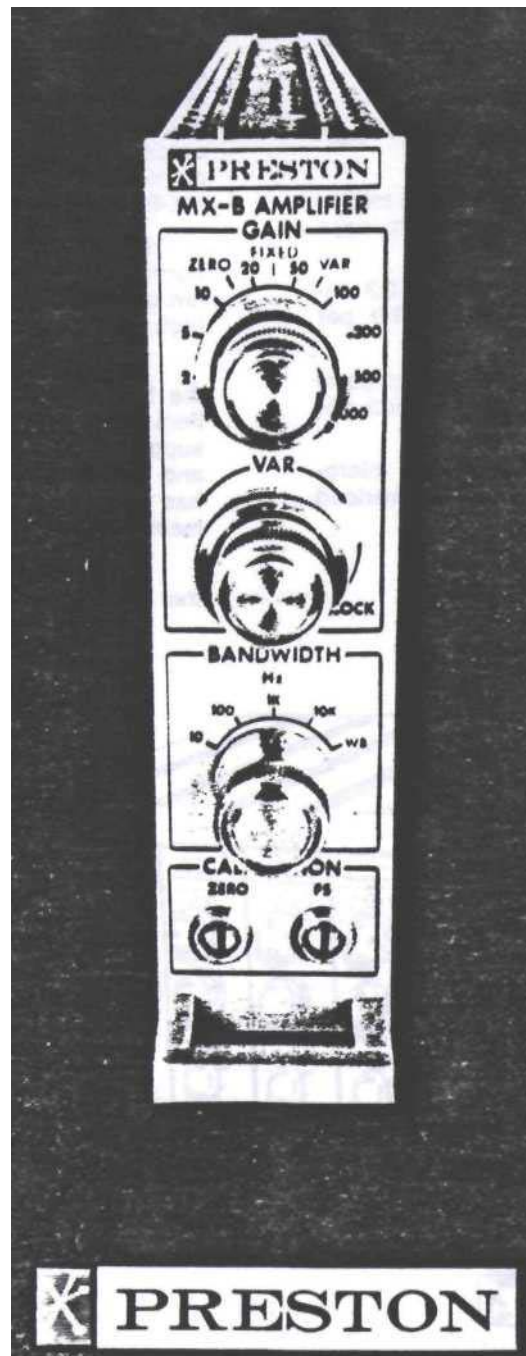


MX Series Instrumentation Amplifiers



MX Series Instrumentation Amplifiers

Where 'big' amplifier performance is required in the new, lower-cost 'compact' size, Preston's MX Series Instrumentation Amplifiers are the answer!

All of the "Balanced Precision" features of Preston's famous 8300 XW8 Series are now available in the new MX Series, including —

- Common Mode Rejection — 150 dB at DC and 120 dB at 60 Hz.
- Common Mode Voltage — 350 volts peak AC or DC.
- Temperature Stability —
Gain Temperature Stability is better than 0.002% per degree C.
Zero Temperature Stability of only 3.5 microvolts RTI and ± 1 millivolt RTO for thirty days at the same temperature.
Zero Temperature Coefficient is only 0.3 microvolts RTI and ± 0.1 millivolts RTO per degree Centigrade.
- Pumpout Current is less than 200 picoamps at 25°C and changes less than 10 picoamps per °C.
- Overload recovery is a super-fast 60 microseconds to within $\pm 0.05\%$ from an overload five times full scale.

