

NDS Products, Inc.

111 Anderson Street
Pasadena, TX 77506

Phone: 713/475-2986 Fax: 713/477-6741

Web Site: ndsproducts.com

e-mail: sales@ndsproducts.com info@ndsproducts.com

ND – 4000B

120V or 230V

Area Monitor

Operation Manual

Revision B January 01, 2004

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ND-4000B 120/ 230V

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NOTE: DUE TO NDS PRODUCTS' CONTINUING PROGRAM OF RESEARCH & DEVELOPMENT, ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND MAY BE VARIED AT OUR DISCRETION.

NOTE: THE ND-4000B IS A CONTROL UNIT FOR EXTERNAL ALARMS. THE RED LIGHT ON THE FRONT PANEL WILL TURN ON IF THERE ARE NO EXTERNAL ALARMS PLUGGED IN. THIS IS TO TELL YOU YOUR ALARMS ARE NOT PLUGGED IN OR THAT THEY ARE NOT OPERATING PROPERLY.

WITH THE EXTERNAL ALARMS (LIGHTS OR SIREN) PLUGGED IN AND OPERATING PROPERLY, THE RED LIGHT TURNS ON WHEN RADIATION IS DETECTED ABOVE 2 mR/hr.

1.0 USER CAUTION AND WARNINGS:

THIS INSTRUMENT IS INTENDED SOLELY FOR THE DETECTION AND MEASUREMENT OF IONIZING RADIATION. IT SHOULD BE USED ONLY BY PERSONS WHO HAVE BEEN TRAINED IN THE PROPER INTERPRETATIONS OF ITS READINGS AND THE APPROPRIATE SAFETY PROCEDURES TO BE FOLLOWED IN THE PRESENCE OF RADIATION.

THE EQUIPMENT HEREIN IS DESIGNED AND MANUFACTURED IN COMPLIANCE WITH ALL APPLICABLE SAFETY STANDARDS; NEVERTHELESS, CERTAIN HAZARDS ARE INHERENT IN THE USE OF ALL ELECTRONIC EQUIPMENT. ADEQUATE WARNINGS ARE INCLUDED IN THIS MANUAL AND ON THE PRODUCT ITSELF TO COVER HAZARDS THAT MAY BE ENCOUNTERED IN NORMAL USE AND SERVICING OF THIS EQUIPMENT. NO OTHER PROCEDURES ARE WARRANTED BY NDS PRODUCTS. IT SHALL BE THE OWNER'S OR USER'S RESPONSIBILITY TO ASSURE THAT THE PROCEDURES HEREIN ARE METICULOUSLY FOLLOWED, AND ESPECIALLY THAT THE WARNING AND CAUTIONARY NOTES ARE HEEDDED. FAILURE ON THE PART OF THE USER IN ANY WAY TO FOLLOW PRESCRIBED PROCEDURES SHALL OBSOLVE NDS PRODUCTS AND ITS AGENTS FROM ANY RESULTING LIABILITY.

READ YOUR OPERATION MANUAL**2.0 WARRANTY:**

NDS PRODUCTS WARRANTS THAT THE PRODUCTS COVERED HEREBY SHALL BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD ON ONE YEAR FROM DATE OF NDS PRODUCTS SHIPMENT (GM TUBE IS WARRANTED BY THE OEM FOR 90 DAYS). THE FOREGOING WARRANTY DOES NOT APPLY TO ANY PRODUCTS WHICH HAVE BEEN SUBJECT TO MISUSE (INCLUDING STATIC DISCHARGE), NEGLIGENCE, ACCIDENT, OR MODIFICATION. NDS PRODUCTS' SOLE OBLIGATION TO BUYER HEREUNDER FOR PRODUCTS FAILING TO MEET THE AFORESAID WARRANTY SHALL BE, AT NDS PRODUCTS' DISCRETION, TO REPAIR AND RECALIBRATE THE NONCONFORMING PRODUCT OR TO REPLACE THE NONCONFORMING PRODUCT WHERE WITHIN THE WARRANTY PERIOD: 1) THE BUYER HAS RETURNED THE NONCONFORMING PRODUCT TO NDS PRODUCTS, FREIGHT PREPAID, & 2) NDS PRODUCTS HAS DETERMINED THE PRODUCT IS NONCONFORMING AND THAT SUCH NONCONFORMITY IS NOT A RESULT OF IMPROPER USE, REPAIR, MODIFICATION, OR OTHER MISUSE BY BUYER.

