit will operate with sine or random wave signal inputs.

The purpose of the DC200A is to provide constant air modulator valve displacement over the rated frequency range, and to prevent the over-modulation of the air modulator valve during either sine or random wave acoustic testing by clipping the input signal.



**Figure 1-1, DC200A Displacement Clipper**

Features include:

- Four selectable Filters
- Master gain control
- SE or DIFF Input
- Clipper monitor
- Isolated output
- 115 or 230 Volts RMS power

## Specifications

### Reference Data

Input Impedance	100,000 Ohms
Output Impedance (monitor)	Less than 50 Ohms
Isolated Output Impedance	Less than 600 Ohms across the secondary of the output impedance transformer (Pin 2 SIG and Pin 1 COM) of the XLR connector.
Noise Level	65 dB below maximum output.
Maximum Output	14 Volts P-P at 2 kHz.
Distortion	Less than 1%, 10 Hz to 2 kHz.
Input Level	2 V RMS max.
Clipping Ratio	Adjustable from 9 to 1

### Power Requirements

	105/125 Volts or 210/230 Volts RMS at 50/60 Hz, 6 W
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### Dimensions

	3.5" high x 19" wide x 7.5" deep.
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## Chapter 2

# Installation

### Installation

As soon as the unit is received, unpack and inspect it for shipping damage, loose knobs and components, or other defects.

All components of the DC-200A are contained in one rack-mounting chassis. Proper connections for the unit are listed in **Table 2-2**. **Figure 2-1** is a dimensional drawing for use during installation.

Mount the unit housing (case) into a 19-inch relay rack using the special binder head screws (10-32 x 1/2), provided. Install the chassis into the unit housing. Make the operational connections described in **Table 2-2**. Provide adequate equipment ventilation.

With the DC-200A connected in the acoustic testing system, determine the ground circuit strapping required as follows:

If the DC-200A is in a system where a common return must be made at the DC-200A, Jumper TB1-CHAS and TB1-SIG together to connect the chassis, to signal ground.

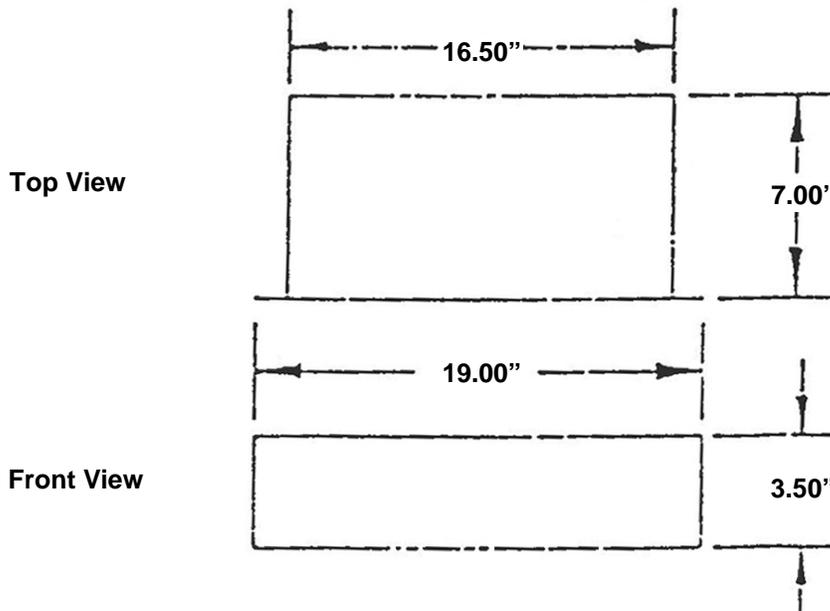


Figure 2-1, DC200A Dimensional Drawing



**Figure 2-2, Front Panel**

**Table 2-1, DC-200A Controls and Indicators (Front Panel)**

<b>Panel Marking</b>	<b>Description and Function</b>
Master Gain	Potentiometer that controls the signal level through the DC-200A.
Clipping Ratio Meter Meter Adjustment Factory Set	Meter that indicates the ratio of the clipped output peak voltage to the unclipped input rms voltage.
Interlock	Indicator lamp that lights when the MASTER GAIN control is not fully counterclockwise.
Power (LED)	Indicator lamp that lights when power is applied to DC-200A
Gain Level Set	Potentiometer that adjusts the signal level from the equalizer circuit.
Clipper Level Set	Potentiometer that determines the level at which the unit will clip.
Power ON-OFF	Switch applies/ Removes AC Power to/from the unit.

