



# HIGH VOLTAGE AMPLIFIER MODEL T-700

## MODULAR HIGH VOLTAGE AMPLIFIER SERIES

### Description

The T-700 series is a modular solution implementing modules with  $\pm 250$  V (-B grade) or  $\pm 400$  V (-H grade) max output. This series is assembled in a backplane-based, 19" rackmount chassis with an integrated power supply. Up to six single channel modules can be installed into a T-700 chassis. This series can be remotely controlled by a PC by means of optional modules and software. Each T-700 single channel unit can be equipped with one or more of the available options.

Key features	Applications
Optimal price/performance ratio	High voltage instrumentation
High stability	Piezo transducer excitation
High flexibility	Programmable power supplies
Integrated power supply	Electrostatic transducers and deflection
Customizable design	

Specifications	Physical dimensions
<ul style="list-style-type: none"> <li>Max input voltage: <math>\pm 10</math> V (20 Vpp)</li> <li>Max output voltage : <math>\pm 250</math> V (500 Vpp) (-B grade)</li> <li>Max output voltage: <math>\pm 400</math> V (800 Vpp) (-H grade)</li> <li>Bandwidth (without load):               <ul style="list-style-type: none"> <li>DC to 100 KHz (-B grade)</li> <li>DC to 40 KHz (-H grade)</li> </ul> </li> <li>Channels: up to 6, independent</li> <li>Power supply 230 Vac 50-60 Hz</li> <li>Load: capacitive, resistive</li> <li>Output current: 100 mA peak-to-peak max</li> <li>Ripple Voltage: 2 mV max full bandwidth</li> <li>RMS noise absolute 1.2 mV (typical)</li> </ul>	<p>Specifications:</p> <ul style="list-style-type: none"> <li>Width: 84 TE (19" Rack)</li> <li>Height: 3 U</li> <li>Depth: 410 mm</li> <li>Weight: 13 Kg max</li> </ul> <p>Environment:</p> <ul style="list-style-type: none"> <li>Operating Temperature: <math>-10^{\circ}\text{C}</math> to <math>50^{\circ}\text{C}</math></li> <li>Humidity: 0 to 95%</li> </ul>



Front and lateral view of a T-700-H High Voltage Amplifier Module.



## Configuration

T-700 amplifiers are enclosed into a 19" rack mount chassis, 3U x 84TE and include a precision, very low noise, high voltage power supply. The configuration is modular, i.e. composed by a Base Unit plus 1-to-6 HV Amplifier modules, each with individual options available.

The device is based on a standard Eurocard PCB 3Ux220 mounted with a 12TE front panel and backplane-compatible F-type DIN plug. Input (BNC) and output (TNC) connectors, as well as other optional switches and display are available at the front panel.

Module	Description	Order code
Base unit	Backplane-based 19" Chassis (84TEx3Ux42cm) with dual HV Power Supply, capable to accommodate up to 6 single channels HV amplifier modules	T-700
HV Amplifier module (±250 V version)	Single channel HV Amplifier module, ±10 V input, ±250 V output (gain=25), standard Eurocard 3Ux220 with 12TE front panel and connectors	T-700-B
HV Amplifier module (±400 V version)	Single channel HV Amplifier module, ±10 V input, ±400 V output (gain=40), standard Eurocard 3Ux220 with 12TE front panel and connectors	T-700-H
Digital remote control	External Remote control module, allows to drive the HV Amplifier by custom external digital drivers	T-700-RD
Parallel port remote control	Remote control module and software to drive the HV Amplifier by a PC-Parallel Port	T-700-RC
Offset generator	High Precision, very low noise Offset Generator with output range of 0 to ±10V	T-700-OF
Multiple gain selector	Multiple Gain selector, allows to change the HV amplifier gain (2-8 gain values, user defined)	T-700-RE
Inverting option	Inverting/non inverting switch selector, allows to change the signal polarity	T-700-OI
Output connectors switch	Selector to switch the output alternatively to one of two separate connectors	T-700-OS
Digital display	3.5 digit LCD display, allows to precisely monitor the output voltage	T-700-DD



## Technical notes

### INPUT AMPLITUDE

The input amplitude should normally be kept within  $\pm 10$  V and not exceed  $\pm 12$  V. This is most important since the input protection network will limit the signal amplitude and cause distortion. The input protection network effectively cuts accidental spikes and overshoots.