THE FOREGOING WARRANTY AND REMEDIES ARE EXCLUSIVE AND ARE MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY, OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE. NDS PRODUCTS NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR USE OF ITS PRODUCTS, AND NDS PRODUCTS MAKES NO WARRANTY WHATSOEVER FOR PRODUCTS NOT MANUFACTURED BY NDS PRODUCTS. NDS PRODUCTS SHALL NOT BE LIABLE FOR DAMAGES DUE TO DELAYS IN DELIVERIES OR USE AND SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHETHER ARISING FROM CONTRACT, TORT, OR NEGLIGENCE, INCLUDING BUT NOT LIMITED TO, LOSS OF PROFITS, LOSS OF GOODWILL, OVERHEAD, OR OTHER LIKE DAMAGES.

3.0 SPECIFICATIONS:

ENERGY RESPONSE _____ GAMMA AND X-RAY FROM 80-2000KeV, +/- 20%

MAXIMUM INTENSITY OR SATURATION: _____ GREATER THAN 1000R/hr

TEMPERATURE RANGE: _____ -30 TO 50 DEGREES C

SIGNALS: _____ GREEN AC ON LIGHT
RED ALARM TRIP LIGHT

REMOTE ALARM OUTLETS: _____ (2) CONTACTS RATED AT 5 AMPS 120AC

POWER: _____ 120VAC 50 TO 60 CYCLES

POWER FUSE: _____ 5 AMPS AT 120VAC/230VAC

ALARM FUSE: _____ 5 AMPS AT 120VAC/230VAC

ENCLOSURE: _____ NEMA 3R STEEL, MEETS UL 50 TYPE 3R, IEC 529, IP 32.
8" HI X 8" W X 4" DEEP

WEIGHT: _____ 6 POUNDS 8 OZ.

STANDARD UNITS: ND-4000B: PLUG IN UNIT
8 FT POWER CORD
2 EA 120VAC OR 230VAC OUTLETSND-4000B: HARD WIRE READY
CONDUIT CONNECTIONSOPTIONS: ND-AM1: RED ROTATING ALARM LIGHT
STAND/ MOUNTING HOLES
25 CABLEND-AM2: SIREN
RED ROTATING ALARM LIGHT
25 FT CABLE**4.0 DETECTOR:**

THE DETECTOR USED IN THIS INSTRUMENT IS A HALOGEN QUENCHED GEIGER TUBE. THE EFFECTIVE LENGTH IS 1.1 INCHES AND THE EFFECTIVE DIAMETER IS 0.482 INCH. THE WALL THICKNESS OF THE TUBE IS 30 mg/cm SQUARED.

5.0 INSTRUMENT LIMITATION (SATURATION) *CAUTION*

IT IS A WELL KNOWN PHENOMENON THAT ALL GEIGER-MUELLER SURVEY METERS SATURATE OR OVERLOAD AT SOME POINT (THIS MAY BE CALLED FLOODING OR JAMMING). THIS PARTICULAR MODEL WILL SATURATE WHEN IN A RADIATION FIELD IN EXCESS OF 1000 R/hr WHEN IT HAS BEEN PROPERLY MAINTAINED. IF THE RADIATION FIELD IS IN EXCESS OF 1000 R/hr, ONE OF TWO EVENTS WILL OCCUR: 1) THE NEEDLE WILL SWING TO THE EXTRME RIGHT AND WHEN IT REACHES SATURATION, THE NEEDLE WILL FALL BACK TO ZERO, OR 2) IF THE SURVEY METER IS TURNED ON IN A FIELD IN EXCESS OF 1000 R/hr, THE NEEDLE WILL NOT REACT AND STAY AT ZERO.

ALTHOUGH A 1000 R/hr FIELD IS EXTREMELY HIGH AND MAY NEVER BE ENCOUNTERED, PROPER RADIATION SAFETY PROCEDURES AND REGULATIONS SHOULD BE OBSERVED WHEN MAKING ANY TYPE OF RADIATION SURVEY.

