



MODEL 753A

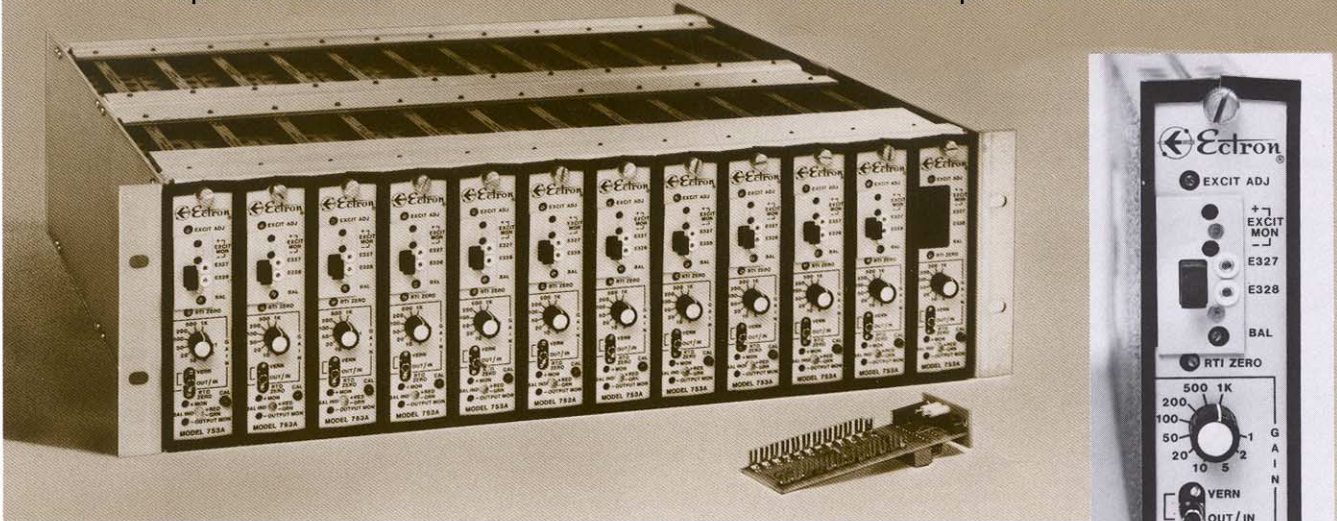
TRANSDUCER
CONDITIONING AMPLIFIER

Precision Differential Direct-coupled Amplifier

- 300 V common-mode voltage
- 140 kHz bandwidth
- 0.4 $\mu\text{V}/^\circ\text{C}$ stability, 0.005% linearity
- Five-pole filter
- Output-zero indicator

Versatile Transducer-signal Conditioner

- Isolated constant-voltage and -current excitations
- Front-panel plug-in conditioner assembly
- Ten-wire transducer input
- Remote-control single- and double-shunt CAL
- Twelve units per 5 $\frac{1}{4}$ -inch enclosure



The Ectron Model 753A transducer-signal-conditioning amplifier is an ac-line-powered plug-in unit containing a high-performance differential dc amplifier, active filter, traditional signal-conditioning functions, including transducer excitation, constant voltage or constant current, balance, and calibration with a front-panel plug-in conditioner subassembly.

Up to twelve Model 753A's mount in the Model E713 19-inch rack-mount enclosure, which has rear-panel connectors for all inputs, outputs, power, and control.

The Model 753A was specifically designed to accurately process low-level signals in electrically noisy environments.

The Model 753A combines a high-performance direct coupled wideband differential dc amplifier featuring high common-mode rejection, excellent linearity, stability, and low noise with an individually isolated, regulated, and adjustable constant-voltage and constant-current transducer excitation sources.

The amplifier provides ten fixed-gain steps from 1 to 1000 with a $\times 2.5$ vernier gain to provide complete gain coverage from 1 to 2500.

Amplifier output is ± 10 V at 10 mA with a bandwidth of dc to 140 kHz and includes a plug-in five-pole filter card for user selection of a lower bandwidth.

Common-mode rejection is 120 dB with an operating common-mode-voltage capability of ± 300 V dc or peak ac.

