Please return to Mark Bier

TD 9500

OPERATION MANUAL

The TD series of power supplies from Spectrum Solutions are multiple output, high voltage supplies that were originally designed to drive electro-optical lenses in beam steering applications. Since introduction, the instrument has also found use as a general purpose laboratory supply.
Spectrum Solutions warrants this product to be free from defect for a period of 90 days from delivery. During this time, any necessary repairs to the product will be performed at no cost to the customer. In the event of product failure, Spectrum Solutions reserves the right to replace or repair any or all components at our discretion. In the case of failures due to abuse of the unit, either electrical or machanical, the warranty will be declared void and the customer will be responsible for all costs incurred in repairing the unit.

**********CAUTION**********

There are potentially dangerous high voltages contained within the covers of this instrument. Please do not attempt to repair this unit unless you have working knowledge of high voltage DC circuits. In any event, please consult Spectrum Solutions before removing the covers of this instrument. Spectrum Solutions can not assume responsibility or liability for any injuries or damages that may occur due to customer-attempted repair or modification of this unit.

Direct all technical or service inquiries to:

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SPECIFICATIONS

OUTPUTS	TD 9500 9 at +/- 500 VDC
OUTPUT CURRENT:	0.5 mA from each output
NOISE:	50 mV RMS at full rated output (500 Volt models)
STABILITY:	Better than 0.1% over 8 hours
RISE TIME:	2 V/usec
SLEW RATE:	2 V/usec
SIZE:	19" W x 15.5" D x 3.5" H
WEIGHT:	6 pounds (3 Kg)
INPUT:	110 to 120 VAC, 50/60 Hz.

FRONT PANEL CONTROLS

ON/OFF: Switches AC to the unit. Panel meter will light when power is "On".

COMP: Depressing this switch enables the unit to process an externally generated command. The red LED in the switch will light when the computer mode is activated.

METER: This 9 position switch allows the user to select which output is monitored by the 4.5 digit front panel meter. This control is also active when the unit is in the computer mode.

OUTPUT ADJUST: These 9 controls adjust the output of each supply from + 500 VDC to - 500 VDC.

REAR PANEL CONNECTIONS

LINE IN: Requires 110 to 120 VAC at 50/60 Hz. Fuse is .75SB.

J1: Is enabled when the unit is switched into the computer mode. This connector is used to bring in a +10 VDC to -10 VDC externally generated command that will drive an individual output from -500 VDC to +500 VDC. Pin out for this connector(J1)is as follows:

Pin 1-------Output 1
Pin 9 ------Output 2
Pin 2-------Output 3
Pin 10------Output 4
Pin 3-------Output 5
Pin 11------Output 6
Pin 4-------Output 7
Pin 12------Output 8
Pin 5-------Output 9
All remaining pins are tied to common.

OUTPUT: BNC Connectors (1-9)

The following connections are found only on those units equipped for operation at elevated off-ground potentials.

Gnd:Chassis Ground.

J2:Float Common.
These two terminals are used to select ground-based or floating operation. For ground-based operation, a jumper is connected between these two posts. This also grounds the center pin of the "MHV" connector adjacent to the posts. For off-ground operation, remove the jumper between the posts. **NOTE:** Please verify that the jumper has been removed from the "Gnd and J2" posts before attempting operation at elevated potentials. Failure to do so may cause damage to the float supply.

J3: This MHV BNC is used to introduce the off-ground float potential to the unit. Maximum off-ground float capability is +/- 2 KV. There is an internal 20 meg ohm resistor in series with this connector to provide some measure of protection in the event of a

failure in the float supply or an unexpected ground fault in the device to which the TD power supply is connected. However, **THIS RESISTOR WILL PROTECT NOTHING IF THE MAXIMUM FLOAT POTENTIAL IS EXCEEDED!!!** Failure to adhere to this limit will most certainly cause damage to the unit and will void the manufacturers warranty.

INITIAL TURN-ON AND CHECK-OUT

After receiving the power supply, please remove it from the packing and check for any obvious damage that may have occurred during shipping. Verify also that you have the AC line cord and the standard output connection cable. (Note: Some 500 volt models may be equipped with individual BNC
connectors for individual power supply outputs. Spectrum Solutions does not supply the interconnect cables with this arrrangement).

Attach the line cord to the chassis and plug it into the appropriate outlet (110-120 VAC, 50/60 Hz.). Turn the unit on by switching the power switch to the "1" position. The LCD meter should light and will be displaying a number from -200 to +200 (-500 to +500 on 500 volt models). Set the meter switch to output #1 and adjust the #1 output adjust control from full ccw to full cw. The LCD meter will indicate a smooth change from -200 to +200 (-500 to +500 on 500 volt models). Repeat this procedure for all remaining outputs.

Set all outputs to +100 V. With no input to the "EXT COMMAND" connector on the rear of the chassis, set the unit to computer mode by depressing the "COMP" switch. The red LED on the "COMP" switch should light and all outputs should read 000.0 +/- 000.2. Return the unit to the manual mode.

The unit is now ready to be connected to the user's system.

OPERATION IN THE MANUAL MODE

In normal use, the power supply is left in the manual mode and the user adjusts the output of each supply by using the appropriate control knob. The output of the individual supplies is monitored by selecting each output with the metering switch. The output voltage as presented on the meter is an actual sample of the voltage that is leaving the chassis via the output connector.

Each adjustment potentiometer is connected across +10 VDC and -10 VDC supply rails. As the control is turned, the wiper of the potentiometer supplies a potential through the analog switch IC. This potential is delivered to a feedback regulated, constant current, inverting output circuit with a gain of 50. Hence, an input of -10 VDC to the circuit gives an output of +500VDC. Applying +10 VDC to the circuit will give an output of -500VDC.

All of the individual circuits are short-circuit protected and can be directly connected to chassis ground without sustaining permanent damage. This is not to imply that direct connection to chassis ground is a normal operating condition, but just an indication that this device is relatively rugged.

A maximum current output of 0.5 mA can be pulled from each circuit. This is generally more than enough current when the supply is used as a beam steerer, for example. Should the supply be used as a general laboratory supply, please be aware of this limitation. The onset of current limiting will bring a plethora of problems. Indications of current limiting are rapid falloff of the selected voltage; increased output noise; and loss of stability. The quickest way to diagnose a load-related problem is to disconnect the supply from the circuit to which it is attached. If everything appears to work normally, then a closer look at the load is in order.

OPERATION IN THE COMPUTER MODE

Operating in the computer mode isn't much different than operating in the manual mode. The only difference is where the command into the actual power supply circuit comes from.
The "EXT COMMAND" connector on the rear of the chassis is used to bring in the externally generated command. Referring to the schematic at the rear of the manual will show that the commands from the front panel potentiometer and the commands from the "EXT COMMAND" connector are all routed into an SW-06 IC. This IC functions as a solid-state switch that is controlled by the "COMP" switch on the front panel. When in the manual mode, the SW-06 allows the commands from the control potentiometer to be passed to the circuits. Depressing the "COMP" switch disconnects the manual controls and allows any commands on the "EXT COMMAND" connector to be brought into the active circuits.

Driving the power supply through the "EXT COMMAND" requires a signal that can move from +10 VDC to -10 VDC. This will correspond to an output of -500 VDC to +500 VDC. The most convenient way to generate this signal is through the use of commercially available Digital to Analog Convertor (DAC). Most available DAC's have the ability to provide the bipolar output necessary to drive the output circuits. If, however, you have a DAC that is unipolar or is bipolar but unable to output the required +/- 10 VDC, please contact Spectrum Solutions for information on changing the input circuitry to accommodate different input voltages.