6.0 INSTALLATION: ND-4000B 120V MODEL OR ND-4000B 230V MODEL**6.1 120VAC/ 230VAC HARD WIRED TO APPLICABLE UNIT:**

NOTE: HIGH VOLTAGE DANGER. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT INSTALLATION AND REPAIR.

6.1.1 MOUNT UNIT IN DESIRED LOCATION (2mR/hr & ABOVE) USING THE 4 MOUNTING HOLES ON BACK OF UNIT. ACCESS BY LIFTING COVER, BEING CAREFUL OF THE INTERNAL WIRING FROM INDICATOR LIGHTS ON THE FRONT PANEL.

6.1.2 BRING 120V/ 230V POWER TO MONITOR LOCATION. ACCESS THROUGH CASE IS PROVIDED BY TWO ½ INCH DIAMETER CONDUCT OUTLETS. WITH AC TURNED OFF, WIRE CONNECTIONS AS SHOWN BELOW ON TERMINAL STRIP WIRING DIAGRAM ALSO SHOWN INSIDE UNIT.

TERMINAL 1: 120VAC/ 230VAC IN. UNIT POWER

TERMINAL 2: NEUTRAL. 3 TERMINALS FOR AC IN AND ALL EXTERNAL ALARMS

TERMINAL 3: GROUND. 2 TERMINALS FOR ALL AC GROUND

TERMINAL 4: EXTERNAL ALARMS. 2 TERMINALS 120VAC/ 230VAC ONLY

6.2 INSTALLATION OF PLUG-IN MODELS:

6.2.1 MOUNT UNIT IN DESIRED LOCATION, NEAR AC RECEPTACLE AND IN A LOCATION WHICH WOULD ENCOUNTER RADIATION LEVELS OF 2mR/hr AND ABOVE.

6.2.2 PLUG UNIT'S AC POWER CORD INTO RECEPTACLE.

6.2.3 PLUG AC ALARMING DEVICES (OPTIONS) INTO UNIT'S RECEPTACLES LOCATED ON RIGHT SIDE OF CASE.

7.0 CHECKOUT/ OPERATION:**7.1 CAUTION NOTE!**

THE "RADIATION PRESENT" LIGHT WILL ACTIVATE UNDER THE FOLLOWING CONDITIONS:

- WHEN RADIATION LEVELS ARE ABOVE 2mR/hr
- WHEN THERE ARE NO EXTERNAL ALARMS INSTALLED
- WHEN THE EXTERNAL ALARMS ARE NOT FUNCTIONING

7.2 POWER UNIT UP. GREEN "POWER ON" LIGHT SHOULD ACTIVATE. IF NOT, CHECK WIRING CONNECTIONS, THE AC POWER IN FUSE (F2) LOCATED ON LEFT SIDE OF TERMINAL STRIP AND THE "POWER ON" LIGHT BULB.

7.3 ACTIVATE MONITOR BY EXPOSING UNIT TO 2 mR/hr OR ABOVE. ALL WARNING DEVICES (OPTIONAL ADD ONS) AND PANEL RED "RADIATION PRESENT" LIGHT SHOULD ACTIVATE. IF NOT, CHECK WIRING CONNECTIONS, THE EXTERNAL ALARM FUSE (F1) LOCATED ABOVE F2 ON LEFT SIDE OF TERMINAL STRIP AND "RADIATION PRESENT" LIGHT BULB.

8.0 TROUBLESHOOTING:

NOTE! VOLTAGE DANGER. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT REPAIR.

8.1 WILL NOT ACTIVATE BUT HIGH VOLTAGE TO GM TUBE O.K.

POSSIBLE DEFECTIVE COMPONENT:

GM TUBE 713

IC 14024

IC 14069

RELAY

ALARM FUSE

8.2 AC IN O.K. NO 11VDC OUTPUT:

POSSIBLE DEFECTIVE COMPONENT:

DC POWER SUPPLY

8.3 AC IN O.K. NO DC OUTPUT

POSSIBLE DEFECTIVE COMPONENT:

DC POWER SUPPLY

8.4 11VDC O.K. TO T1. NO VOLTAGE TO GM TUBE.