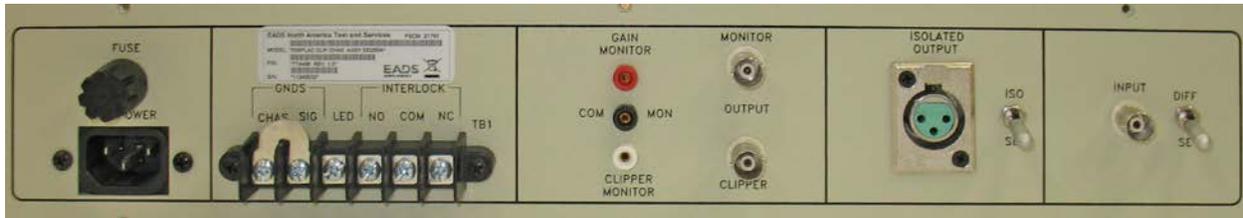


Figure 2-3, Rear Panel

Table 2-2, DC-200A Operational Connections (Rear Panel)

Connection		Function	
INPUT	BNC J1-1 Shell	Signal ground	
	BNC J1-2 Center	Input Signal to DC-200	
Clip Level Test Points	Monitor	Output Signal	
	Clipper	Signal from clipper circuit	
	Common	Signal ground	
Isolated Output XLR Connector	Pin 1	One side of output transformer secondary (COM)	
	Pin 2	Other side of output transformer secondary (SIG)	
	Pin 3	Signal ground	
Monitor Output BNC Connector	Center	Signal ground	
	Shell	Signal voltage side of primary winding of output transformer	
Clipper Output BNC Connector	Center	Clipper output	
	Shell	Signal ground	
AC PWR Input		117 or 230 V, 50/60 Hz, primary power	
		TB1-NC	Closed with TB-1 COM when master gain control is fully counterclockwise.
	Interlock	TB1-COM	Interlock switch moving contact
		TB1-NO	Closed with TB-1 COM when master gain control is not fully counterclockwise.
		TB1-LED	Interlock lamp (DS2) ground circuit
	Ground	TB1-CHAS	Chassis ground
	TB1-SIG	Signal ground	

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## Chapter 3

# Operation

The DC200A is pre calibrated at the factory. **Figure 2-2** shows the front panel, **Table 2-1** details the controls and indicators, **Figure 2-3** shows the rear panel and **Table 2-2** details the operational connections that provide the front and rear panel description. The DC200A circuitry is packaged on a single PC board.

### CAUTION

**An internal 115-230 switch (S3) located on the circuit board selects for application with 115 or 230V RMS power. DO NOT APPLY 230 V RMS power with the 115-230 Switch in the 115V position as it could damage the unit. When operating with 230 V RMS power, the fuse should be changed to one with a 1/8 amp. rating.**

The DC200A has four equalization profiles as shown in **Figures 3-1 through 3-4**. In the DC200A the inputs and output of each equalizer can be selected by movable jumpers. They are marked DC200-1 thru DC200-4. The equalizers are designed to accommodate the different air modulators.

**NOTE:** *The jumper locations are marked DC200-1 thru DC200-4. Remove the top cover and select the appropriate equalizer. Jumpers are at the input and outputs of each equalizer.*

EQUALIZER	MODULATOR
DC200-1	EPT-948
DC200-2	EPT-200
DC200-3	EPT-110
DC200-4	EPT-1094

Prior to use of the acoustic system, the gain of the system amplifier must be adjusted to drive overall system gain corresponding to gain adjustments and indications on the DC200A. Refer to **Fig. 2-2** and **2-3** and **Tables 2-1** and **2-2** for a description of the functions and all operating control indicators.

