

OPS MODEL TABLE

MODEL	d-c OUTPUT RANGE		OUTPUT IMPEDANCE			
	VOLTS	AMPS	VOLTAGE MODE		CURRENT MODE *	
			SERIES R	SERIES L **	SHUNT R	SHUNT C ***
OPS GROUP IXB						
OPS 500B	0-500	0-0.04	2.2 ohms	100 mH	125 Mohms	0.04 μ F
OPS 1000B	0-1000	0-0.02	9.0 ohms	100 mH	250 Mohms	0.02 μ F
OPS 2000B	0-2000	0-0.01	34.0 ohms	100 mH	500 Mohms	0.01 μ F
OPS GROUP X						
OPS 3500	0-3500	0.01	0.5 ohm	0.1H	350 Mohms	3.3 x 10 ⁻⁹ F
OPS 5000	0-5000	0.005	1.6 ohms	0.1H	500 Mohms	1.6 x 10 ⁻⁹ F
<p>* Current mode using an external current sensing and feedback circuit. Impedance data based on a 10 Volt sample.</p> <p>** For determining dynamic impedance in voltage mode.</p> <p>*** For determining dynamic impedance in current mode.</p>						

OPS GENERAL SPECIFICATIONS

SPECIFICATION	CONDITION	RATING/DESCRIPTION
CONTROL		
Type	Voltage	Variable input, fixed gain
	Current	Differential comparison
Voltage	Local	Not available
	Remote analog	0 to 1mA
	Remote digital, 1000V max.	Use SN, SNR interface
Current	Local	Trimmer adjustment
	Remote	0 to 1V d-c
Dynamics	Fast mode only	See dynamics table
User amplifier	Uncommitted	One, for voltage control
References	Two provided	±6.2V, 1mA
Gain	Open loop d-c	1,000,000
MECHANICAL		
Input connection	OPS IXB	Detachable IEC type 3-wire *
	OPS X	Permanently wired *
Output connections	Front panel	Binding posts, OPS IXB only
	Rear panel	Barrier strip
Meters	—	None
Indicators	Pilot	Neon
Mounting (in std 19" racks)	OPS IXB	Use RA-24 Rack Adapter
	OPS X	Mounting "ears" provided
Cooling	Convection	Top surface
Dimensions (HxWxD)	OPS IXB size:	Inches: 5-7/32 x 8-11/32 x 12-7/8 mm: 132.6 x 211.9 x 327
	OPS X size:	Inches: 5-7/32 x 19 x 16-31/32 mm: 132.6 x 482.6 x 431
Finish: Fed Std 595	Front panel	Light gray, color 26440
Weight	Packed for shipment	OPS IXB: 19Lb (8.6kg) OPS X: 45Lb (20.4kg)
* Plug pattern #1		

OPS INPUT /OUTPUT CHARACTERISTICS

SPECIFICATION	CONDITION	RATING/DESCRIPTION
INPUT		
a-c voltage	User selectable	105-125, 210-250
Current	Max load, 115 Vac	0.75A
Frequency	Range	60Hz ± 3Hz
Time Delay	Turn-on	Approximately 30 seconds
OUTPUT		
d-c output	Series pass	Hybrid type
Type of stabilizer	Voltage stabilizer	Current limited
Voltage	Adjustment range for temp. 0-65°C	0 to 100% of rating
Current		0 to 100% of rating
Error Sense	Voltage allowance	0.5V per load
Isolation voltage	Output to ground	1000V d-c or peak
Leakage current, output to ground	rms at 115V a-c	<30 microamperes, OPS IXB
	p-p at 115V a-c	<300 microamperes, OPS IXB
	rms at 115V a-c	<50 microamperes, OPS X
	p-p at 115V a-c	<500 microamperes, OPS X
Series connection	Max voltage off grd.	1000V d-c or peak
Parallel connection	—	Not recommended
OVP	—	Not available

OPS DYNAMIC SPECIFICATIONS

	STABILIZATION MODE	OPS 500B	OPS 1000B	OPS 2000B	OPS 3500B	OPS 5000B
Bandwidth (d-c to f_{-3dB})	Voltage	800 Hz	400 Hz	200 Hz	230 Hz	160 Hz
	Current	320 Hz	160 Hz	80 Hz	130 Hz	100 Hz
Programming Time Constant	Voltage	200 μ sec ⁽¹⁾	400 μ sec ⁽¹⁾	800 μ sec ⁽¹⁾	700 μ sec ⁽²⁾	1 msec ⁽²⁾
	Current ⁽³⁾	500 μ sec	1 msec	2 msec	1.2 msec	1.6 msec
Large Signal Frequency Response	Voltage	320 Hz	160 Hz	80 Hz	135 Hz	100 Hz
Slewing Rate	Voltage	>1V/ μ sec	>1V/ μ sec	>1V/ μ sec	>3V/ μ sec	>3V/ μ sec
Transient Recovery	Voltage	<100 μ sec	<100 μ sec	<100 μ sec	<100 μ sec	<100 μ sec
	Current	500 μ sec	1 msec	2 msec	1.2 msec	1.6 msec

(1) Calculated for a feedback resistance of 1000 ohms per volt of output and a feedback capacitance of 400 pF. The range of capacitance available internally is 400 pF to 3900 pF.

(2) Calculated for a feedback resistance of 1000 ohms per volt of output and a feedback capacitance of 200 pF. The range of capacitance available internally is 200 pF to 1900 pF.

(3) Calculated for a load resistance equal to $E_{o,max}/I_{o,max}$ and the tabulated value for equivalent output capacitance.

OPS STATIC SPECIFICATIONS

INFLUENCE QUANTITY	UNCOMMITTED VOLTAGE CHANNEL ⁽¹⁾		CURRENT CONTROL CHANNEL OUTPUT EFFECTS	REFERENCE ±6.2V ±5% NOMINAL
	OFFSET VOLTAGE ΔE_O	OFFSET CURRENT ΔI_O		
SOURCE VOLTAGE (min.-max.):	<10 μ V	<1 nA	<10 μ A	<0.005 %
LOAD (No load — full load):	<10 μ V ⁽²⁾	<1 nA	<10 μ A	—
TIME (8-hour drift):	<20 μ V	<1 nA	<0.01% of I_O max.	<0.005 %
TEMPERATURE, PER °C:	<20 μ V	<0.5 nA	<0.01% of I_O max.	<0.005 %
RIPPLE AND NOISE ⁽⁴⁾	rms	<0.01% of E_O max. — or 15 mV ⁽³⁾	<50 μ A	—
	p-p ⁽⁵⁾	<0.1% of E_O max. — or 150 mV ⁽³⁾	<250 μ A	—

(1) The output effect can be calculated by the relationship $\Delta E_O = \Delta E_r (R_f / R_i) \pm \Delta E_{iO} (1 + (R_f / R_i)) \pm \Delta I_{iO} (R_i)$ where R_f is the feedback resistor, and R_i is the input resistor from the reference, E_r .

(2) ΔE_{iO} for load in current stabilization mode is $\Delta E_O /$ open-loop gain. ΔE_O is the compliance voltage change.

(3) Whichever is greater.

(4) One terminal must be grounded or connected so that common-mode current does not flow through the load or, in current mode, through a current sensing resistor.

(5) Peak-to-peak ripple is measured over a 20Hz to 10MHz bandwidth.