Preston's Model MX-B Amplifier has a full set of front-panel controls too, with —

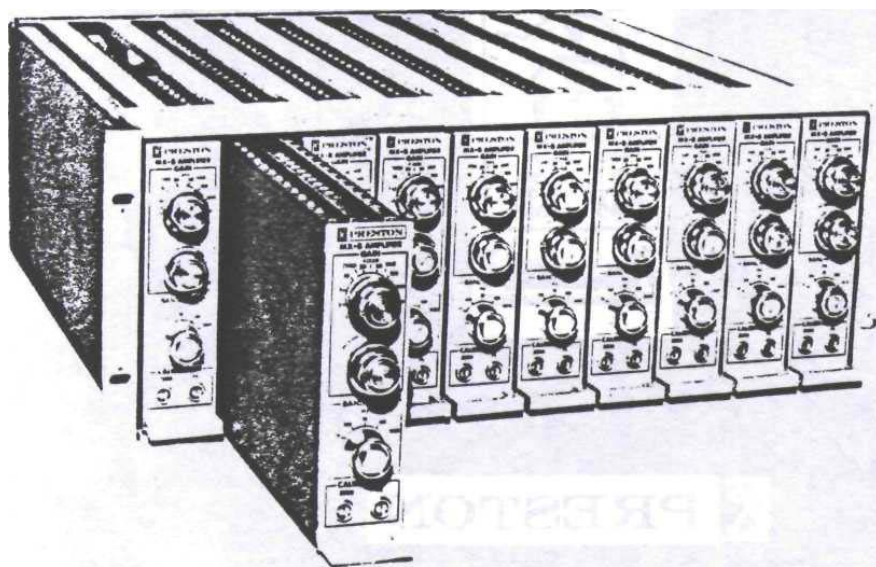
- 10 Gain Settings from 1 to 1000.
- Continuous gain control to a maximum gain of 2500.
- Five bandwidth settings for DC-to-3dB bandwidths from 10 Hz to 50 kHz.

These performance and operational features make the MX-B Amplifiers the right choice for the most demanding applications. Real-time process control systems, scientific data acquisition systems, multi-channel analog data recorders, strip-chart or galvanometer recorders— virtually every requirement for high performance analog signal amplification can be met by the MX-B Amplifiers.

MX Series Amplifiers also save over 60% of the normal amplifier's front-panel space requirements, and ten of these new amplifiers can be installed in a 7 inch high, 19 inch wide RETMA rack.

Take a good look at the detailed specifications on the following pages. You'll find the MX Series Amplifiers complete with everything from a built-in AC power supply to front-panel gain and zero trim adjustments, and they're built with the same quality and care that has made Preston the leader in high reliability instrumentation amplifiers.

For complete price and delivery information on the MX Series Amplifiers and on the many optional features that can be Included, contact Preston Scientific. We'll put all our years of amplifier experience on the line for you.



Input Characteristics

Input Impedance: 100 Megohms minimum shunted by less than .001 microfarads (or all gains at DC.

Input Connections: Input connection is three wires: Input High, Input Low and Guard.

Source Characteristics: All specifications will be met with 0 to 1000 ohms source impedance. Length of Input leads will not affect the operation of the amplifier. Source may be floating or grounded through any impedance.

Common Mode Rejection: Minimum CMR levels at various frequencies of common mode voltages are —

CMV Frequency	CMV Rejection
DC	150 dB
60 Hz	120 dB
400 Hz	110 dB
10 kHz	60 dB

Common Mode Voltage: Maximum CMV is 350 volts peak AC or DC.

Pumpout Current: 100 picoamps nominal. 200 picoamps maximum at +25 °C. The pumpout current will change less than 10 picoamps per degree Centigrade.

Input Overload Recovery: The amplifier will recover from an overload of five times full scale to within $\pm 0.05\% \pm 10$ microvolts in 60 microseconds maximum. Recovery time of the amplifier increases proportionately as the bandwidth decreases (i.e. at 1 kHz, recovery time is 2 milliseconds). A 30 volt normal mode overload will not permanently damage the amplifier.

Gain Characteristics

Gain Selection: Fixed gains of OFF, 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000 may be selected by front panel switches. Variable gain feature permits selection of any gain steps up to a maximum gain of 2500.

Gain Accuracy: Accuracy of fixed gains 0.01% —3 microvolts RTI.

Gain Stability: 0.01% full scale for six months at the same temperature.

