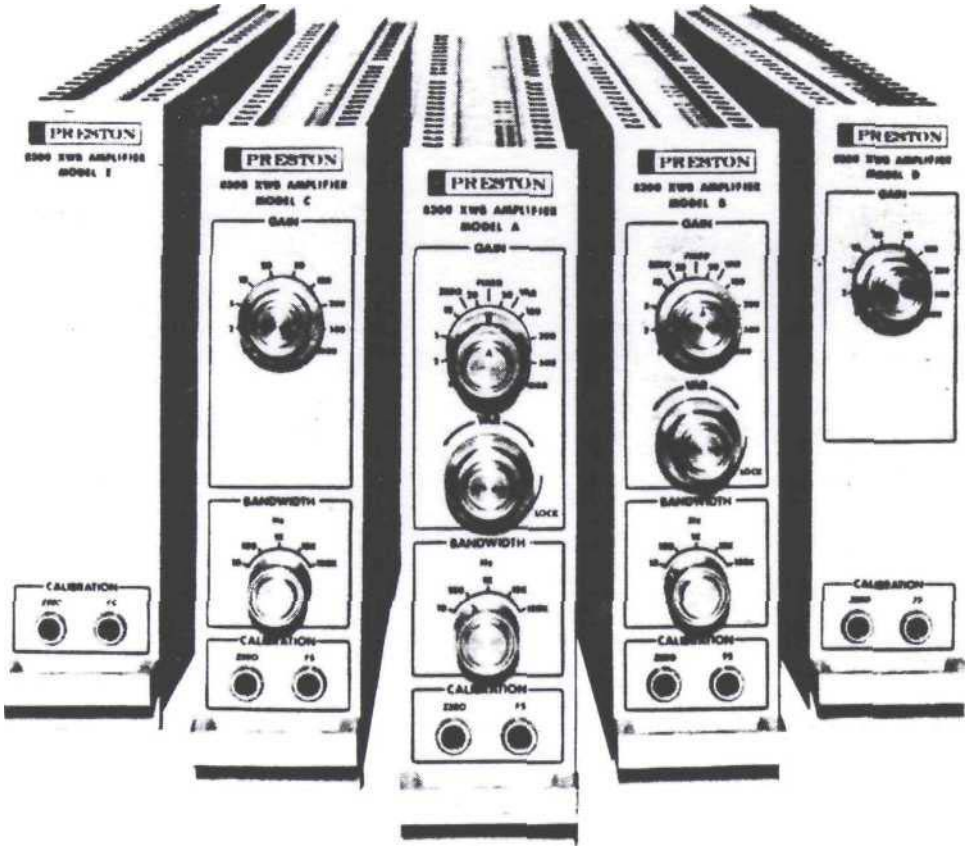
8300 XWB SERIES

Floating Differential Amplifiers



These amplifiers feature:

- Linearity ±0.005%
- Drift 0.1 *fiV* per °C
- Common mode voltage 350V
- Accuracy ±0.01%
- Settling time 30 *psec*
- Common mode rejections 130 db @ 60 Hz
- Bandwidth 100 kHz
- Short circuit proof
- Self contained power supply

We turn the key... from A to D

8300 XWB DESCRIPTION & APPLICATIONS

The 8300 XWB Series Amplifier is a DC to 100 kHz, floating differential, low level, instrumentation amplifier which provides infinite isolation between the input and output circuits. Most XWB Models include switch-selectable gains from 1 to 1000 (up to 2500 with vernier gain control), switch-selectable full power bandwidths from 10 Hz to 100 kHz (—3 db points) and full scale output of ^=10 volts at 100 milliamps. In addition, all XWB Series Amplifiers offer a unique combination of features including 150 db common mode rejection (at all gain ranges), less than 3 microvolts of noise RTI and drift as low as 0.1 microvolts per degree C RTI or less than 1 millivolt for 50 degrees C RTO. XWB Series Amplifiers will meet all performance specification* for signals having o common mode voltage up to 350 volts peak AC or DC. The XWB Series Amplifier is assembled in a rack mountable "heavy duty" aluminum chassis using high reliability input/output connectors with an integral DC power supply capable of operation from either 115 volts or 220 volts 50 Hz to 60 Hz.

