

INSTRUCTION MANUAL
MODEL 201 POWER SUPPLY
SERIAL NO. 985013

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MECH-TRONICS NUCLEAR
Melrose Park, IL 60160

1.1 WARRANTY

Mech-Tronics Nuclear warrants its products to be free from defects in workmanship and materials for a period of twelve months from date of shipment, provided that the products have been used in a manner consistent with good practice, and not subjected to abuse, modification or alteration. Repair or replacement will be made at MTN's option without charge. Shipping expense to Mech-Tronics Nuclear will be borne by the customer except in cases where defects are discovered upon initial operation; Mech-Tronics Nuclear will absorb charges on return shipment.

All peripheral equipment associated with Mech-Tronics Nuclear products and not manufactured by Mech-Tronics Nuclear is subject only to the warranty stated by the supplying manufacturer.

Mech-Tronics Nuclear reserves the right to modify or alter the design of its products at its option without incurring responsibility for modification of previously manufactured products.

Mech-Tronics Nuclear does not assume any risk or liabilities for any handling or conditions beyond our control. See installation section of this manual for any warranty constraints.

1.2 DAMAGE IN TRANSIT

Shipments should be examined immediately upon receipt. If evidence of damage is found, the carrier making delivery should be notified at once and a report of the damage made; since the carrier is normally liable for damage in shipment. Waybills and other documentation, including packing materials, should be preserved to aid in establishing claims. Mech-Tronics Nuclear should also be notified of the circumstances so that we may assist in establishing the claim and in providing, if necessary, replacement equipment.

1.3 QUALITY CONTROL

Each Mech-Tronics Nuclear instrument is required to pass a severe and rigid series of quality tests prior to approval for shipment. These tests are designed to expose any flaws in materials or workmanship. Permanent records of these tests are filed in our Service Department for use in warranty control and as a source of statistical information.

1.4 SERVICE

Mech-Tronics Nuclear instruments not in warranty may be returned to the factory for repairs or checkout at modest expense to the customer. Out-of-warranty instruments serviced at our factory are required to pass the same quality control standards as those used for new production instruments. We request that you contact our Customer Service Department for instructions prior to shipping any equipment.



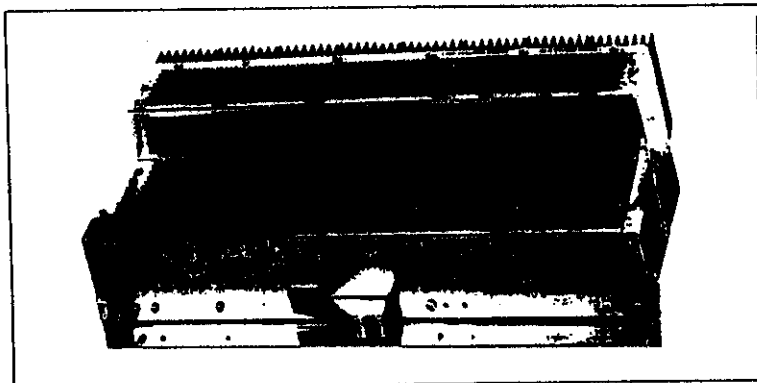
TECHNICAL SPECIFICATIONS

200 Series

Model 201 Power Supply

SIX OUTPUT NIM BIN SUPPLY

- 170 watt D.C. power output exceeds NIM V-H requirements
- Class "H" Transformer (180°C), all Teflon wire and 105°C rated capacitors for Maximum reliability.
- Optional Routing connector cover available.



SPECIFICATIONS

Input:	103-129V (117V nominal), or 206-258VAC (234 nominal), 47-65Hz, 400 watts.
Output:	±24VDC, 0-1.5 each, 2A Max. combined total. ±12VDC, 0-3A each, 4A Max. combined total. ±6VDC, 0-10A each, 12A Max. combined total. Maximum combined output power, 170 watts with balanced loads on 6, 12 & 24 volt outputs. 150 watts with unbalanced loads. 117VAC at 0.5A.
Regulation:	±0.05% over the combined range of output load and input voltage.
Short Term Stability:	After 1 hour warm-up, less than ±0.2% for a 24 hour period over the combined range of output load and input voltage with constant ambient temperature.
Long Term Stability:	After 1 hour warm-up, less than ±0.5% for a six month period at constant input voltage, output load & ambient temperature
Ripple and Noise:	The combined ripple and noise on any DC voltage does not exceed 3mV peak to peak.
Operating Temperature:	0-50°C without derating. Derate 3%/°C to 60°C.
Temperature Coefficient:	The change in any DC voltage is less than 0.01%/°C from 0°C to 60°C.
Output Impedance:	The output impedance of any DC voltage is less than 0.3 ohm at any frequency up to 100kHz.
Size:	16 7/8" Wide, 5" High, 8 1/2" Deep.
Power Cord:	3 wire line cord (8' long).
Ordering Information:	Shipping Weight: 29 lbs. Ordering Stock No: 000201-00 Options: 900201-01 — Routing Connectors 900201-02 — 234 VAC Input 900201-03 — 234 VAC Input with Routing Connector



