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WP775
REGULATED DC POWER SUPPLY
(0 - 30V ; 0 - 5A)

INSTRUCTION
MANUAL



M-00172

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**SECTION 1
GENERAL INFORMATION**

DESCRIPTION

- 1.1 The Regulated DC Power Supply Model WP775B is an easy to use general purpose, laboratory power supply, particularly suitable for experimental set ups, circuit development application.

It is a well regulated constant voltage / constant current supply which delivers 0 - 30V at 0 - 5Amps and can be adjusted continuously throughout the output range. The front panel CURRENT control can be used to establish the output current limit (overload or short circuit). When the supply is used as a constant voltage source, VOLTAGE controls can be used to limit the output voltage. When the supply is used as a constant current source, CURRENT controls can be used to limit the output current. The unit will automatically cross over from constant voltage to current mode and vice-versa if the output current or voltage exceeds these preset limits. Output voltage and current are continuously monitored on two front panel meters.

The load terminals are provided on the front panel. Either the positive or negative output terminal may be grounded or the power supply can be operated floating at upto a maximum of $\pm 300\text{VDC}$ above ground.

**SECTION-2
SPECIFICATIONS**

OUTPUT VOLTAGE	: 0-30V DC continuously variable with coarse and fine VOLTAGE controls.
LOAD CURRENT	: 0-5 A max, continuously variable with coarse and fine CURRENT controls.
CONSTANT VOLTAGE MODE REGULATION	
LINE	: Less than $\pm 0.01\%$ +2mV for $\pm 10\%$ change in line voltage
LOAD	: Less than $\pm 0.01\%$ + 2mV for load change from zero to full load.
RIPPLE & NOISE	: Less than 1mV rms max.
CONSTANT CURRENT MODE REGULATION	
LINE	: Less than $\pm 0.1\%$ +250 μA for $\pm 10\%$ change in line voltage.
LOAD	: Less than $\pm 0.1\%$ +250 μA for change in output voltage from 0 volts to maximum output voltage.
RIPPLE & NOISE	: 0.04% rms
OUTPUT POLARITY	: Floating w.r.t. ground.
OVERLOAD PROTECTION	: Automatic overload and short circuit protection.
TRANSIENT RESPONSE	: 100 μsecs to within 10mV of set output voltage for load change from 10% to 90%.
STABILITY	: $\pm 0.1\%$ +2.5mV (CV Mode) $\pm 0.5\%$ +2mA (CC Mode)

PANEL METERS	: 2½" analog meters are provided with an accuracy of ± 2% fsd.
MODE INDICATION	: Respective LED lights up when the unit is working in CV or CC mode.
OUTPUT CONTROLS	: Single turn coarse and fine voltage and current controls are provided on the front panel.
OPERATING TEMPERATURE	: 0-40°C.
INPUT VOLTAGE	: 115VAC ± 10%, 47 - 63Hz single phase
DIMENSIONS(WxDxH)	: 230mm x 255mm x 133mm.
WEIGHT	: 9.0Kg(approx)

SECTION 3 INSTALLATION

3.1 INITIAL INSPECTION

As soon as the power supply unit is unpacked inspect for any damage that may have occurred during transit. Save all packing material until inspection is completed. If any damage is found, notify the carriers immediately. Our authorised representatives should also be notified.

3.2 PHYSICAL CHECK

This check should confirm that there are no broken knobs or connectors, that the cabinet and panel surfaces are free of dents and scratches and the meters are not scratched and cracked.

3.3 ELECTRICAL CHECK

The power supply unit should be checked against electrical specifications. An in-cabinet performance check will verify proper operation.

3.4 INSTALLATION DATA

The power supply unit is shipped ready for bench operation. It is necessary only to connect the unit to a rated source of power and it is ready for operation.

3.5 LOCATION

The power supply unit is naturally cooled. Sufficient space should be kept around the unit while in operation, so that heat sinks do not remain in confined space or close to another heating source. The ambient temperature of the area around the unit should be less than 40°C.

3.6 INPUT POWER REQUIREMENTS

The power supply unit may be operated continuously on specified input voltage.