### LOAD

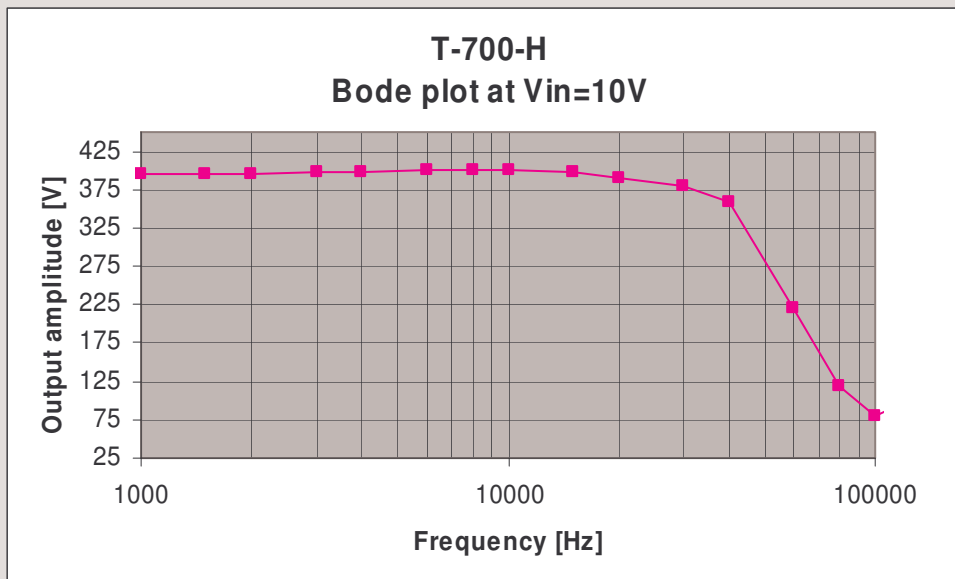
The amplifier is intended to drive resistive and capacitive loads. The maximum load capacitance depends on the slew rate of the amplifier and on the working frequency.

The maximum capacitance limit includes the capacitance of the connection cable (ca 100 pF/m for a standard coaxial cable). Increasing the capacitive load causes overshoot to appear. If a larger capacitive load is required then the slew rate should be reduced accordingly. Such an adjustment can be made before shipment. It may also be performed at a later date by qualified personnel and the factory should be contacted for advice. Inside the cabinet exist hazardous voltage levels and the amplifier circuit is sensitive to static discharge.

Overloading the output may cause an overshoot which might be dangerous for the connected devices. The continuous output current limit is 100 mA<sub>pp</sub> and the output power limit is 25 W (-B grade) and 40W (-H grade), which corresponds to Safe Operating Area (SOA). The temporary peak current may be up to 110 mA. The output is equipped with a current limiting circuit which withstands accidental short-circuits.

The amplifier may be overheated when the output is short-circuited for a long time and/or if the peak current appears to be frequent.

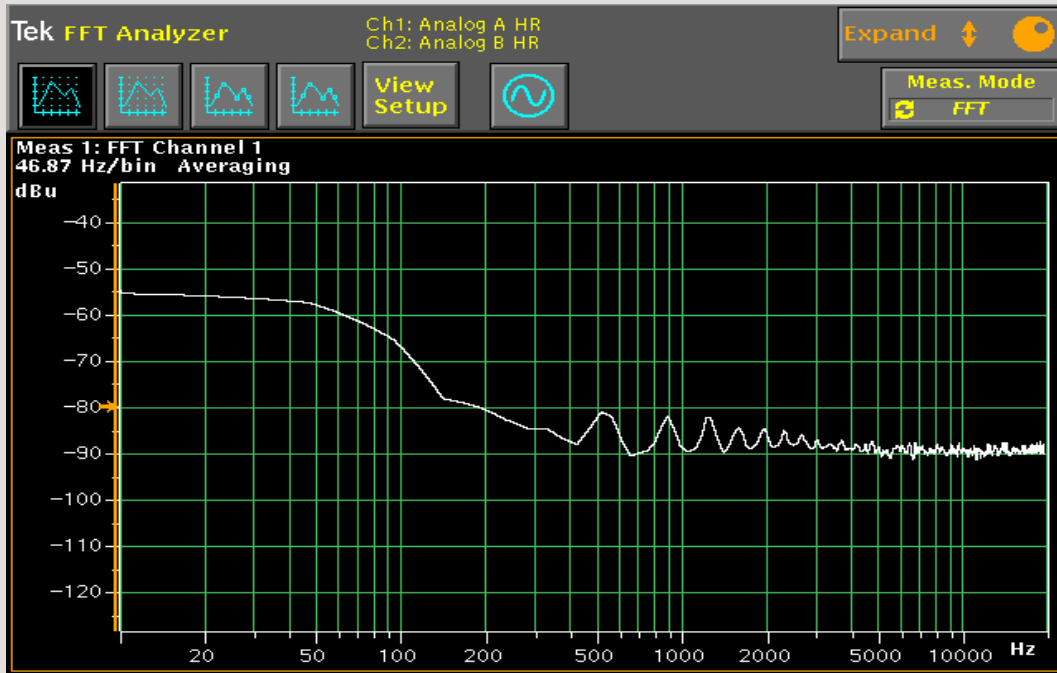
## Typical Bode plot (no load):