3. DESCRIPTION

The model 201 NIM Bin Power Supply furnishes regulated positive and negative 6, 12 and 24 volts DC power to a standard NIM Bin; it is designed to mount on the rear of the Instrument Bin. This power supply meets or exceeds the requirements of a Type V-H Supply as specified in Atomic Energy Commission Report TID-20893 (Revision 4) with two exceptions:

1. There is no provision for an input power line filter.
2. The depth of the package exceeds the maximum specified depth of seven and one half inches by one inch.

Because of the high power to volume ratio and specified convection cooling, internal temperature of the loaded power supply is well above ambient. High temperature insulations and components are used to insure reliability in this environment. The power transformer utilizes class "H" insulation (180°C); teflon insulated wire is utilized for all point to point wiring and all filter capacitors are rated at a minimum of 95°C.

The power supply is protected against damage due to excessive internal temperature by an overtemp power cutout thermostat; a second thermal switch supplies a thermal warning when temperature is nearing the cutout temperature. Additional protection against output power overload and component failure is provided by; input fuses, individual DC output fuses and foldback current limiting in each of the six DC outputs. The power supply has been designed to provide a life expectancy in excess of five years.

4. INSTALLATION

The Model 201 is connected to a nuclear instrument module bin through an electrical interface connector and four mounting screws. The connector is an AMP type 202651-2, and the bin should be equipped with the mating connector type 202650-2.

To mount the Model 201 Power Supply to a NIM bin, loosen the screws holding the top and bottom covers on, join the interface connectors, tighten the four corner captive screws (supplied with unit) to the bin back plate, then tighten the top and bottom covers so they are flush against the bin back plate. This will insure that the bin bus is properly shielded.

Maintain a minimum of 1/2" of air space underneath the power supply and keep the top of the power supply free from obstructions to provide adequate ventilation. The warranty will not apply if these precautions are not followed.

If the power supply is equipped with a power output routing connector (Pg 15), the screw on cap should be placed on the connector when not in use. This will prevent damage to the connector threads and insure that the cable connector can always be properly mated with the output connector.

5. OUTPUT VOLTAGE ADJUSTMENT

The six DC output voltages are independently adjustable.

Output voltage adjustment potentiometers (R90-R95) are located along the top of the circuit card and the approximate locations are indicated on the top cover. Output voltages can be adjusted with a small screwdriver thru the indicated ventilating holes in the top cover.

Should it be necessary to remove the top cover to make the adjustments, do not change the setting of the single turn potentiometers (R56-R61) located near the voltage adjustment controls. These controls determine the current limit foldback point on each DC output voltage. They have been factory set to activate the current limit at a point greater than 0.2 AMPS above the specified output MAX current over a 0 to 50 degree ambient.

6. DISASSEMBLY

1. Remove the screws holding down the top & bottom covers; units with an output routing connector require the removal of all output connector wires from the terminal block on the circuit board before the top cover is free of the power supply.
2. Remove the interface connector (J1) from its retaining bracket and the front panel to circuit board connector (P2) from its mating connector.
3. Remove the six screws holding the side panels to the rear panel. Push the interface connector thru the grommeted hole in the front panel. The front panel and rear panel assemblies are now separated.
4. The heat sink assemblies can be removed from the rear panel by removing three #4 Fillister head screws. The heat sink can now be removed from the rear panel. Wires connected to the transistor sockets are of sufficient length to permit access to all parts mounted on the heat sink.
5. The PC board is mounted, with seven two inch spacers, to the rear panel. Removal of the seven screws holding the board allows the board to be moved forward away from the heat sinks. The wire leads connected from the board to power transistors and input fuses are long enough to provide access to the rear of the board.

