

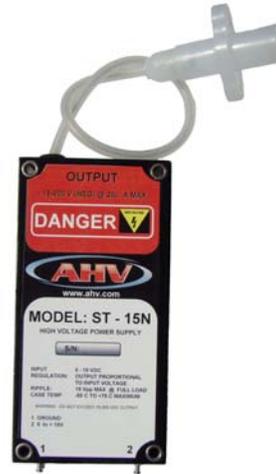


AMERICAN HIGH VOLTAGE
POWER SUPPLIES FOR THE WORLD

ST Series High Voltage Power Supply

General Description

The ST Series high voltage power supplies are designed to provide very high output voltages especially for image intensifiers tubes. They provide of up 20 kV with power levels to 3 Watts depending on model selected. The output voltage of the ST power supply is directly proportional to the input voltage (0 – 15 VDC). The output ripple is typically less than 0.5% at full power load. The high voltage output lead is returned to the ground of the power supply which is accessible from the input power lead. All models are encapsulated in a thermosetting epoxy for high reliability and protection against moisture. The ST series are reverse input voltage, short circuit and arc protected.

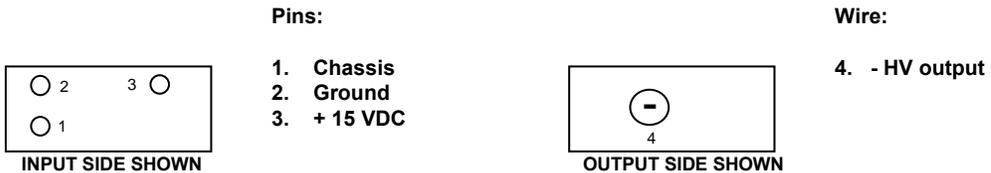


ST Series

Features

- Output proportional to Input
- Encapsulated
- 5,000 VDC to 20,000 VDC available
- 3 Watts power
- Metal case for low ripple: 0.5% Vpp

Connection Diagram



Available Models:

3 Watt Models:

Name	Maximum Output Voltage	Maximum Output Current	1 st Year
ST-5P	5,000 VDS (positive)	0.60 mA	1999
ST-10P	10,000 VDC (positive)	0.30 mA	1996
ST-15P	15,000 VDC (positive)	0.20 mA	1997
ST-20P	20,000 VDC (positive)	0.15 mA	1997
ST-5N	5,000 VDC (negative)	0.60 mA	1999
ST-10N	10,000 VDC (negative)	0.30 mA	1996
ST-15N	15,000 VDC (negative)	0.20 mA	2003
ST-20N	20,000 VDC (negative)	0.15 mA	2004



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Electrical Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value			Units
		Min	Typical	Max	
Supply Voltage:	(all models)	1	15	18	VDC
Input Current:	No Load:	35	35	40	mA
	Full Load (3W models):	50	50	65	mA
Output Ripple:	No Load (all models):	0.3 %	0.3 %	0.4 %	Vpp
	Full Load (all models):	0.3 %	0.4 %	0.5 %	Vpp
Load Regulation:	No Load to Full Load	20%	20%	25%	V _{NL} /V _L
	Half Load to Full Load	10%	15%	20%	V _{NL} /V _L
Output Linearity	No Load		1%		$\frac{\Delta V_{OUT}}{\Delta V_{OUT (ideal)}}$
Output Linearity	Full Load (all models):		1%		$\frac{\Delta V_{OUT}}{\Delta V_{OUT (ideal)}}$
Short Circuit Current:			200	300	mA
Power Efficiency:	Full Load	50%	55%	60%	$\frac{P_{OUT}}{P_{IN}}$
Reverse Input Polarity	Protected to 50 VDC				
Temperature Drift:	No Load			500	ppm/DegC
	Full Load			500	ppm/Deg C
Thermal Rise:	No Load (case)			5	degrees C
	Full Load (case)			15	degrees C
Slew Rate (10% - 90%)	No Load			100	mS
	Full Load			120	mS
Slew Rate (90% - 10%)	No Load			200	mS
	Full Load			100	mS
Drain Out Time	No Load (5 TC)			250	mS



