

# COPLEY MODEL 231HC

# HIGH POWER AMPLIFIER CHARACTERISTICS

Specification typical @25°C/forced air @400 fpm, HV=+160V. Current mode load=1.0 mH+60 mΩ. Capacitor each side to grnd 0.47μF

	Current Mode						
Model	Output (±A Peak) Pulse Duration / Off time (ms)						
231HC	∞ (DC)	500/500	100/100	10/20	170/1000	25/1000	4/100
	70	85	90	100	100	125	125

<b>PEAK CURRENT SHUTDOWN</b>	130 A
<b>INPUT LIMITER</b> Current Mode	Adjustable ±15 to ±125 A
<b>SATURATION RESISTANCE</b>	0.05 Ω
<b>GAIN</b> Current Mode	Adjustable with programmable span 5.38 to 13.88A/V
<b>OUTPUT OFFSET</b> Current Mode Span	±25 mA, adjustable to zero 0.35 A
<b>INPUT CHARACTERISTICS</b> Main Input 1 Impedance Max Input Voltage Common Mode Rejection Input 2 Gain	Differential 50 kΩ each input to ground, 25kΩ differential ±18V either input or differential 70 dB min, from DC to 360 Hz Same as Input 1 Programmable
<b>DC OUTPUT RESISTANCE</b> Current Mode	2000 Ω
<b>LOAD</b> Current Mode Adaptable Range	1000 μH + 66 mΩ, 0.47 μF each side to ground 2 μH to 2.5 H, 0.012 Ω to Open
<b>CURRENT MODE RESPONSE</b> Small Signal Bandwidth	-3 dB @ 5 kHz
<b>CURRENT SETTLING TIME</b> Time Reference Input Ramp Slope Ramp 0 to ±100 A  Ramp ±100 A to 0 A	End of input ramp ±100 A/800 μsec 200 μsec to within 1.0 A, 1% 350 μsec to within 200 mA, 0.2% 200 μsec to within 1.0 A, 1% 350 μsec to within 200mA, 0.2%
<b>TOTAL HARMONIC DISTORTION</b> Current Mode Load	200 Hz, 60 A RMS, 0.2% max 1000 μH + 33 mΩ
<b>DC DRIFT</b> Current Mode Offset Self Heating Drift, 0 to ±60 A Scale Factor	After 1 hour 1 mA/°C 22 mA/10 minutes maximum 60 ppm/°C
<b>SWITCHING FREQUENCY</b> Synchronization	81 kHz Input or output

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## NOISE OUTPUT

Current Mode

10 Hz to 10 kHz 0.6 mA RMS  
10 Hz to 500 Hz 0.4 mA RMS

## RIPPLE NOISE OUTPUT

Each Side to Ground  
80 V Output, Differential  
Current, 0 V Output  
Current, 80 V Output

81 kHz  
2.5 V RMS max, same phase  
2.5 V RMS max  
0.4 mA /L RMS  
4 mA/L RMS  
where L = load inductance in mH

## DC POWER SUPPLY SENSITIVITY

Current Mode

0.4 mA/V max

## CURRENT MONITOR

Source Resistance

Front & rear D connectors  
±1 V/10 A ±1%

0.1 Ω

## VOLTAGE MONITOR

Source Resistance

Front & rear D connectors  
±1 V/20 V ±1%

940 Ω

## PROGRAMMING HEADER

Accessibility

Sets to Voltage or Current Modes or Fixed Output Resistance. In Current Mode sets gain and response for specific load

Rear panel D connector

## REMOTE SHUTDOWN

Switch closure enables output  
Selectable ENABLE or INHIBIT  
Grounded or optoisolated input  
Display Panel **Inhibit** switch must be off

## SWITCHES

(on optional display panel) **Inhibit**, with LED, front panel  
**Reset**, also on rear panel

## LOAD PROTECTION

Voltage or Current

Adjustable input limiter  
Soft Start

Shutdown

Current vs time  
All four bridge arms open  
To +HV and ground

Diode Clamps

## AMPLIFIER PROTECTION

Overload  
Current vs Time  
Each Heat Sink Temp  
Overvoltage Shutdown  
Undervoltage Shutdown

Input limiter  
Shutdown  
Shutdown 87 °C  
170 V  
40 V

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## 5 V CMOS STATUS OUTPUTS

+5V  
CHANNEL ON  
NORMAL  
FAULT  
DC  
HOT  
OVER-CURRENT  
MODULE 1  
Maximum Current Output

Fault is Low  
HV>20V  
Amplifier enabled and operating  
Amplifier operates if enabled  
Inverted normal  
One or more DC voltages out of range  
Heat sink over-temperature  
Too much current for too long  
Module 1 fault  
±10 mA

## SYNCHRONIZING I/O (81kHz)

Rear D connector

## REAR PANEL LED

NORMAL

## POWER REQUIREMENTS

High Voltage Supply  
Current  
Quiescent Current  
Internal Capacitance

+50 V to +160 V  
See Note 1  
0.35 A  
13000 μF

## THERMAL REQUIREMENTS

Power Dissipation at 60 A RMS  
Peak Dissipation at 85 A  
Forced Air 400fpm  
Storage

500 W  
1000 W  
-20 °C to +35 °C  
-30 °C to +85 °C

## MECHANICAL

Size  
Fins & Air Flow  
Weight

18.8" L x 9.44" H x 5.1" D  
Horizontal  
18lb, 8 kg