ELECTRICAL PARTS LIST

<u>I.D.#</u>	<u>MECH-TRONICS #</u>	<u>DESCRIPTION</u>
BR1-BR3	130017-30	MDA 2502 BRIDGE RECTIFIER
C1-C3	125014-04	.1 MFD CAPACITOR 400 VDC
C4,C5	128019-01	470 MFD, 25DCWV 105°C ALUM. CAPACITOR
C6-C9	123020-04	820 PFD SILVER MICA CAPACITOR
C10-C13	125001-00	.01 MFD CAPACITOR 250VDC
C14,C15	121016-05	1000 PFD CERAMIC CAPACITOR
C16-C19	127010-01	10 MFD, 25DCWV TANT. CAPACITOR
C20,C21	128018-01	330 MFD, 25DCWV, 105°C ALUM. CAPACITOR
C22,C23	128017-01	100 MFD, 25DCWV, 105°C ALUM. CAPACITOR
C24,C25	128008-01	1 MFD, 25DCWV, 105°C ALUM. CAPACITOR
C26, C27	128015-01	61,000 MFD 25DCWV, 95°C ALUM. CAPACITOR
C28,C29	128016-01	3900 MFD 30DCWV, 105°C ALUM. CAPACITOR
C30,C31	128014-02	1900 MFD 50DCWV, 105°C ALUM. CAPACITOR
D1-D6	130001-10	IN4188 DIODE
D7-D12	130015-01	IN825 6.2 VOLT ZENER DIODE
D13-D16	130016-01	IN960B 9.1 VOLT ZENER DIODE
D17-D18	130013-10	IN821 6.2 VOLT ZENER DIODE
D19-D24	130018-01	IN5400 DIODE
D25,D26	130004-50	IN2484 DIODE
D27	132030-01	MCR 649AP-1 125°C SCR
F1,F2*	187007-01	3AG, 5 AMPERE SLOW BLOW FUSE
F3,F4	187008-01	8AG 15 AMPERE FUSE
F5,F6	187010-01	2AG 5 AMPERE FUSE
F7,F8	187009-01	2AG 3 AMPERE FUSE
J1	198011-23	23 PIN CONNECTOR BLOCK AMP 202651-2
	198012-01	18 GA RECEPTACLE AMP 66358-0
	198053-01	22 GA RECEPTACLE AMP 66331-8
J2	198055-12	CONNECTOR HOUSING MOLEX 03-09-2121
	198055-00	FEMALE PC TERMINAL, MOLEX 02-09-1134
	198055-02	FEMALE WIRE TERMINAL MOLEX 02-09-1118
P1	186021-96	LINE CORD WITH NEMA 3 BLADE PLUG
P2	198056-12	CONNECTOR HOUSING MOLEX 03-09-1126
	198055-01	MALE CRIMP TERMINAL
Q1,Q9,Q10	132028-01	MJ2955 TRANSISTOR
Q15-Q17		
Q2,Q7,Q18	132029-01	T1P30C TRANSISTOR
Q3,Q6,Q22	132021-01	T1P29C TRANSISTOR
Q4,Q11	132007-00	2N3645 TRANSISTOR
Q5,Q12,Q13	132027-01	2N3055 TRANSISTOR
Q19-Q21		
Q8,Q14	132002-00	2N3642 or PN3642 TRANSISTOR
Q23, Q24	132001-00	2N4122 or PN4122 TRANSISTOR

* 234 VAC INPUT CHANGE FUSES TO 3 AMPERE (SLOW BLOW)

CONTINUED

ELECTRICAL PARTS LIST CONTN'D

<u>I.D.#</u>	<u>MECH-TRONICS #</u>	<u>DESCRIPTION</u>
R1	110083-23	2.7K OHM 1/2W ±5% CARBON COMP. RESISTOR
R2	110095-22	22K OHM 1/4W ±5% CARBON COMP. RESISTOR
R3	110107-22	68K OHM 1/4W ±5% CARBON COMP. RESISTOR
R4-R7	113013-37	0.1 OHM 5W ±10% WIRE WOUND RESISTOR
R8-R9	113014-38	0.5 OHM 10W ±10% WIRE WOUND RESISTOR
R10,R11	113012-37	1 OHM 5W ±10% WIRE WOUND RESISTOR
R12	113006-26	120 OHM 3-1/4W ±10% WIRE WOUND RESISTOR
R13,R14	110081-24	5.6K OHM 1W ±5% CARBON COMP. RESISTOR
R15-R18	110089-23	4.7K OHM 1/2W ±5% CARBON COMP. RESISTOR
R19,R20	110023-22	22 OHM 1/4W ±5% CARBON COMP. RESISTOR
R21-R24	110031-22	47 OHM 1/4W ±5% CARBON COMP. RESISTOR
R25-R28	110027-22	33 OHM 1/4W ±5% CARBON COMP. RESISTOR
R29-R45	110039-22	100 OHM 1/4W ±5% CARBON COMP. RESISTOR
R46-R49	110049-22	270 OHM 1/4W ±5% CARBON COMP. RESISTOR
R50,R51	110071-22	2.2K OHM 1/4W ±5% CARBON COMP... RESISTOR
R52,R53	111385-11	100K OHM ±1% METAL FILM RESISTOR RN55C
R54,R55	110079-22	4.7K OHM 1/4W ±5% CARBON COMP. RESISTOR
R56-R61	114024-01	200 OHM Pot 1/2W CERMET ±100PPM
R62-R65	111177-11	681 OHM ±1% METAL FILM RESISTOR RN55C
R66,R67	111135-11	249 OHM ±1% METAL FILM RESISTOR RN55C
R68-R73	111268-11	6.04K OHM ±1% METAL FILM RESISTOR RN55C
R74-R77	111189-11	909 OHM ±1% METAL FILM RESISTOR RN55C
R78-R81	111229-12	2.37K OHM ±1% METAL FILM RESISTOR RN60C
R82,R83	111222-11	2K OHM ±1% METAL FILM RESISTOR RN55C
R84,R85	111231-11	2.49K OHM ±1% METAL FILM RESISTOR RN55C
R86,R87	111239-12	3.01K OHM ±1% METAL FILM RESISTOR RN60C
R88,R89	111202-11	1.24K OHM ±1% METAL FILM RESISTOR RN55C
R90-R95	114011-00	1K OHM 3/4W 15 TURN CERMET POT ±100PPM
R96,R97	110007-22	4.7 OHM 1/4W ±5% CARBON COMP. RESISTOR
R98,R99	110055-22	470 1/4W ±5% CARBON COMP. RESISTOR
S1	143010-01	THERMAL SWITCH N.C. 185 ⁰ F
S2	143010-00	THERMAL SWITCH N.O. 160 ⁰ F
T1	244026-01	TRANSFORMER, CLASS "H" INSULATION
U1-U8	134089-01	741 125 ⁰ C INTEGRATED CIRCUIT