The 8300 XWB Series Amplifier offers unique combinations of capabilities and specifications, making ft the most versatile amplifier for your most demanding instrumentation application. Any one model may be used in a wide variety of applications including low level signal conditioning requirements in noisy and high CMV environments; high gain or low gain isolation buffer amplifier for real time process control applications; pre-amplifier for digital voltmeters, data recorders, or Analog-to-Digital Converter*,- driver amplifier for strip chart recorders, pen drives and oscillograph galvo's. The amplifier features extremely low drift, very low noise, high accuracy, and wide dynamic range (DC to 100 kHz) common mode rejection, while offering very fast overload recovery and on-scale settling times. The 8300 XWB is an outstanding DC Amplifier which meets our customers growing needs far a superior instrumentation amplifier.

COMMON specifications MODELS A, B, C, D, E

GAIN STABILITY ..... 0.01% (six-month term)

SETTLING TIME (TO ±0.01% FULL SCALE) ..... 100 kHz ... 30 µsec
10 kH… …250 µset
1 kHz ... 2.5 msec
100 Hz ... 25 msec
10 Hz ...250 msec

SLEWING RATE ..... 3 volts per µsec

COMMON MODE REJECTION ..... CMR ratio versus frequency is specified as follows, with an unbalance of 1000 ohms. ..
150 db at DC min; 130 db at 60 Hz min
110dbat400Hz min; 115 db at 400 Hz typ
65dbat 10kHz typ

PLJMPOUT CURRENT ..... Less than 0.2 namps @ 25°C and less than 0.01 namps/°C

COMMON MODE VOLTAGE ..... 350 volts maximum at peak AC/DC

CHOPPER 1NTERMODULATION ..... Lest than 0.01%

INPUT NOISE (measurement bandwidth 300 kHz) ..... 100 kHz ... Less than 3 µvolts RMS
10 kHz ... 10 µvolts P-P (1 µvolts RMS)
1 kHz ... 5 µvolts P-P
100 Hz ... 3 µvolts P-P
10 Hz ... 2 µvolts P-P

LONG TERM ZERO DRIFT ..... ±5 µvolts RTI ±1 m volt RTO at ±10% line voltage (six-month term)

INPUT IMPEDANCE ..... 100 Mohm shunted by less than 0.001 µfarad for all gains at DC

OUTPUT NOISE ..... Lest than 0.5 m volts peak for 100 kHz at a measured bandwidth of 300 kHz

OVERLOAD RECOVERY ..... 30 µsec to within 0.01% of overload signal RTI, up to ±20 volts

OUTPUT CAPABILITY ..... 100 m amps at ±5 volts or ±10 volts full scale; capacity loads to 0.22 µfarads will not cause instability

OUTPUT IMPEDANCE ..... 0.5 ohm max

POWER ..... 115 or 220 volts ±10%, 50 to 60 Hz

AMPLIFIER PROTECTION .... The output is unconditionally short-circuit proof

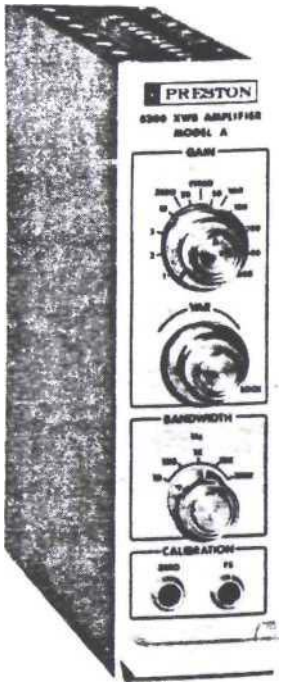
OPERATING TEMPERATURE ..... 0° to +50°C

DIMENSIONS ..... 20.375 inches long (including connectors), 2.12 inches wide and 8.25 inches high