3.7 REPACKAGING FOR SHIPMENT

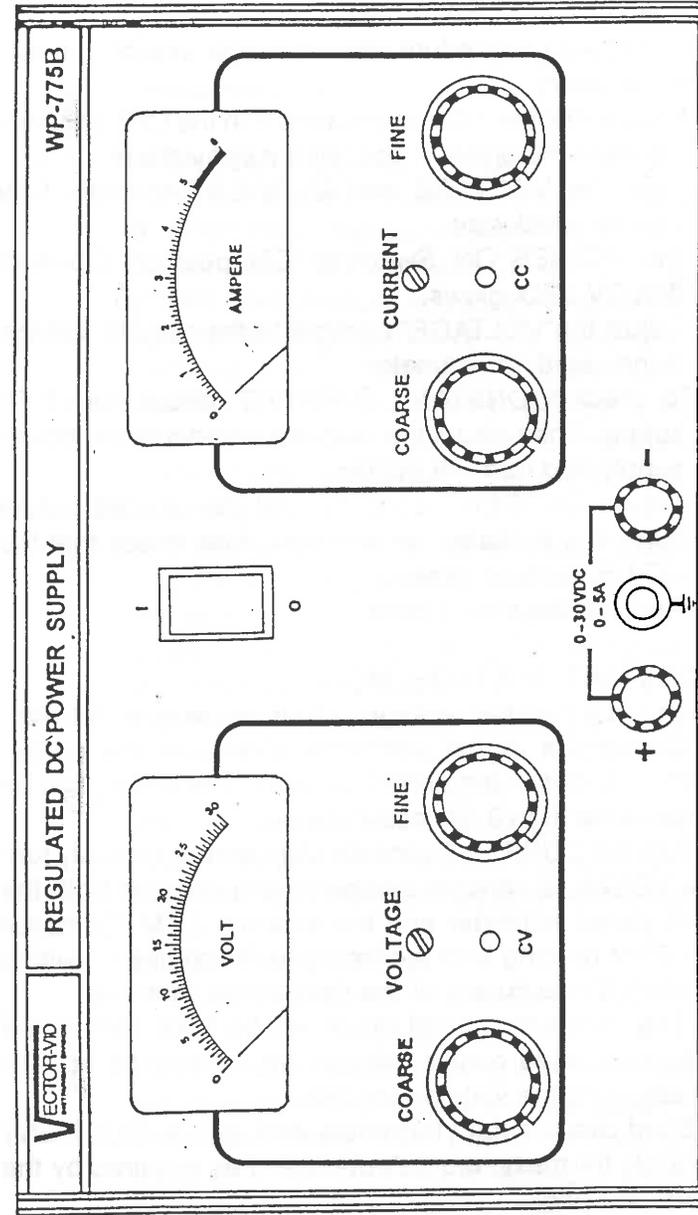
To ensure safe shipment of the power supply unit, it is recommended that the package designed for the unit be

used. The original packaging material is reusable. Be sure to attach a tag to the unit specifying the owner, and the fault observed with a brief description.

3.8 REMOVING COVER

The top cover is retained in place by 4 self tapping screws & two handle mounting screws. To remove cover, proceed as follows:

- a) Remove the chrome-plated handle caps.— *NA*
- b) Remove the handle mounting screws.
- c) Remove the self tapping screws on sides.
- d) Lift the cover from rear side, slide backwards & pull.



WP775B: FRONT PANEL LAYOUT

SECTION 4 OPERATING INSTRUCTIONS

4.1 TURN ON PROCEDURE :

The following procedure describes the use of controls and indicators.

- a. Ensure that the AC power switch is in the OFF position.
- b. Connect the unit to a specified input voltage.
- c. Turn the VOLTAGE and CURRENT controls fully counter-clockwise.
- d. Set 'POWER ON' Switch to 'ON' position. Observe that CV LED glows.
- e. Adjust the "VOLTAGE" controls till the desired voltage is indicated on voltmeter
- f. To check "CONSTANT CURRENT" circuit, turn OFF supply. Short circuit the output terminals of the power supply and turn ON supply.
- g. Adjust 'CURRENT' controls until the desired output current is indicated on ammeter. Also check that the CC LED should glow.
- h. Remove the short circuit.