POSSIBLE DEFECTIVE COMPONENT:

T1

CR5

CR6

Q1

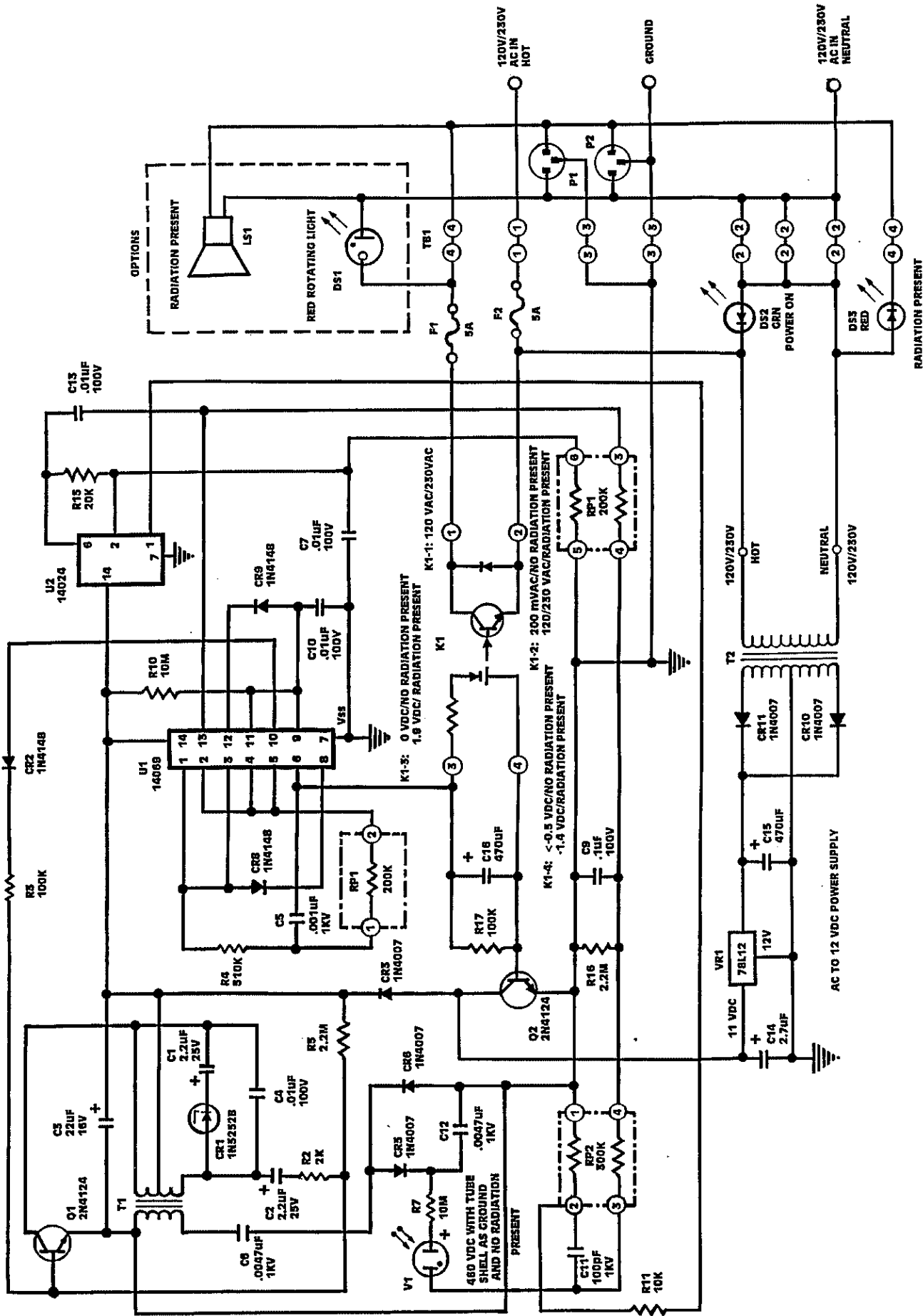
CR1

12-Aug-97

BILL OF MATERIAL

980-4000-000		ND-4000B 120V/230V PC ASSY		REV B	
ITEM	PART NUMBER	DESCRIPTION		QTY	REF DESIG
1	100-1000-102	CAP CER DISC	.001 uF 1 KV 20% Y5U .25 LS	1	C5
2	100-1000-472	CAP CER DISC	.0047 uF 1 KV 20% Y5U .25 LS	2	C6, 12
3	100-0100-103	CAP CER DISC	.01 uF 100V 20% Y5U .25 LS	4	C4,7,10,13
4	100-1000-101	CAP CER DISC	100.0 pF 1 KV 10% Y5U .25 LS	1	C11
5	105-2200-025	CAP ELE ALUM	2200.0 uF 25V 20% AXL 1.0 LS	1	C16
6	110-0025-225	CAP ELE TANT	2.2 uF 25V 10% RDL .1 LS	2	C1, 2
7	475-0100-001	TRANSISTOR	1N4124	2	Q1, 2
8	110-0016-226	CAP ELE TANT	22.0 uF 16V 10% RDL .1 LS	1	C3
9	115-0100-104	CAP PLY FILM	0.1 uF 100V 10%	1	C9
10	150-0100-001	DIODE 1N4007	STANDARD RECOVERY	3	CR3,5,6
11	150-0150-001	DIODE 1N4148	HIGH SPEED SWITCHING	3	CR2,8,9
12	150-0300-001	DIODE 1N5252B	ZENER	1	CR1
13	200-0100-001	IC 14024	STAGE RIPPLE COUNTER	1	U2
14	200-0300-001	IC 14069	HEX INVERTER	1	U1
15	250-0100-202	RES CF 1/4W 5%	2.0 K OHM	1	R2
17	250-0100-225	RES CF 1/4W 5%	2.2 M OHM	2	R5,16
18	250-0100-103	RES CF 1/4W 5%	10.0 K OHM	1	R11
19	250-0100-106	RES CF 1/4W 5%	10.0 M OHM	2	R7,10
20	250-0100-203	RES CF 1/4W 5%	20.0 K OHM	1	R15
21	250-0100-104	RES CF 1/4W 5%	100.0 K OHM	2	R3,17
22	250-0100-514	RES CF 1/4W 5%	510.0 K OHM	1	R4