WEIGHT ..... 8.5 pounds (shipping weight is 10.5 pounds)

AMPLIFIER technical specifications

MODEL A



ELECTRICAL

GAIN ..... Ten fixed steps of 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000; variable between each itep up to gain of 2500. Bandwidth for gains above 1000 limited to 40 kHz

GAIN ACCURACY ..... ±0.01% ±3 µvolts RTI

GAIN LINEARITY ..... ±0.005%

GAIN TEMPERATURE COEFFICIENT ..... 10 ppm per degree C maximum

BANDWIDTH ..... Switch-selectable ... 10,100, 1 kHz, 10 kHz and 100 kHz. Filter is a two-pole critically damped response with 12 db per octave roll-off.

DRIFT ..... 0.1 µvolts per degree C RTI ±20 µvolts per degree RTO

FRONT PANEL CONTROLS

FUNCTION SWITCH ..... A three-posit ion rotary switch for selection of either fixed or variable gain modes or zero (shorted input)

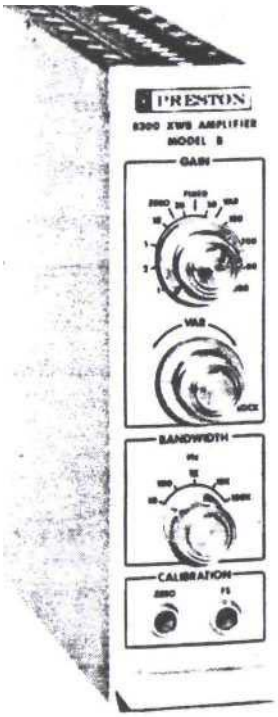
GAIN 5WITCH ..... A ten-position rotary switch for selection of fixed gains

VARIABLE GAIN ..... A ten-turn potentiometer with locking de vice for selection of any gain from 1 to 2500

BANDWIDTH SWITCH ..... A five-position rotary switch for selection of desired bandwidth

CALIBRATION ..... Screw-driver controls for zero and unity gain

MODEL B



ELECTRICAL

GAIN ..... Ten fixed steps of 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000; variable between each step up to gain of 2500. Bandwidth for gains above 1000 limited to 40 kHz

GAIN ACCURACY ..... ±0.01% ±3 µvolts RTI

GAIN LINEARITY ..... ±0.01%

GAIN TEMPERATURE COEFFICIENT ..... 20 ppm per degree C maximum

BANDWIDTH ..... Switch-select able ... 10,100, 1 kHz, 10 kHz and 100 kHz. Filter is a two-pole critically damped response with 12 db per octave roll-off.

DRIFT ..... 0.3 µvolts per degree C RTI ±100 µvolts per degree C RTO

FRONT PANEL CONTROLS

FUNCTION SWITCH ..... A three-position rotary switch for selection of either fixed or variable gain modes or zero (shorted input)

GAIN SWITCH ..... A ten-position rotary switch for selection of fixed gains

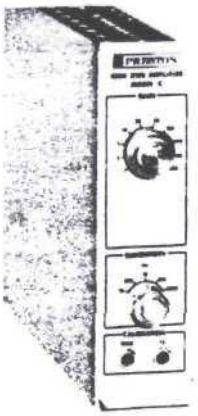
VARIABLE GAIN ..... A ten-turn potentiometer with locking de vice for selection of any gain from 1 to 2500

BANDWIDTH SWITCH ..... A five-position rotary switch for selection of desired bandwidth