4.2 CONSTANT VOLTAGE MODE:

To select a constant voltage output, proceed as follows :

- a. Connect a digital voltmeter (DVM) to the output terminals, observing correct polarity. The DVM must be rated better than 0.5% accuracy.
- b. Turn the CURRENT controls clockwise and slowly turn the VOLTAGE controls clockwise and observe both the front panel voltmeter and the external DVM. Compare the DVM reading with the front panel voltmeter reading to verify the accuracy of the front panel voltmeter.
- c. The minimum control range will be from zero to the maximum rated output voltage. Adjust desired voltage by adjusting the voltage controls.
- d. Short circuit output terminals and adjust CURRENT controls for maximum output current as required by the load conditions.

If a load change causes the current limit to be exceeded, the power supply will automatically cross over to constant current output at current limit and output voltage will drop proportionately. In setting the current limit, allowance must be made for high peak currents which can cause unwanted crossover.

4.3 CONSTANT CURRENT MODE

To select a constant current output, proceed as follows

- a. Short circuit the output terminals of the power supply.
- b. Connect a DC ammeter OR a shunt-digital voltmeter (DVM) combination across the output terminals, using appropriately-gauged wire and hardware. The recommended current ratings for the ammeter or the shunt and the wire must be at least 10% more than the output current of the power supply model. The ammeter or shunt-DVM combination must be rated better than 0.5% accuracy.
- c. Turn the VOLTAGE controls clockwise and Turn the CURRENT controls slowly clockwise. The control range will be from zero to maximum rated output current for the power supply model. Adjust CURRENT controls for desired output current.
- d. Compare the ammeter reading with the front panel ammeter reading. Or, compare the DVM reading with the front panel ammeter reading using $I = V/R$, where V is the DVM reading and R is the DC shunt resistance.
- e. Open output terminals and adjust VOLTAGE controls for maximum output as required by the load conditions.

4.4 LOAD CONNECTIONS:

The load should be connected to the power supply output terminals using separate pairs of connecting wires. This will minimize mutual coupling effects between loads and will retain full advantage of the low output impedance of the power supply. Each pair of connecting wires should be as short as possible and twisted or shielded to reduce noise pick up. (If a shielded pair is used, connect one end of the shield to ground at power supply and leave the other end unconnected).

4.5 Positive or negative voltage can be obtained from this supply by grounding either one of the output terminals or one end of the load. Always use two leads to connect load to the supply, regardless of whether the setup is grounded. This will eliminate any possibility of the output current return paths through the power source ground which would damage the line cord plug. This supply can also be operated upto $\pm 300V$ DC above ground, if neither output terminal is grounded.

SECTION 5
PART LIST & SCHEMATICS

PCB Components

ZSDT-CT/01 PCB Rev 01

Ref Designator	Value
RESISTORS	
R1	270E,2W,5%,MOR
R2	47E,0.25W,5%,MFR
R3	10K,0.25W,5%,MFR
R4*	500E,0.25W,5%,MFR
R5	10E,0.25W,5%,MFR
R6	3K9,0.25W,5%,MFR.
R7	3K3, 2W,5%,MOR.
R8	10K,0.25W,5%,MFR.
R9	8K2,0.25W,5%,MFR.
R10	100K,0.25W,5%,MFR
R11	4E7,0.25W,5%,MFR.
R12	1K5,0.25W,5%,MFR.
R13	180K,0.25W,5%,MFR.
R14	390E,0.25W,5%,MFR.
R15	6K8,0.25W,5%,MFR
R16	12K,0.25W,5%,MFR
R17	3K9,0.25W,5%,MFR
R18	10K,0.25W,5%,MFR.
R19	10K,0.25W,5%,MFR.
R20	10K,0.25W,5%,MFR.
R21	3K3,2W,5%,MOR
R22	270E,2W,5%,MOR.
R23#	82K,0.25W,5%,MFR
R24	4K7,0.25W,5%,MFR
R25	24E,0.25W,5%,MFR
R26	820E,0.25W,5%,MFR
R27#	330K,0.25W,5%,MFR
R28#	39K,0.25W,5%,MFR
R29#	180K,0.25W,5%,MFR
R30	1K,0.25W,5%,MFR
R31	15E,0.25W,5%,MFR
R32	6K8,0.25W,5%,MFR
R33	15K,0.25W,5%,MFR
R34	6K8,0.25W,5%,MFR
R35	15K,0.25W,5%,MFR
R36	1K,0.25W,5%,MFR

