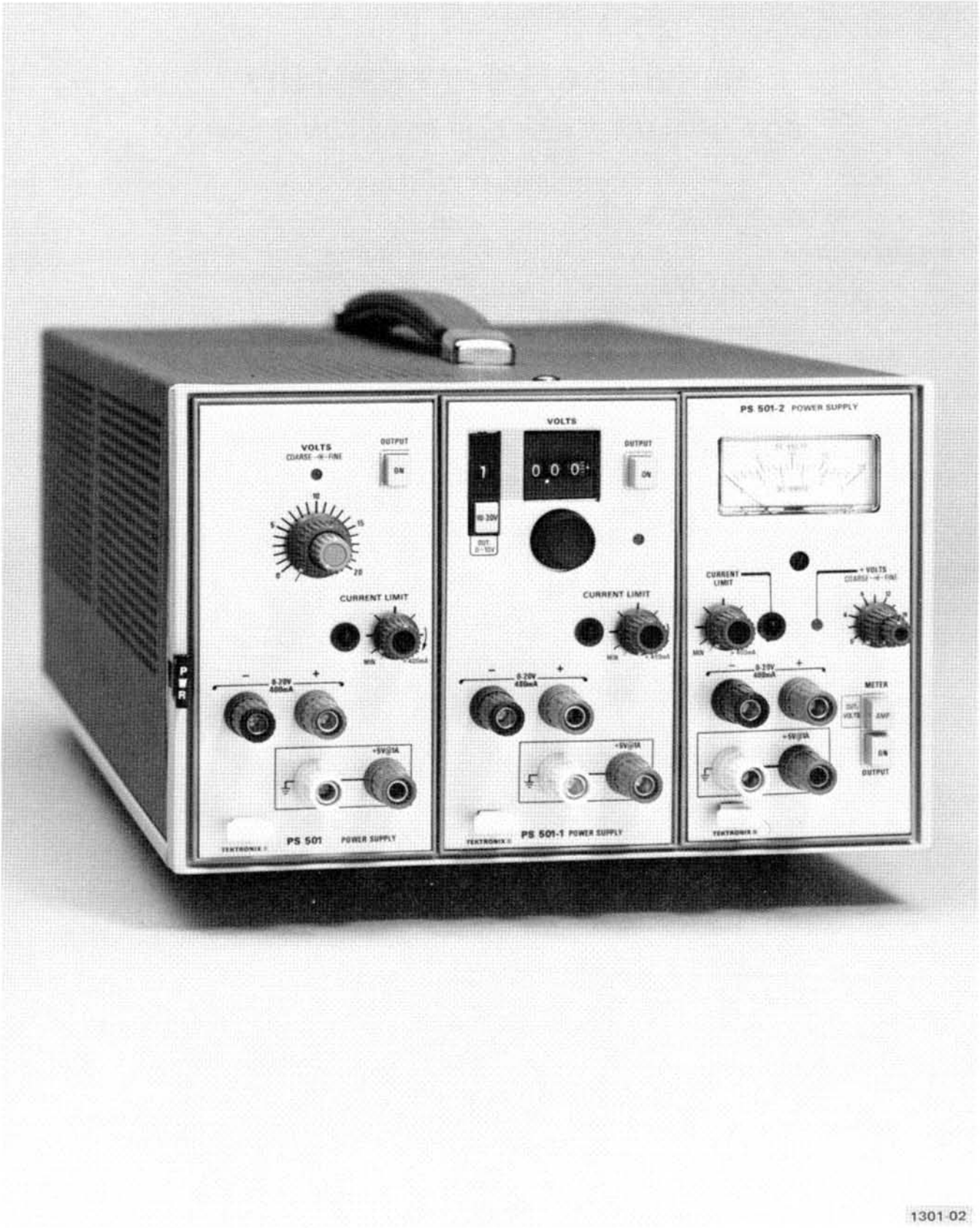

1301-02

PS 501 (-1, -2) Power Supplies.

SPECIFICATION

Introduction

The PS 501 is a constant-voltage, current-limiting, 0 to 20 Vdc power supply designed to operate in any compartment of a TM 500 Series Power Module. The PS 501 is a floating power supply in which either terminal may be grounded, or floated to 350 Vdc + peak ac. Front-panel controls provide continuously variable voltage selection, as well as current limiting from 0 to at least 400 mA.

The floating supply is suited for powering discrete transistor circuitry, or acting as a bias or reference supply. Several PS 501's or other suitable supplies can be combined for applications involving complementary circuitry, linear integrated circuits, or any circuitry requiring cascaded DC levels.

A ground-referenced +5 V auxiliary supply is also included that is suitable for bipolar logic, light-emitting diodes, incandescent displays and similar applications. With the floating supply available for powering discrete interface circuits and level shifting, the PS 501 can be used for many digital/analog applications.

NOTE

Instrument differences between the PS 501-2 and the PS 501 (-1) are listed in this manual at various places. Where no differences are indicated, the PS 501 information applies to the PS 501-2.