The Model 753A excitation supply and front-panel plug-in conditioner subassembly can accommodate almost any transducer signal source requiring current or voltage excitation, bridge completion, balance, and calibration. It accommodates one-, two-, and four-arm resistive bridge transducers as well as potentiometers and RTD's. A ten-wire input system is provided with terminals to facilitate wiring of inputs with fewer connections.

Bifurcated terminals are provided on the front-panel plug-in conditioner module for user-installed balance-limit and calibration resistors.

The Model 753A includes four remote-controlled solid-state switches whereby two isolated remote-control inputs allow the user to configure the calibration circuitry to obtain bipolar CAL or three steps of unipolar CAL, either with single- or double-shunt capability.

Front-panel monitor jacks are provided for amplifier output with visual displays to indicate polarity of input imbalance and whether in CAL mode.

Selection of constant-voltage or constant-current excitation and local or remote sensing is via the user-positioned plug jumpers. No soldering is required.

Each unit is self-contained with integral line power supply. Isolation from excitation common to power, rack, and output grounds or other Model 753A's is 10 G Ω minimum shunted by 1 pF maximum.

MODEL E713 ENCLOSURE

The Model E713 provides mounting for up to 12 model 753A's in 5 $\frac{1}{4}$ inches of vertical panel space in a standard 19-inch rack-mount enclosure and includes a rear-mounted connector panel for inputs, outputs, power, and control. The input connectors are PT02A-12-10S with mates provided. Output connectors are BNC.

Each Model 753A is mechanically secured. The frame of the enclosure is connected to power ground and is isolated from signal inputs and outputs. Maximum depth, including mating connectors is 22 inches.

MODEL 753A

TRANSDUCER CONDITIONING AMPLIFIER

Performance Limits:

The following specifications are the maximum deviation from the ideal permitted in this Ectron instrument.

INPUT CHARACTERISTICS

Configuration: Differential, direct coupled. May be used inverting, non-inverting differential or single ended. Input isolated from output and power.

Impedance: 50 M Ω minimum shunted by 200pF maximum.

Input Bias Current: ± 2 nA, ± 0.5 nA/ $^{\circ}$ C maximum.

Maximum Input Voltage: ± 50 volts minimum differential and ± 350 volts common mode without damage.

Common Mode Rejection: Minimum of 120dB, dc to 60Hz for gain of 1000 with up to 350 ohm source imbalance. At lower gains CMR exceeds 63dB plus gain in dB. CMR decrease does not exceed 6dB/octave from the specified value at 60Hz, up to 100KHz.

Common Mode Voltage: ± 300 volts dc or peak ac. (maximum operating)

Zero Adjustment: Recessed front panel controls are provided for input and output zero adjustment. Zero shift does not exceed ± 1 mV RTO when switching gain over full range.

Zero Stability: ± 5 μ V RTI, ± 0.5 mV RTO for 40 hours at constant temperature; ± 0.4 μ V/ $^{\circ}$ C RTI, ± 0.15 mV/ $^{\circ}$ C RTO maximum.

DYNAMIC RESPONSE

Bandwidth: dc to 140KHz minimum (- 3dB).

Filter: The amplifier includes a five pole (30dB/octave) Bessel filter with 3dB bandwidth from 1Hz to 50KHz set by a plug-in filter module (one included). From 50KHz to 100KHz response is two pole Bessel. (User to specify FCO.)

Settling Time: 25 μ s maximum to within ± 0.1 %.

Overload Recovery: 50 μ s maximum to within ± 0.1 % for a 10 times full scale input overload up to ± 10 volts.

Slew Rate: 3.1V/ μ s RTO, 1.5V/ μ s RTI minimum.

Noise (With 350 ohm Bridge, 100KHz Filter):
0.1Hz to 10Hz—1 μ V RTI plus 0.5mV RTO, peak.
0.1Hz to 10KHz—3 μ V RTI plus 0.3mV RTO, RMS.
0.1Hz to 100KHz—6 μ V RTI plus 0.6mV RTO, RMS.

ORDERING INFORMATION

Model 753A Amplifier	P/N 753-501-XX Extra Filter Card Assy (01 = 100kHz, 02 = 30kHz, 03 = 10kHz, 04 = 3kHz, 05 = 1kHz, 06 = 300Hz, 07 = 100Hz, 08 = 30Hz, 09 = 10Hz. Other FCO factory quote
Model E713 Enclosure	
Model 723 Single Unit Cable Assy.	
Model M-563 Single Unit Mount	P/N 753-502-01 Extra Bridge Completion Module
	P/N 753-701-01 Extra Blank Filter Card

Specifications subject to change without notice

OUTPUT CHARACTERISTICS

Output: ± 10 volts at 10mA. Protected against damage from continuous short, stable with capacitive loads to .22 μ F.

