

**MODEL 350**ENVIRONMENTAL AMPLIFIER/
SIGNAL CONDITIONER

- 20 Megohm Input Impedance
- dc to 20 kHz Bandwidth
- Variable Excitation
- X1 to X2500 Gain
- Differential Input
- 12 or 28 V dc Powered
- 100 g Shock
- EMI/RFI Protection



Model 350



Model 351



Model 352

DESCRIPTION

The Ectron 350 Series Amplifier/Signal Conditioners are small environmental differential dc amplifiers with built-in variable voltage bridge excitation supply. Three models comprise the 350 Series, differing only in physical size and mounting configuration. With an input impedance of 20 Megohm and bandwidth of 20 kHz, they are designed for use with a wide variety of external transducers including piezo-resistive type strain gages. The dense packaging, encapsulated construction and advanced design result in a finished product which can produce highly accurate data under the most severe conditions.

All models are complete with a full set of front panel operating controls including selectable gain steps of 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000 with a X2.5 vernier gain which may be switched in or out. Also included are output zero, bridge balance and adjustable excitation voltage controls.

Protection against electromagnetic interference (EMI) and radio frequency interference (RFI) is obtained through the use of a steel case and filters on all input, output, excitation and power leads.

APPLICATIONS

The 350 Series is particularly adapted to airborne or other vehicle applications, where their small size and +12 V or +28 V dc power operation is desired.

The Model 350 is designed for rack or cabinet mounting when multiple units are required in a restricted area. The Model 351 includes four mounting studs to attach the unit to a mounting plate. When so mounted it is the most rugged of the three models.

The Model 352 is interchangeable with the Model 418 and 428, and is designed to operate in any of the standard 400 or 4000 Series enclosures.

SPECIAL MODIFICATIONS

Ectron has incorporated in the 350 Series the most desirable operating characteristics. While their small size and dense packaging prohibit large scale modifications, custom versions of the 350 Series involving variations in specifications are possible. Please consult the factory for additional information and added costs.

MODEL 350

ENVIRONMENTAL AMPLIFIER/
SIGNAL CONDITIONER



SPECIFICATIONS

Unless otherwise noted, all specifications apply at 25°C after 30 minutes warm up with 0 to 1000 Ω source resistance in any unbalance. RTI is referred-to-input, and RTO is referred-to-output.

INPUT CHARACTERISTICS

Configuration: True differential. May be used inverting, non-inverting, or single ended. No ground-return path required.

Input Impedance: 20 M Ω shunted with 50 pF.

Maximum Source Current: 30 nA at 25°C, ± 1.0 nA/°C.

Zero Stability: ± 1 μ V/°C RTI ± 150 μ V/°C RTO.
 ± 6 μ V/°C RTI ± 300 μ V/°C RTO for 90 days.

Common-mode Rejection:

Dc to 60 Hz with 100-W unbalance: 50 dB plus gain in dB.
Common-mode Voltage (Operating): ± 10 V dc or peak ac (sum of signal and cmv).

MAXIMUM SAFE OVERLOAD CONDITIONS

Common-mode Voltage: ± 50 V dc or peak ac.

Differential Input Voltage: ± 50 V dc or peak ac.

OUTPUT CHARACTERISTICS

Output Impedance: 0.5 Ω , dc to 20 kHz.

Output Capability: 10 mA at ± 10 V.

Short-circuit Safe: 25 mA nominal.

Zero Control: ± 300 mV RTO.

Linearity: Within 0.01% of best straight line.

GAIN

Selectable: $\times 1$ to $\times 2500$ continuous using a 1-2-5-10 step switch and a 1-10-100 multiplier plus vernier.

Vernier: $\times 1$ to $\times 2.5$ of step gain.

Accuracy: $\pm 0.1\%$ with vernier gain out.

Temperature Coefficient: $\pm 0.005\%$ /°C.

Stability: 0.01% for 90 days.

DYNAMIC CHARACTERISTICS

Frequency Response (Full Signal):

Dc to 20 kHz ± 3 dB. Higher frequencies attenuated by third-order Bessel filter.

With Pins 11 and 12 connected together, a 10-Hz output filter (-3 dB ± 1 dB) is actuated.

Noise: 0.1 to 10 Hz 1 μ V RTI + 100 μ V RTO peak.
10 Hz to 20 kHz 2 μ V RTI + 150 μ V RTO rms.

Capacitance Loading: Stable to 0.1 μ F.

EXCITATION POWER SUPPLY

Voltage (Front-panel adjustable):

5 to 15 V dc with +28-V power (Option X).

3 to 9 V dc with +12-V power (Option Y).

Line Regulation: $\pm 0.05\%$ for 5% line variation.

Load Regulation: $\pm 0.05\%$, no load to full load.

Temperature Coefficient: $\pm 0.005\%$ /°C.

Current: 50 mA.

Short-circuit Safe: 60 mA nominal.

Noise: 200 μ V rms (10 Hz to 20 kHz)

POWER

Protection: Reverse-polarity protected.

Voltage 12 V (Option Y): +12 V (10.5 to 15 V).

Overvoltage Protection: 50 V < 50 ms, 26 V < 1 minute.

Current: 75 mA + Excitation load, nominal.

Voltage 28 V (Option X): +28 V (24 V to 32 V).

Overvoltage: 50 V < 1 m.

Current: 50 mA + excitation load, nominal.

CONTROLS

Gain: Toggle: three-position multiplier of 1, 10, and 100.

Rotary: four-position multiplier of 1, 2, 5, and 10.

Vernier Gain: $\times 1$ to $\times 2.5$ (Twenty-turn potentiometer)

Vernier-gain Switch: IN/OUT.

Zero: ± 300 mV RTO.

Bridge Balance: 10-k Ω vernier (Twenty-turn potentiometer)
Balance-limit resistor not supplied.

Excitation: Twenty-turn potentiometer.

DIMENSIONS

Model 350

1.125" (28.6 mm) W, 2.375" (60.3 mm) H, 2.375" (60.3 mm) L.

Model 351

2.0" (50.8 mm) W, 1.125" (28.6 mm) H, 2.275" (57.8 mm) L.

Model 352

1.125" (28.6 mm) W, 2.375" (60.3 mm) H, 4.09" (103.8 mm) L.

WEIGHT

Models 350 and 351: 6.1 oz (173 g) nominal.

Model 352: 9.0 oz (255 g) nominal.

CONNECTOR

Fifteen-pin "D" subminiature (DA-15S, DAM-15S, etc.).

ENVIRONMENT

Emi/rfi: Filtering, all leads

Storage Temperature: -60°C to +125°C.

Operating Temperature: -25°C to +71°C.

Relative Humidity: 100% per MIL-E-5272C.

Altitude: No limit with suitable heat sink.

Static Acceleration: 100 g.

Shock (6-ms sawtooth): 100 g.

Vibration (5 to 55 Hz): 0.12" DA.

Vibration (55 Hz to 2 kHz): 20 g.

ORDERING INFORMATION

Model 350 Amplifier/Conditioner

Model 351 Amplifier/Conditioner

Model 352 Amplifier/Conditioner

Supply Voltage Option (Specify One)

X: Operates from 24 to 32 V dc

Y: Operates from 10.5 to 15 V dc

F.O.B. San Diego, CA
Delivery 60 Days ARO

NOTE: RTI is Referred to Input, RTO is Referred to Output.

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Specifications subject to change without notice.

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