Ref Designator	Value
R37	2K,0.25W,5%,MFR
R38	1K,0.25W,5%,MFR
R39	1K,0.25W,5%,MFR
R40	4K7,0.25W,5%,MFR
R41	330K,0.25W,5%,MFR
R42	100E,0.25W,5%,MFR(I CAL)
R43*	4K7,0.25W,5%,MFR (I CAL)
R44	1K,0.25W,5%,MFR
R45	1K,0.25W,5%,MFR
R46*	5K1,0.25W,5%,MFR(V CAL)
R47*	100E,0.25W,5%,MFR(V CAL)
R48	2K,0.25W,5%,MFR
R49	3K6,0.25W,5%,MFR
R50	Shorting Link
R51	10E,0.25W,5%,MFR
R52	Not Used
R53	Not Used
<u>PRESETS</u>	
PR1	5K,LIN,VER
PR2	500E,LIN,VER
PR3	500E,LIN,VER
<u>CAPACITORS</u>	
C1	0.1uF/100V,MP
C2	0.1uF/250VAC,MKP
C3	15,000uF,50V,ELE,
C4	0.1uF,50V,MP
C5	33uFR,50V,ELE
C6	100uF,50V,ELE
C7	100uF,50V,ELE.
C8	1uF,50V,ELE
C9	4.7uF,50V,ELE
C10	10uF,50V,ELE.
C11	100uF,50V,ELE.
C12	47uF,50V,ELE.
C13	1KPF,50V,CD.
C14	1KPF,50V,CD
C15	0.1uF,50V,CD.
C16	10uF,50V,ELE.
C17	10uF,50V,ELE.

Ref Designator	Value
C18	0.1uF,50V,CD.
C19	220uF,50V,ELE
C20	220uF,50V,ELE
C21	47uF,50V,ELE
C22	10uF,50V,ELE
C23	0.1uF,50V,CD.
C24	10uF,50V,ELE.
C25	10uF,50V,ELE.
C26	0.1uF,50V,CD.
<u>DIODES</u>	
CR1	Not Used
CR2	1N4007,1KV/1A
CR3	1N4007,1KV/1A
CR4	1N4007,1KV/1A.
CR5	1N4007,1KV/1A
CR6	1N4007,1KV,1A.
CR7	1N4007,1KV/1A
CR8	1N4007,1KV/1A.
CR9	1N4007,1KV/1A.
C10	1N4007,1KV/1A
CR11	1N4007,1KV/1A
CR12	1N4007,1KV/1A.
CR13	1N4007,1KV/1A.
CR14	1N4007,1KV/1A
CR15	1N4007,1KV/1A.
CR16	1N4007,1KV/1A.
CR17	1N4007,1KV/1A.
CR18	1N4007,1KV/1A.
CR19	1N4007,1KV/1A.
CR20	1N4007,1KV/1A.
CR21	1N4007,1KV/1A.
CR22	1N4007,1KV/1A.
CR23	1N4007,1KV/1A.
CR24	1N4007,1KV/1A.
CR25	1N4148,100V/10mA
CR26	1N4148,100V/10mA
CR27	1N4148,100V/10mA
CR28	1N4148,100V/10mA
CR29	1N4007,1KV/1A.

Ref Designator	Value
ZENERS	
Z1	1N758,10V/0.4W
Z2	1N758,10V/0.4W
Z3	1N750,4.7V/0.4W
BRIDGE	
BR1	10A/600VDC BRIDGE
BR2	CSB-1,100V/1A BRIDGE.
IC's	
IC1	4N25 OPTO
IC2	7812
IC3	TL431
IC4	LM324
IC5	7812
IC6	TL431
IC7	79L05
IC8	Not Used
TRANSISTOR's/FET/SCR	
Q1	BC109
Q2	MPSA12
Q3	BC557
Q4	BC557
Q5	BC547
FET1	IRFP150
SCR1	SCR 2N6396
CONNECTORS	
CON1	3.96mmPITCH, 3PIN M
CON2	2.54mmPITCH,12PIN M
CON3	2.54mmPITCH,12PIN M
CON4	2.54mmPITCH, 6PIN M
MISCILLANEOUS	
TP1	RIM PIN MALE
TP2	RIM PIN MALE
TP3	RIM PIN MALE
TP4	RIM PIN MALE
TP5	RIM PIN MALE
TP6	RIM PIN MALE