To make these adjustments, perform steps 1 thru 4 below.

1. Set the Master Gain Control and Gain Level Set at the DC200A, and the gain of the power amplifier to minimum.
2. Connect a sine wave oscillator to the input of the DC200A, and set to a frequency of 200 Hz and a level of 200 millivolts RMS.
3. On the DC200A, adjust the MASTR GAIN control for a clipping ratio of 1.41 on the front panel meter. At this point the waveform will just start to clip. If required use the CLIPPER SET LEVEL control to extend the range of the MASTER GAIN control. (Meter adjustment is factory set)
4. Adjust the power amplifier gain and, if necessary, the GAIN LEVEL SET (front panel) to derive full modulation fro the electro-pneumatic transducer.

**NOTE:** *The positions of the DC200A OUTPUT GAIN and the Power amplifier gains are now set and should not be further adjusted.*

## Operation

Make certain all requirements of the previous section have been met and proceed as follows:

1. Set the MASTER GAIN control fully counterclockwise.
2. Start the power amplifier. If the power amplifier will not start, check the INTERLOCK indicator on the DC200A. If the lamp is illuminated, reset the MASTER GAIN control fully counterclockwise.
3. Adjust the Master GAIN control for the designed level system.

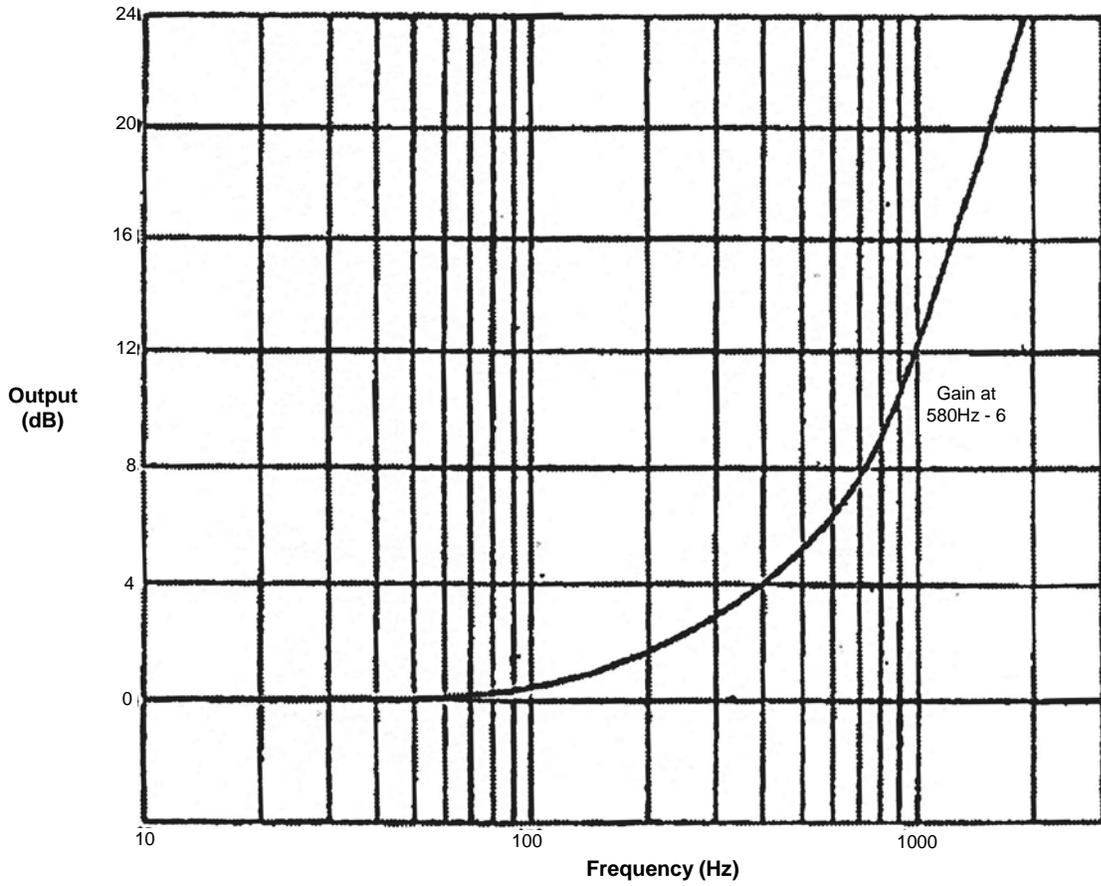


Figure 3-1, Filter 1 Equalizer Frequency Response

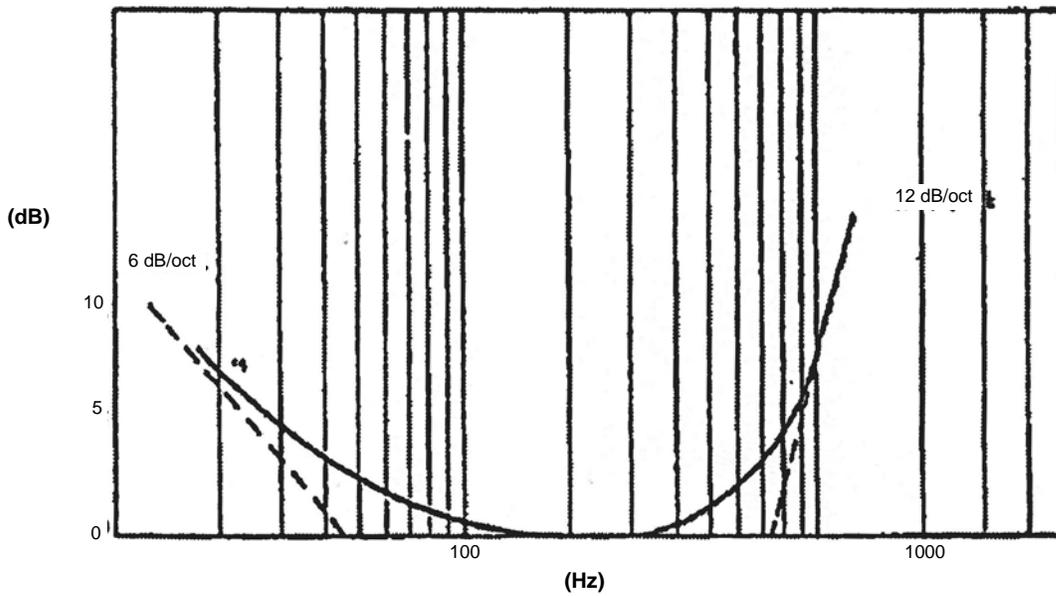


Figure 3-2, Filter 2 Equalizer Frequency Response

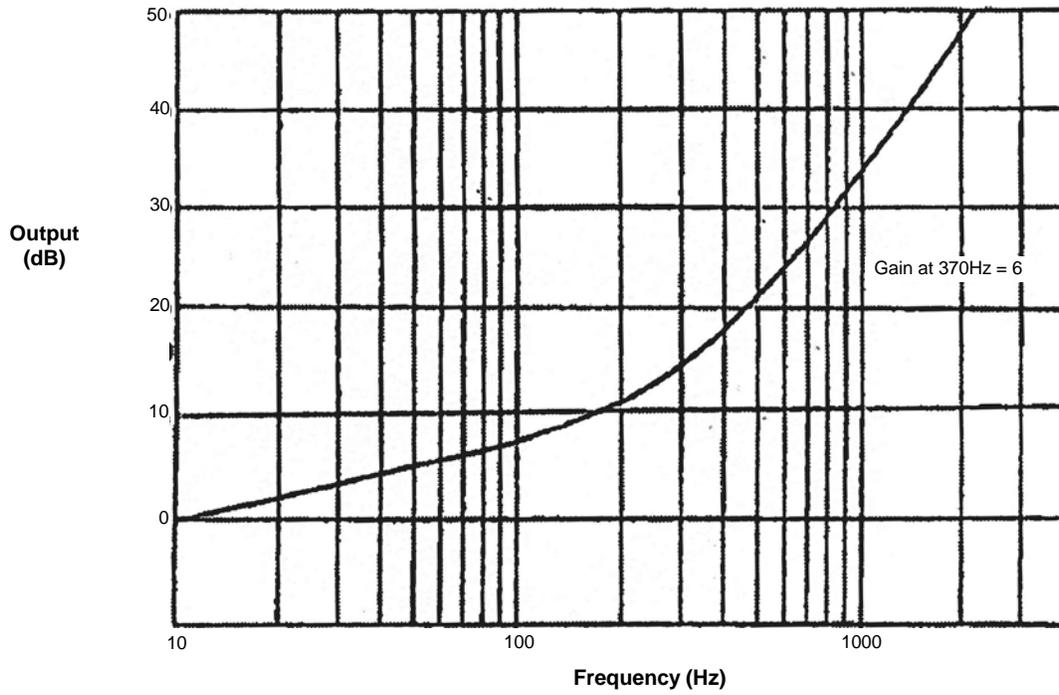


Figure 3-3, Filter 3 Equalizer Frequency Response

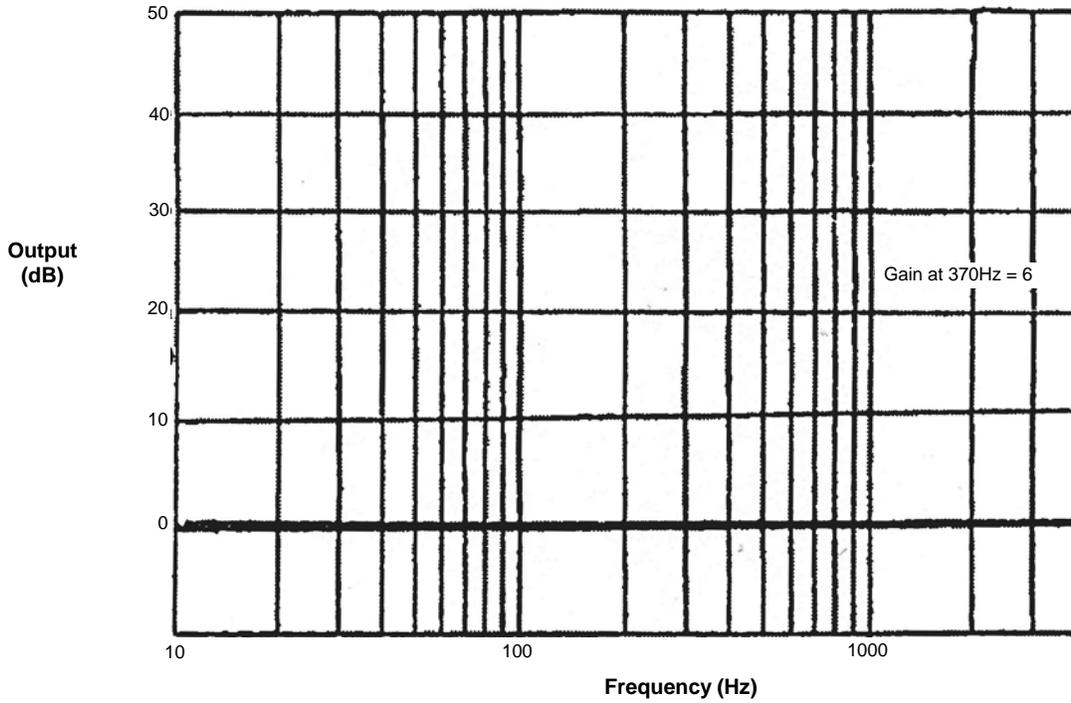


Figure 3-4, Filter 4 Equalizer Frequency Response