Bode plot of the output signal of a T-700-H HV amplifier with 10V<sub>pp</sub> sinusoidal AC input signal.

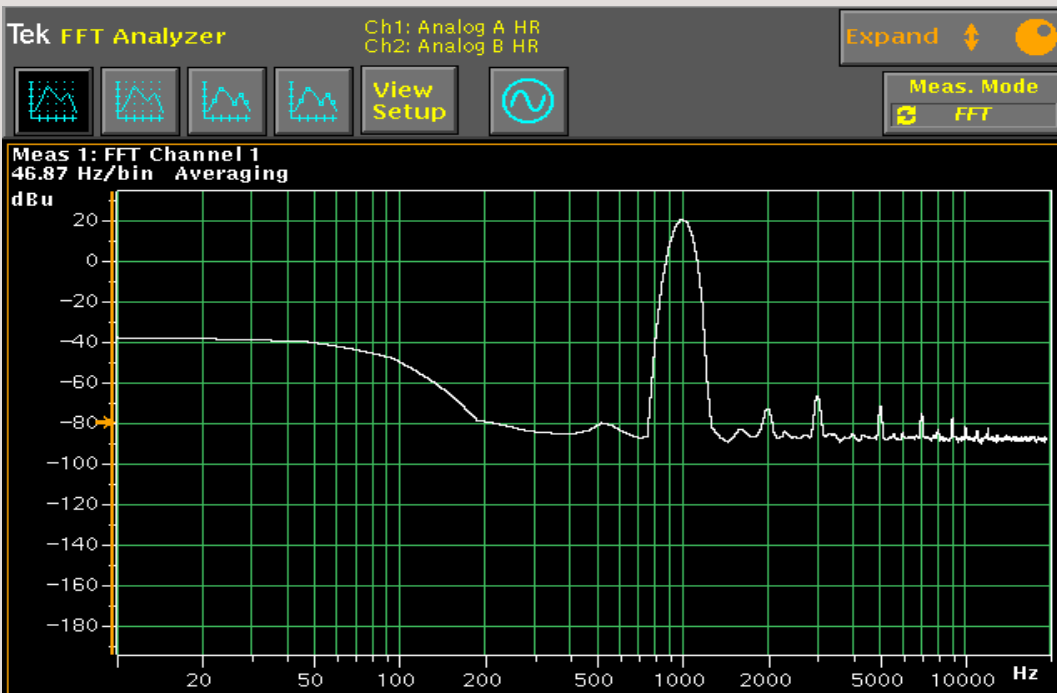


## Spectral response



Spectral response at 0 VDC input

## Spectral response

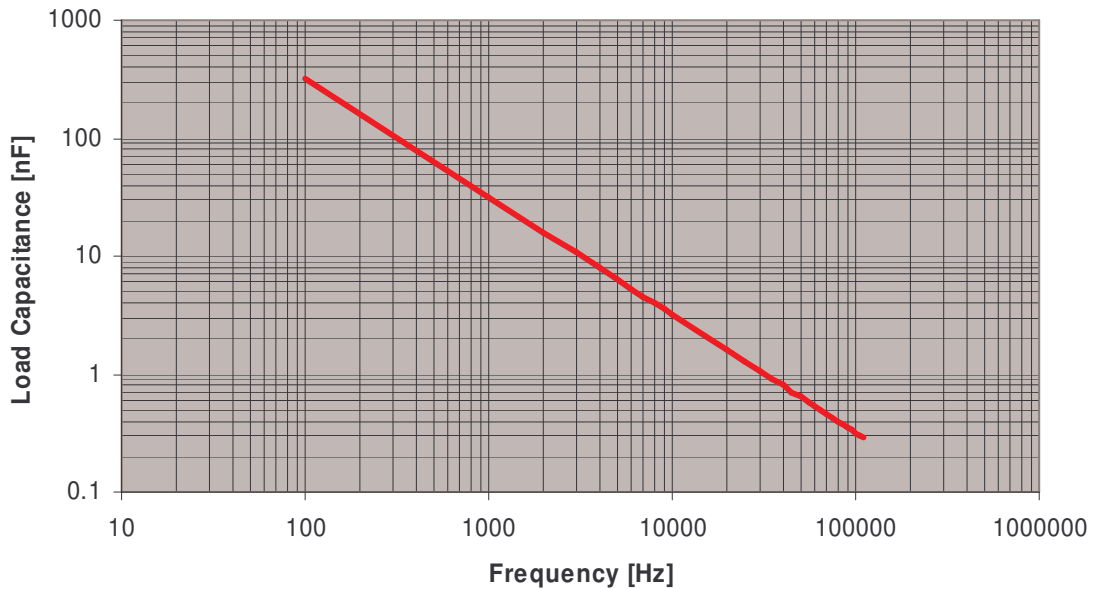