Ref Designator	Value
RESISTORS	
R1	1K,2W,5%,MOR
R2	0.1E,2.5W,5%,WW
R129*	33K,0.25W,5%,MFR
CAPACITORS	
C1	0.1uF,50V,CD
C2	470uF,50V,EL
C3	10uF,50V,EL
DIODE	
CR1	1N5402

SAFETY

INSULATION CLASS I, POLLUTION DEGREE 2 : IEC 1010 -1

This instrument has been built & tested as per IEC publications prepared by Technical Committee No. 66(Ref. No. CEI/ IEC 1010-1:1990) : Safety requirements for electrical equipment for measurement, control & laboratory use. This instructions manual provides information and warning data which must be taken into consideration by the user for safety of operator and instrument.

SAFETY PRECAUTIONS TO BE TAKEN BEFORE SETTING THE INSTRUMENT INTO SERVICE :

Warning : Any interruption of the safety lead inside or outside the unit or disconnection of the protection ground terminal may render the instrument dangerous. An intentional disconnection is prohibited.

When the instrument is to be supplied via an auto-transformer, in order to reduce the supply voltage available, make sure the common terminal is connected to the neutral point (grounded) of the supply circuit. The jack should only be into a plug fitted with a grounding piece. The safety connection should never be interrupted by the use of an extension cord without a protection (ground) lead. The power supply cord must be connected to the mains network (with good value), before connecting the control of the measuring circuits.

SYMBOLS (as marked on equipment or in this manual) :



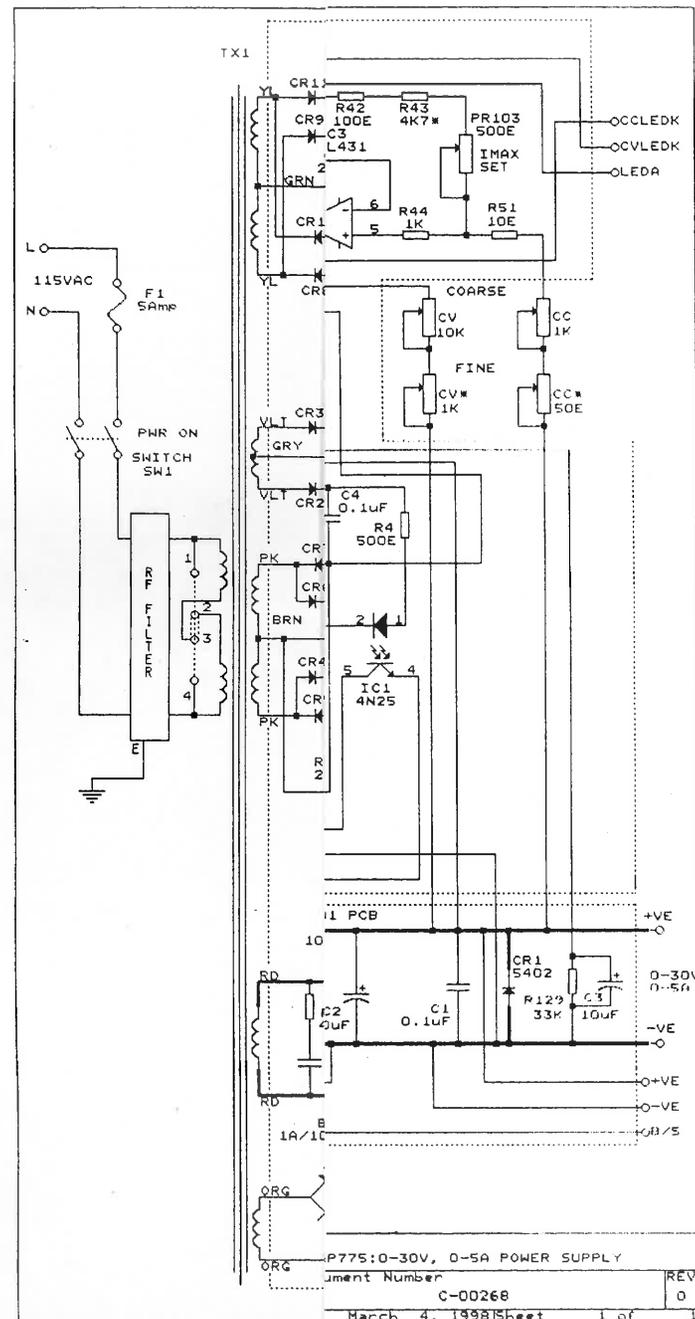
DANGER High Voltage.