Output Impedance: 0.1 ohm in series with 5 μ h maximum.

Isolation: Less than 100 nA RMS leakage to power or rack ground at 60Hz.

Monitor: Output monitor jacks are provided on the front panel.

Gain Range: Ten switch selectable calibrated steps, 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1,000 with a continuously variable vernier providing a 10% overlap of steps. A front panel switch selects calibrated or variable gain.

Gain Accuracy: Better than ± 0.1 % minimum.

Gain Linearity: Better than ± 0.005 % minimum.

Gain Stability: Better than ± 0.01 % for six months, ± 0.004 %/ $^{\circ}$ C.

EXCITATION SUPPLY

Selectable, Constant Voltage or Constant Current

CONSTANT VOLTAGE EXCITATION

Output Range: 0.1 to 18 volts continuously adjustable with 5mV resolution. Output voltage limited to 25 volts maximum.

Output Current: 0 to 100mA minimum regulated, with short circuit limited to 140mA.

Regulation: ± 0.01 % or ± 200 μ V maximum for a ± 10 % line change, or no load to full load.

Noise: Less than 200 μ V plus 0.001% peak-to-peak from 0.1Hz to 20KHz.

Stability: ± 0.01 % or ± 200 μ V for eight hours. Temperature coefficient is less than ± 0.005 % or ± 100 μ V/ $^{\circ}$ C.

Response: Less than 20 μ s to ± 1 % for no load to full load change.

Remote Sensing: Sense current is less than 10 μ A. The excitation source reverts to local sensing when the input sense leads are open to prevent transducer damage.

Monitor: Monitor jacks are provided to measure excitation voltage.



CONSTANT CURRENT EXCITATION

Output: 1mA to 100mA continuously adjustable with 0.05mA resolution.

Compliance Voltage: 0.1 to 16 volts minimum, limited to 25 volts maximum.

Regulation: ± 0.01 % or ± 0.1 μ A maximum for ± 10 % line change.

Output Impedance: 1 M Ω minimum in parallel with 300 pF maximum.

Noise: Less than 1 μ A, ± 5 μ V peak-to-peak from 0.1Hz to 20KHz.

Stability: ± 0.01 % or ± 2 μ A minimum for eight hours. Temperature coefficient is less than ± 0.005 % or ± 1 μ A/ $^{\circ}$ C.

Response: Less than 50 μ s to ± 0.1 % for 10% load changes.

Monitor: Monitor jacks measure the voltage drop across a precision 10 ohm resistor in series with the excitation source.

BRIDGE CONDITIONING

10 Wire Input: +, - excitation, +, - remote sense, signal (2), Cal (4) plus guard shield. Enclosure provides effective 10-wire operation using 9 wires.

Calibration: Can be configured for bipolar or 3 step unipolar Cal with single or double shunt operation using up to 4 Cal resistors.

Cal Switches: MOS FET switches with 0.8 ohms "ON" resistance provide fast reliable operation. Remote controls are optically isolated.

Bridge Completion: Terminals for 1/4, 1/2 and full bridge circuits.

Bridge Balance: 20 turn pot with terminals for balance limit resistor.

POWER, ENVIRONMENT, DIMENSIONS

Power: 120 or 240 Vac +5% - 15%, 50 to 400Hz; 50mA nominal at 120V, no load.

Environment

Temperature: 0 to 55 $^{\circ}$ C, operating
Humidity: Up to 95% without condensation
Shock: 5g vertical, 2g horizontal

Dimensions

Model 753A: 133mm (5 1/4") H, 38mm (1 1/2") W, 425mm (16 3/4") D

Model E713: 133mm (5 1/4") H, 483mm (19") W, 451mm (17 3/4") D

Unless otherwise noted, all specifications apply at 25 $^{\circ}$ C after 30 minutes warm-up with 0 to 350 ohms source resistance in any imbalance. RTI is Referred to Input. RTO is Referred to Output.



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