Spectral response applying a 1kHz sinusoidal signal at the input



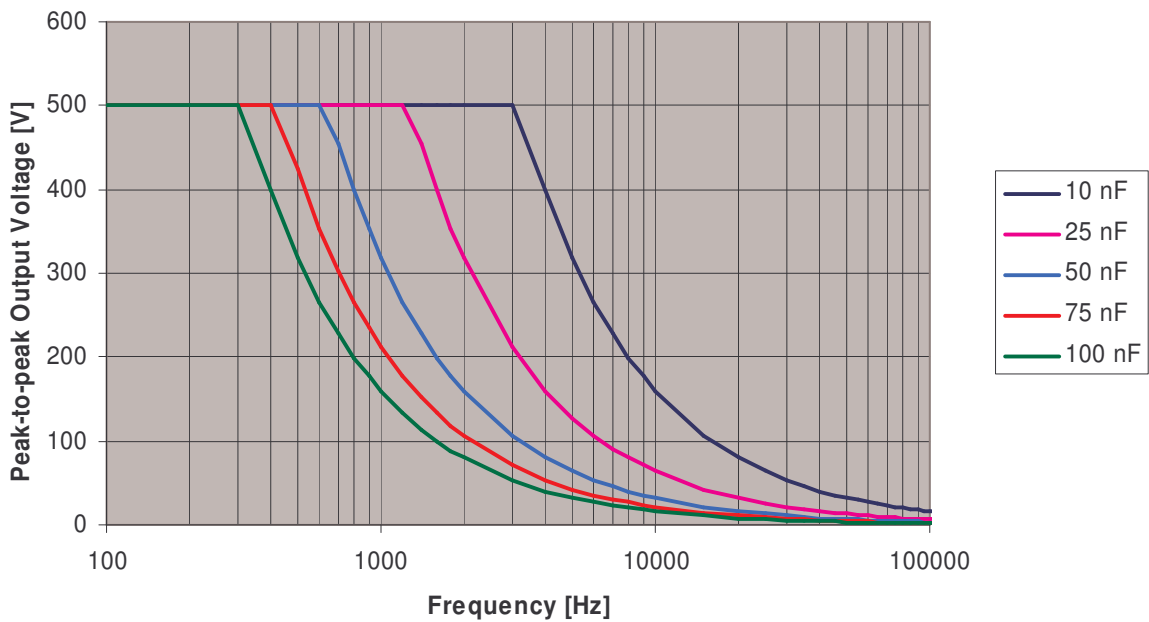
## T-700-B Frequency performance

T-700-B bandwidth as a function of load capacitance at maximum output voltage



## T-700-B Output voltage

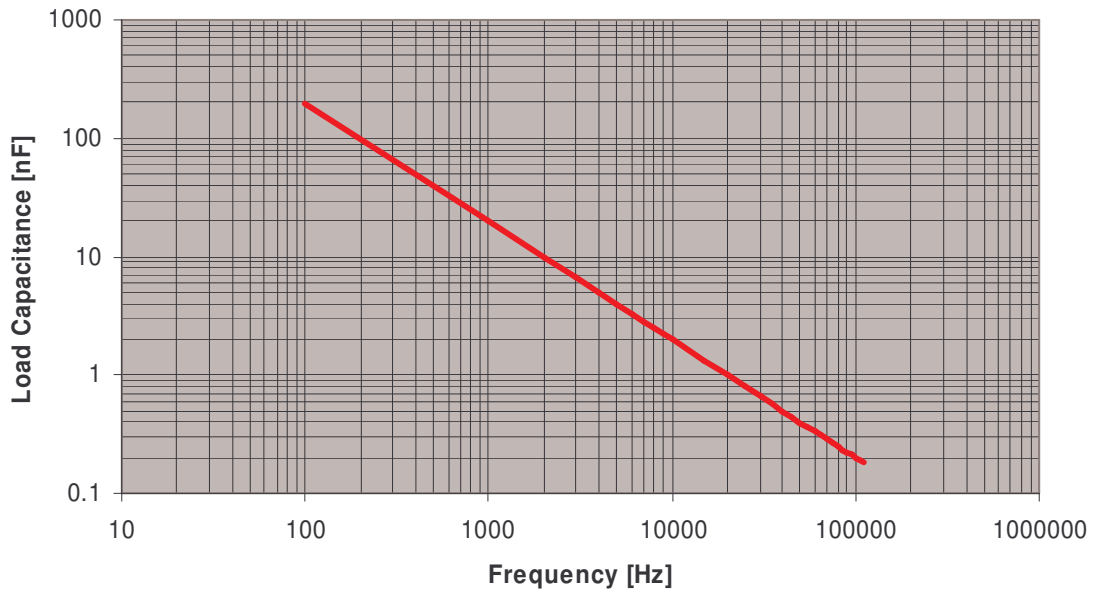
T-700-B Output voltage vs. load capacitance