The electrical characteristics in this specification are valid with the following conditions:

1. The instrument must have been adjusted at an ambient temperature between +20° C and +30° C.
2. The instrument must be in a non-condensing environment whose limits are described under Environmental.
3. Allow twenty minutes warm-up time for operation to specified accuracy; sixty minutes after exposure to or storage in a high humidity (condensing) environment.

The electrical and environmental performance limits together with their related validation procedures comprise a complete statement of the electrical and environmental performance of a calibrated instrument.

SUPPLEMENTAL INFORMATION

The supplemental information listed here represents limits that ensure optimum instrument operation. They are not instrument specifications, but are intended to be used only as maintenance or operational aids.

Table 1-1

ELECTRICAL CHARACTERISTICS

Characteristics	Performance Requirements	Supplemental Information
20 Volt Floating Supply		
Voltage Range	0 V to at least 20 V.	19.99 V in PS 501-1.
Rated Output Current		400 mA, 0° C to +30° C, derating linearly, to 300 mA at +50° C.
Overload Protection		Automatic current limiting and over-temperature shutdown, continuous operation at rated output current at low voltages may actuate a Power Module thermal cutout. *NOTE* *Ripple and noise increase unpredictably when current is being limited.*
Current Limit Range	≤10 mA to at least 400 mA.	Current limiting is indicated by front panel LED.
Maximum Floating Voltage		350 Vdc + peak ac.
Display Accuracy		
PS 501-1	± (0.5% of reading + 10 mV).	Digital dial readout.
PS 501-2	± 0.4 V.	Analog meter readout.
Resolution (Setability)		
PS 501-1		Typically 1.6 mV determined by a 10-turn potentiometer.
PS 501-2		Typically 10 mV.
Load Effect (Regulation)	±1 mV for a 400 mA load change measured at output terminals.	
Source Effect (Line Regulation)	±5 mV for a ±10% line voltage change.	
Stability		Typically less than 0.1% +5 mV for 8 hours at constant line, load, and temperature.
Temperature Coefficient		Typically less than (0.01% + 0.1 mV) 1° C.
PARD (Ripple & Noise) (Periodic and Random Deviations)	≤0.5 mV peak-to-peak with 400 mA load.	10 Hz to 5 MHz, supply not in current limiting.
Transient Recovery Time		20 μs or less to recover within 20 mV of final output voltage after a 400 mA change in output current.

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
5 V Supply		
Output Voltage	+4.75 V to +5.25 ground referenced.	LM309K 5 V regulator integrated circuit.
Rated Output Current		1 A.
Current Limit		Non-adjustable and typically 1.5 A to 3 A.
Load Effect (Regulation)	±100 mV for a 1 A load change.	
Source Effect (Line Regulation)	±50 mV for a 10% line voltage change.	
Stability		Typically less than 30 mV (0.5%) for 8 hours at constant line, load, and temperature.
Temperature Coefficient		Typically less than 0.5 mV/°C.
PARD (Ripple & Noise)	≤5 mV peak-to-peak with 1 A load.	10 Hz to 5 MHz, supply not in current limiting.
Rear Interface Inputs/ Outputs[a]		
20 V Floating Supply		Pins 22A (+), 21A (−). Same as front panel output terminals.
Remote Sense		Pin 23A.
Reference Common		Pins 24A, 24B.
Current Monitor		Pins 19B, 22A. Voltage is 2 Ω times the actual output current, ±5%. Pin 22A is same as + output. Pin 19B is same as emitter of NPN series pass transistor.
Slaving Connections		Pin 26B for current limit slaving. Pin 25B for voltage slaving.

[a] **Warning—Floating potentials will appear superimposed on all rear interface inputs and outputs.**

Table 1-2

ENVIRONMENTAL CHARACTERISTICS

Characteristics	Information
Temperature	
Operating	0°C to 30°C (with derating to 50°C)
Storage	−40°C to +75°C.
Altitude	
Operating	To 15,000 feet. Maximum operating temperature decreased by 1°C/100 feet from 5000 to 15,000 feet.
Storage	To 50,000 feet.
Vibration	
Operating and non-operating	With the instrument complete, vibration frequency swept from 10 to 55 to 10 Hz at 1 minute per sweep. Vibrate 15 minutes in each of the three major axes at 0.015 inch total displacement. Hold 10 minutes at any major resonance; or, if none, at 55 Hz. Total time, 75 minutes.
Shock	
Operating and non-operating	30 g, 1/2 sine, 11 ms duration, 3 shocks in each direction along 3 major axes, for a total of 18 shocks.
Transportation	Qualified under National Safe Transit Committee Test Procedure 1A, Category II.

Table 1-3

PHYSICAL CHARACTERISTICS

Characteristics	Dimensions
Overall Size (measured at maximum points)	
Height	4.96 in (126 mm)
Width	2.6 in (66.8 mm)
Length	11.65 in (296 mm)
Net Weight (Instrument only)	2 lbs (0.906 kg)