CALIBRATION ..... Screw-driver controls for zero and unity gain

AMPLIFIER technical specifications

MODEL C



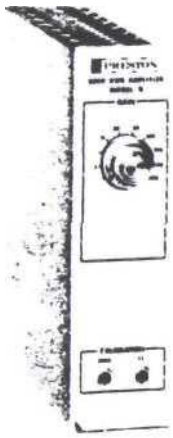
ELECTRICAL

GAIN ..... Ten fixed steps of 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000
GAIN ACCURACY ..... ±0.1% ±3 µvolts RTI
GAIN LINEARITY ..... ±0.01%
GAIN TEMPERATURE COEFFICIENT ..... 20 ppm per degree C maximum
BANDWIDTH ..... Switch-selectable ... 10, 100, 1 kHz, 10 kHz and 100 kHz. Filter is a two-pole critically damped response with 12 db per octave roll-off.
DRIFT ..... 0.3 µvolts per degree C RTI ±100 µvolts per degree C RTO

FRONT PANEL CONTROLS

GAIN SWITCH ..... A ten-position rotary switch for selection of fixed gains
BANDWIDTH SWITCH ..... A five-posit ion rotary switch for selection of desired bandwidth
CALIBRATION ..... Screw-driver controls for zero and unity gain

MODEL D



ELECTRICAL

GAIN ..... Ten fixed steps of 1, 2, 5, 10, 20, 50, 100, 200, 500 and 1000
GAIN ACCURACY ..... ±0.1% ±3 µvolts RTI
GAIN LINEARITY ..... ±0.01%
GAIN TEMPERATURE COEFFICIENT ..... 20 ppm per degree C maximum
BANDWIDTH* ..... Fixed 100 kHz (-3 db)
DRIFT. ..... 0.3 µvolts per degree C RTI ±100 µvolts per degree C RTO

FRONT PANEL CONTROLS

GAIN SWITCH ..... A ten-position rotary switch for selection of fixed gains
CALIBRATION ..... Screw-driver controls for zero and unity gain

'Customer may specify reduced bandwidth as low as 10 Hz at no additional charge

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MODEL E

ELECTRICAL

GAIN ..... Any one fixed gain between 1 and 2000
GAIN ACCURACY ..... ±0.01% ±3 ^volts RTI
GAIN LINEARITY ..... ±0.01%
GAIN TEMPERATURE COEFFICIENT ..... 10 ppm per degree C maximum
BANDWIDTH* ..... Fixed 100 kHz (-3 db)
DRIFT ..... 0.3 µvolts per degree C RTI ±100 µvolts per degree C RTO

FRONT PANEL CONTROLS

CALIBRATION ..... Screw-driver controls for zero and unity gain

'Customer may specify reduced bandwidth of low at 10 Hz at no additional charge

OPTIONS

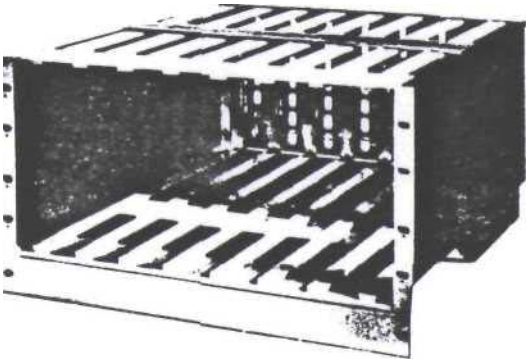
MODELS A, B, C

DUAL OUTPUTS .... Two independent outputs; one filtered ± 10 volts ± 50 mamps, one unfiltered ± 10 volts ± l00 mamps.

MULTIPLEXER SWITCH..... A solid state switch for multiplexing the filtered output. Requires external control logic which must be specified as either positive or negative true, 4 to 12 volts.

ACCESSORIES

MODEL 7600 RACK



TECHNICAL SPECIFICATIONS, MODEL 7600 AMPLIFIER MOUNTING RACK

MOUNTING CAPACITY: The Model 7600 Rack will mount up to eight Preston amplifiers vertically. Blank panels ore available for unused portions of the rack.