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Physical Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value	Units
Dimensions	MKS	50.8 W x 101.6L x 20.6 H	mm
	English	2.0 W x 4.0 L x 0.81 H	inches
Volume:	MKS	105	cm ³
	English	6.4	inch ³
Mass:	MKS	156	grams
	English	5.6	oz
Packaging:	Black anodized aluminum case with epoxy encapsulation		
Finish	Smooth brushed aluminum		
Terminations:	Input and control: Teflon terminals (2) HV Output: Flying lead (Alden connector)		

Environmental Characteristics

(at 25 degrees C unless otherwise specified)

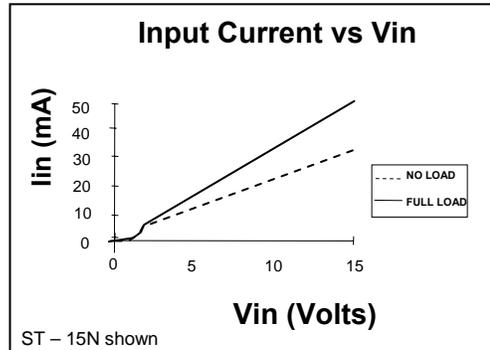
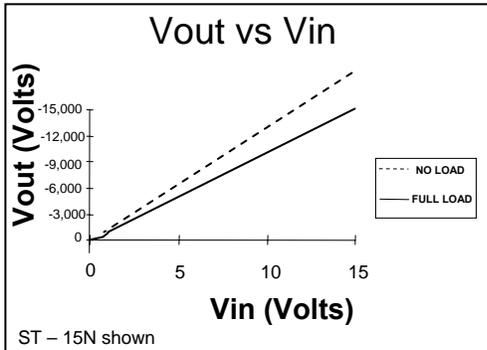
Parameter	Conditions	Value	Units
Temperature Range	case temperature	-40 degrees to + 71 degrees	Celsius
	case temperature	-40 degrees to + 160 degrees	Fahrenheit
Shock:	MIL-STD-810 Method 516	40 g's	Proc IV
Altitude:	pins sealed against corona	-350 to + 16,700	meters
	pins sealed against corona	-1,000 to +55,000	feet
Vibrations:	MIL-STD-810 Method 514	20 g's	Curve E
Thermal Shock	MIL-STD-810 Method 504	-40 deg C to + 71 deg C	Class 2



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ST Series Performance Charts

ST Series



ST Series Application Notes

The ST Series high voltage power supplies are driven by an input voltage of 1.5 to 15 VDC. The input current and output voltage as a function of input is shown in the above graphs. The High Voltage output return is connected to the power input return. As can be seen from the above charts, the output voltage is approximately linear with respect to input voltage except near the lower input voltage region ($V_{in} < 2V$). Here, the output drops off rapidly as the input voltage approaches zero with the absolute minimum input voltage needed for reliable starting being 1.3 VDC. As shown in Figure 1 below, the simple connection of a ST unit to a DC source of voltage will provide a high voltage stepped-up output. The input AC bypass capacitor C1 is optional and is utilized to prevent switching spikes from riding back on the input power lines. Values of 0.1 μF to 10 μF are commonly used.