Gain Temperature Coefficient: 0.002% per degree Centigrade.

DC Linearity: =0.01% full scale ± 3 microvolts RTI.

Gain Trim: Front panel recessed, gain trim provided to adjust any fixed gain to within 0.01%; resolution 0.005% or better.

Zero Characteristics

Zero Stability: ± 5 microvolts RTI, ± 1 millivolt RTO for thirty days at the same temperature.

Zero Temperature Coefficient: 0.3 microvolts RTI ± 0.1 millivolts RTO per degree Centigrade.

Chopper Intermodulation: Less than 0.01% RTO.

Zero Trim: Front panel recessed zero trim provides adjustment of output with resolution of 0.1 millivolts.

Output Characteristics

Output: Amplifier output is continuous ± 10 volts at 100 milliamps.

Output Impedance: Less than 0.5 ohms at DC measured at the output connector of the amplifier.

Capacity Loading: Capacitive loads up to 0.22 microfarads will not cause instability.

Short-Circuit Protection: Amplifier output may be shorted indefinitely without damage.

Frequency Characteristics

Bandwidth: Less than 3 dB down at 80 kHz for all gains at 10 volts peak-to-peak.

Settling Time: 60 microseconds maximum to within 0.01% of final value ± 10 microvolts RTI at 60 kHz bandwidth. Settling time of the amplifier increases proportionately as the bandwidth decreases (i.e., at 1 kHz settling time is 2 milliseconds).

Output niter

The MX-B Series Amplifier provides a manually switched active filter (*). The filter has a two-pole critically damped response with switch selectable cut-off frequencies to reduce the amplifier output bandwidth from 80 kHz to as low as 10 kHz. Roll-off beyond the -3 dB point is 12 dB per octave.

Filter Accuracy: Within $\pm 10\%$ of the 3 dB point. Bandwidth will be constant with gain change.

Noise

Output Noise: Less than 1.0 millivolts peak-to-peak, typically 0.5 millivolts peak-to-peak. (Noise referred to Input with 2-pole filter.)

Amplifier Bandwidth	Typical Noise peak-to-peak $\mu\text{V RTI}$	Max. Noise peak-to-peak $\mu\text{V RTI}$	Max. Noise RMS $\mu\text{V RTI}$
W.B. (80 kHz)	50	60	18
10 kHz	17	20	6
1 kHz	6	10	3
100 Hz	4	5	2
10 Hz	3	4	1

Noise specifications assume a 1 kohm source impedance and a measurement bandwidth of 300 kHz.

(* Four filter positions and wideband as noted.)

Power Requirements

All operation and performance specifications apply for line power of 105 to 130 volts RMS, (or 205 to 235 volts RMS) 50 to 400 Hz.

Step transients of 5% within the voltage range will not affect the amplifier. Each amplifier has an internal DC power supply capable of operation from either 115 volts or 220 volts, 50 to 60 Hz.

Internal Jumpers permit voltage selection.

Mechanical Specifications

Physical Size: Ten amplifier modules mount in a standard 19-inch relay rack, occupying 7 Inch panel height and 19 inches maximum depth.

Environmental Specifications

Operating Temperature: Amplifiers will meet all specifications when operating between 0 °C and 50 °C.

Storage Temperature: -20 °C to +65 °C.

Humidity: To 95% relative.

Vibration: 1g or 0.1 inch double displacement, whichever is the limiting factor, over the range from 5 to 50 Hz.

Pressure: Sea level to 12,000 feet.

Special Performance Amplifier Options

All MX Series Amplifiers:

- Option 5A: Dual Output
- Option 6A: Binary Gain Steps
- Option 8: 110 volt Input Overload Protection

Modal MX-E Amplifier: Single Gain and Bandwidth. Provides the same specifications as the standard MX Series, but front panel gain and bandwidth controls have been eliminated. Customer may specify any one fixed gain between 1 and 2000 and one fixed bandwidth of 1 Hz up to wideband.