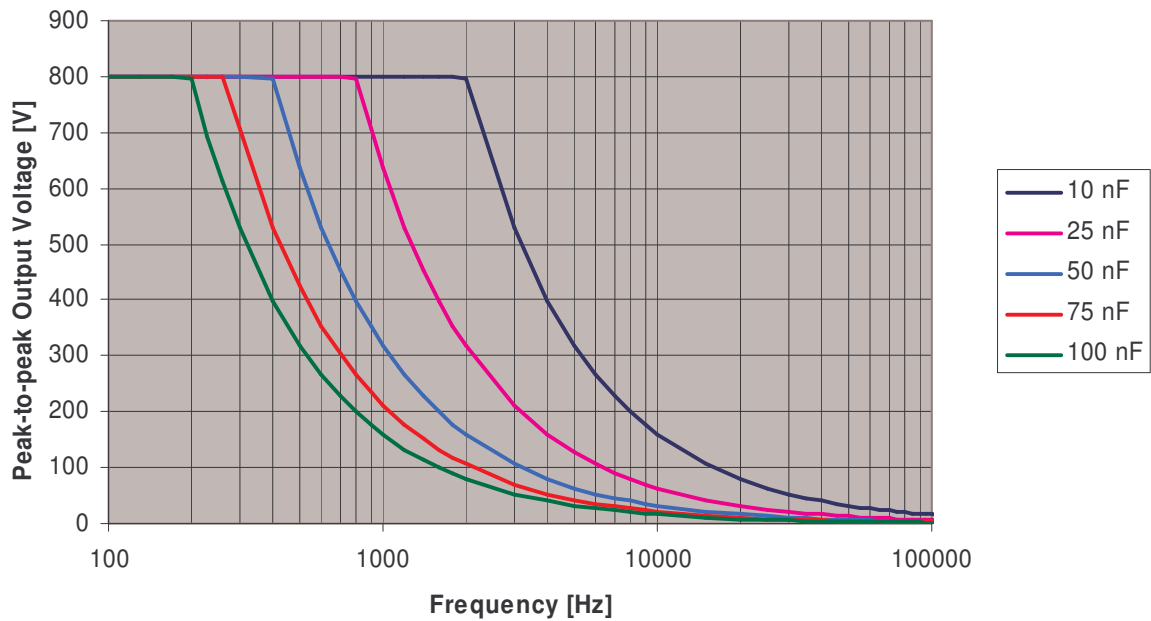
## T-700-H Frequency performance

### T-700-H bandwidth as a function of load capacitance at maximum output voltage



## T-700-H Output voltage

### T-700-H Output voltage vs. load capacitance



Specifications of this datasheet are subject to change without notice