MCEHANICAL PARTS LIST

QTY	MECH-TRONICS #	DESCRIPTION
1	460201-05	TOP COVER (PERFORATED)
1	460201-04	BOTTOM COVER (PERFORATED)
32	182632-03	6-32 x 3/16" SCREW (COVERS)
2	360201-01	SIDE PANEL
10	182632-56	6-32 x 3/8" SCREW (SIDES)
1	460200-80	FRONT PANEL (MOUNTS TO BIN)
4	283032-26	10-32 x 1-5/8" SCREW (BIN MOUNTING)
4"	186511-00	GROMMET STRIP (CONNECTOR HOLE IN PANEL)
2	188048-01	CAPACITOR BRACKET 2"
6	182632-56	6-32 x 3/8" SEMS SCREW (BRKT TO PANEL)
3	182632-12	6-32 x 3/4" SCREW (BRIDGES TO PANEL)
9	180632-03	6-32 KEPS NUT
1	181832-06	8-32 x 3/8" FLAT HD SCREW (XF MOUNT)
3	182832-06	8-32 x 3/8" PAN HD SCREW (XF MOUNT)
4	180832-03	8-32 KEPS NUT
1	460201-01	REAR PANEL (HEAT SINK PANEL)
6	360201-02	4-1/2" HEAT SINK
2	360201-03	3" HEAT SINK
24	185440-06	4-40 x 3/8" SCREW (HEAT SINKS TO PANEL)
13	188083-01	TO-3 INSULATOR (MICA)
13	188082-01	TO-3 SOCKET
26	183600-10	#6 SCREW (TRANSISTOR TO HEAT SINKS)
8	188080-01	TEFLON STANDOFF (ON HEAT SINKS)
2	187006-01	FUSE HOLDER (REAR PANEL)
4	187011-00	FUSE CLIP
1	188075-01	STRAIN RELIEF
1	188046-04	#4 GROUND LUG
1	182440-05	4-40 x 5/16" SCREW
1	180440-03	4-40 KEPS NUT
7	188047-32	2" SPACER (P.C. BOARD TO REAR PANEL)
7	181632-05	6-32 X 5/16" FLAT HD. SCREW
7	182632-54	6-32 X 1/4" SEMS SCREW
2	188047-09	3" SPACER (BETWEEN P.C. BOARDS)
2	180632-03	6-32 KEPS NUT
2	182632-54	6-32 X 1/4" SEMS SCREW
6	188007-02	1/8" #4 SPACER (TRANSISTOR TO BOARD)
6	182440-07	4-40 X 7/16" SCREW
6	180440-03	4-40 KEPS NUT
4	188049-10	#10 Solder Lug

ROUTING COVER OPTION 900201-01

1	460201-06	COVER
1	260201-00	CONNECTOR BRACKET
1	260201-01	RIGHT ANGLE SLEEVE
3	182440-05	4-40 X 5/16" SCREW
6	180440-03	4-40 KEPS NUT
1	188085-08	8 POSITION TERMINAL BLOCK
1	198054-10	CONNECTOR AMPHENOL 97-312A-18-15 (639)
1	198053-00	CONNECTOR COVER 9760-18 (639)
8	188085-00	RING TONGUE TERMINAL
2	182440-04	4-40 X 1/4" SCREW
1	182440-07	4-40 X 7/16" SCREW