COOLING: The Model 7600 Rack is available either with or without three (3) 100 CFM muffin fans.

SIZE: The dimensions of the Model 7600 Rack are: 21.6 inches in length, including the rear connectors,- 19 inches in width; and 10.5 inches in height with cooling fans (8.75 inches without cooling fans).

WEIGHT: The Model 7600 Rack weighs 22 pounds (shipping weight is 45 pounds).

ELECTRICAL CONNECTORS: The input connector is an Amphenol No. 26-4201-8S; the output end power connector is an Amphenol No. 26-4201-165; and the AC power connector is an Amphenol No. 160-3.

MODEL 8020 RACK

TECHNICAL SPECIFICATIONS, MODEL 8020 AND MODEL 14500 AMPLIFIER MOUNTING RACKS

MOUNTING CAPACITY: The Model 8020 Rack will mount one Preston Amplifier horizontally. The Model 14500 Rack (not shown) will mount two Preston Amplifiers horizontally.

SIZE: The dimensions of a Model 8020 or Model 14500 Rack are: 21.6 inches in length, including the rear connectors; 19 inches in width; and 3.5 inches in height.

WEIGHT: The Model 8020 and Model 14500 Racks weigh 10 pounds each (shipping weight is 17 pounds each).

ELECTRICAL CONNECTORS: The input connector it an Amphenol No. 26-4201-85; the output and power connector is an Amphenol No. 26-4201-165. The Models 8020 and 14500 Racks are supplied with factory-wired AC power cords.

INSTRUMENTATION SYSTEM AMPLIFIERS

Programmable Gain and Bandwidth.

The Model "A" and "B" versions of the 6300 XWB Series Amplifiers are now available with programmable gain and bandwidth. These remotely controlled amplifiers identified by Model 8300 XWBRC—A and B are ideal for use in instrumentation systems where gain and bandwidth must be rapidly changed to optimize signal amplitude for digitizing purposes and to reduce the RTI noise level by controlling the bandwidth of the output signal.

As many as 10 gain levels between unity and a maximum gain of 2500 can be provided, and up to five different bandwidths in the range from 10 Hz to 100 kHz can also be included—all in the standard amplifier case.

Control of both gain and bandwidth can be accomplished by a 4 bit binary address at standard digital logic levels in fully automated and computer controlled instrumentation systems.

Options for System Interfacing.

Where system requirements include special performance features, Preston's instrumentation amplifiers can be delivered with a wide variety of options. For complete information, ask for our 'Amplifier Options' brochure.

1. Low Piss Filter —for 1 Hz cut-off frequency.
2. Four Pole Bessel Filter. Increases attenuation to 24 db/octave above cut-off frequency.
3. Dual and Triple Outputs.
4. Binary Gain Steps. 11 gain steps from 1 to 1024.
5. Output Coding. Electrical output signals that indicate gain and bandwidth settings.
6. Calibrate Relay. Internal relay switches to 'standard voltage for system calibration.
7. 110 Volt Overload Protection on Input Signal Lines.
8. Multiplexer Switch. External logic signal switches on internal multiplexer circuits for sampling by ADC or digital voltmeter.

ADDITIONAL PRESTON AMPLIFIERS

DX Series —Model A

Developed to deliver high accuracy, the specifications for these compact instrumentation amplifiers include —

6 Selectable bandwidth	1 Hz, 10 Hz. 100 Hz, 1 kHz, and 10 kHz wide band.
7 Selectable Gains	10, 20, SO, 100. 200, 500 and 1000, plus variable gain.
Gain Accuracy	0.05%
Gain Linearity	0.005%
Settling Time	50 microseconds to within 0.01%.
Pumpout Current	Less than 1 nanoamp @ 25 ºC Less than 10 nanoamps @ 50 ºC
Common Mode Rejection	130 db @ DC, 108 db @ 60 Hz (@ K=1000)
Common Mode Voltage	10 volts peak.
Input Impedance	10 Megohms.
Input Noise (1 σ)	less than 3 microvolts @ 60kHz 2 microvolts @ 100 Hz.
Output Noise (1 σ)	Less than 200 microvolts.
Output Level	±5 or ±10 volts full scale at 100 milliamps max.
Size	1.64" wide, 6.4" high, 15.8" long

MX Serial — Model B

Now you can get all of Preston's "Balanced Precision" performance in the new 'compact' size!