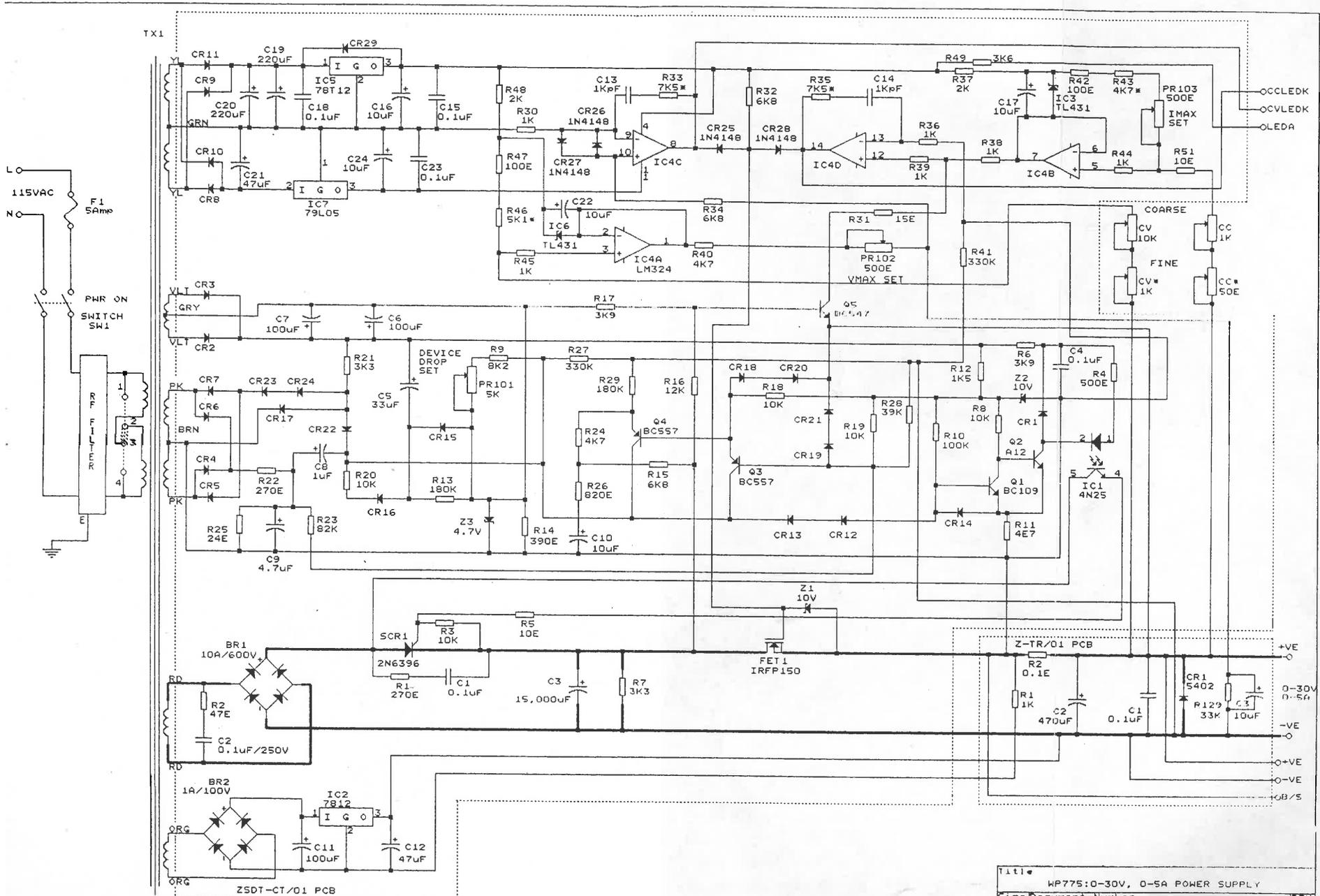


Protective ground (earth) terminal.



ATTENTION - Refer to manual.
This symbol involves a mandatory reference to the operating manual. The User is required to refer and follow the relevant instructions.





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