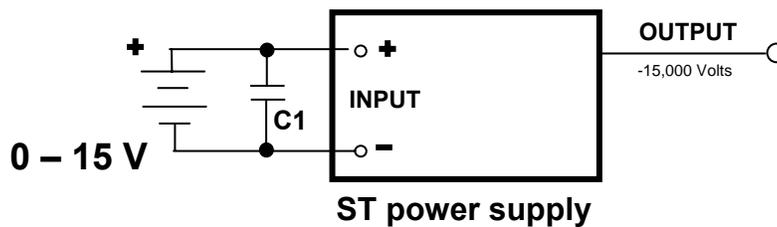


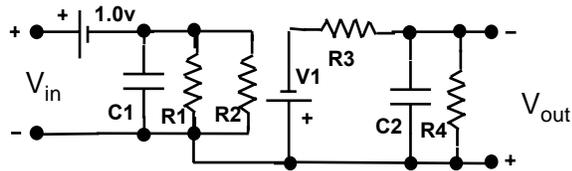
Figure 1: Basic ST hookup schematic



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ST Series

Equivalent ST Circuit Model



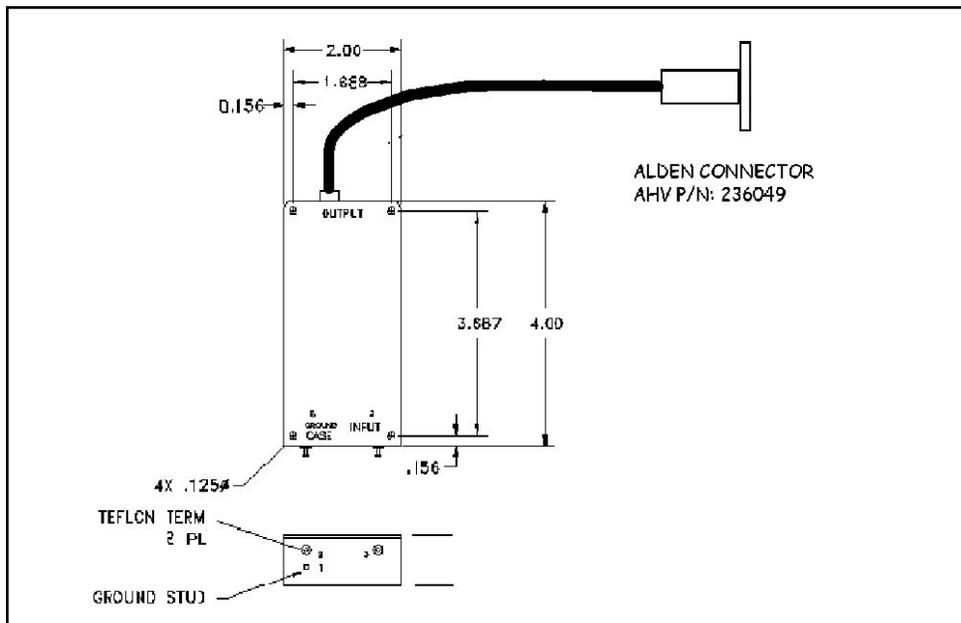
Equivalent ST HVPS Circuit Model

- R1 = (500) Ohms
- R2 = (600) Ohms
- R3 = $(0.1 \times V_{out_max} / I_{out_max})$ Ohms
- R4 = $(100 \times V_{out_max}^2)$ Ohms
- C1 = (10×10^{-6}) Farads
- C2 = $(0.005 \times I_{out_max} / V_{out_max})$ Farads
- V1 = $(VR_2 \times V_{out_max} / 15)$ Volts

For example, for an ST-15N:

- Vout_{max} = 15,000 V
- Pout_{max} = 3 W
- Iout_{max} = 0.0002 A
- R1 = 500 Ohms
- R2 = 600 Ohms
- R3 = 7.5 Megohms
- R4 = 22.5 Gigohm
- C1 = 10 uF
- C2 = 66 pF

Outline Drawing: (inches)



Ordering Information:

ST - XXN

Example:

ST - 10N: Maximum output = -10,000VDC, 3 Watts, 15 VDC input
 ST - 20P: Maximum output = +20,000VDC, 3 Watts, 15 VDC Input

XX = Output voltage

- 10 = 10kVDC
- 15 = 15kVDC
- 20 = 20kVDC