Complete with five selectable bandwidths, 10 front-panel gain settings with variable gain from 1 to 2500, Common Mode Rejection above 120 db from DC to 60 Hz, Common Mode Voltage of 350 volts peak, ½ nanoamp pumpout current —and many other performance specifications found only in Preston's 8300 XWB Series — the new MX Series Model "B" is ideal for every application that requires the ultimate in performance.

THE 8300AU

The new 8300AU, a programmable amplifier system, offers unique combinations of capabilities and specifications, making it the most versatile amplifier for your most demanding instrumentation application. Via RS232 or IEEE488 interface, your computer can control all modes of calibration, gain, and filter selection. The system can also be controlled from the front panel of the 8300AU Master Control Unit.

Requiring less than 60% of the panel space of our other models of comparable performance, the 8300AU system includes individual controls for 12 switchable gain settings from 1 to 2048 with an optional continuous gain control up to a maximum gain of 3000, and eight switchable bandwidths from 1 Hz to a maximum bandwidth of 100KHz. The first seven bandwidth positions provide a 4-pole Butterworth (or Bessel) response filter.

Also plug-in mode cards are available for strain gauge, thermocouple, and RTD sensors. Additionally, a signal conditioning power supply is available with remote sensing. Calibration modes include shunt-resistance, voltage-substitution plus the ability to switch the power supply connection to the input of the amplifier for monitoring purposes.

This system's remote programmability plus the abilities of the calibration modes represents a significant costs and time savings over other methods employing manual calibration and adjustment techniques.

SPECIFICATIONS

INPUT

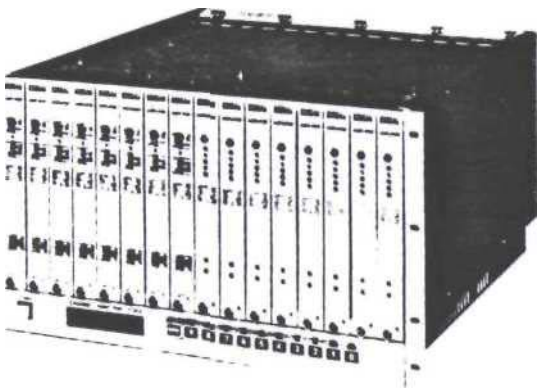
Impedance:	100 megohm minimum shunted by 1500 PF maximum for all gains.
Connection:	3 wires-high, low and guard.
Source:	1k ohms maximum to meet spec.
System Common Mode Rejection:	130dB DC to 60Hz with up 1k unbalance.
System Common Mode Voltage:	350 volts peak AC or DC.
Bias Current:	1 nA at 25 degree C, plus/ minus 0.5nA per degree C.
Steps:	12 binary gain steps from 1 to 2048.
Accuracy:	0.1% (0.01% optional)
Linearity:	.01%
Stability:	0.01% for six months. 0.002 % for per Deg C.
Tempco.	

OUTPUT

Capability:	10 volts peak at 20 mA max.
Impedance:	Less than 1 Ohm,

Protection: The output is unconditionally short circuit proof.

Slew rate:	1.5 volts/usec
Bandwidth:	Less than 3dB down at 100kHz (10 volts peak to peak) Full power bandwidth 50kHz. (20 volts peak to peak)



For additional information on these Preston Amplifiers and other Preston products, please contact your local Preston representative.