23	255-0004-304	RES NET	4 PIN 2 RES 300 K ISOL	1	RP1
24	255-0005-204	RES NET	6 PIN 3 RES 200 K ISOL	1	RP2
25	415-4000-230	RELAY SS 230VAC		1	K1
26	225-0100-014	SOCKET IC 14 PIN		2	XU1, 2
27	450-6816-001	TRANSFORMER	MINI 50VRMS	1	T1
28	455-4000-012	POWER SUPPLY	12V	1	
29	500-0713-001	TUBE GM 713		1	V1
30	551-4000-002	ND-4000 PC BOARD		1	

990-4000-000		ND-4000B 120V/230V UNIT ASSY		REV B	
ITEM	PART NUMBER	DESCRIPTION		QTY	REF DESIG
1	980-4000-120	ND-4000B 120V/230V	PC ASSY	1	
2	400-4000-012	AUDIO TRANSDUCER	PIEZO ALERT 12V	OPT	LS1
3	580-4000-001	LIGHT ASSY	ROTATING RED 120VAC	OPT	DS1
4	575-4000-120	LAMP S6 120V		1	DS2
5	580-4000-002	GREEN PANEL 120V	GREEN PANEL INDICATOR	1	DS2
6	577-4000-002	LENS RED		1	DS3
7	580-4000-001	LAMP HOLDER	1.0 DIA	2	XDS1, 2
8	690-4000-001	DECAL ND-4000		1	
9	670-0250-005	FUSE	250 VAC 5 AMP 1.25 LG	2	F1, 2
10	665-4000-003	FUSE CLIP	30A 300V	2	XF1, 2
11	715-4000-001	CONDUIT CONNECTOR	.5 IN DIA	2	OPT
12	700-4000-008	CABLE POWER	8 FT PLUG	1	OPT
13	490-4000-008	TERM STRIP	8 CC	1	TS1
14	575-4000-230	LAMP 10S6 230VAC	230VAC MODELS	1	OPT
15	580-4000-222	GREEN PANEL 230VAC	GREEN PANEL INDICATOR	1	OPT
16	580-4000-001	RED PANEL 120V L, LA	RED PANEL INDICATOR L, LA	1	OPT
17	580-4000-221	RED PANEL 220V L, LA	RED PANEL INDICATOR L, LA	1	OPT



NBS PRODUCTS	
ND-4000B 120V/250V	
CIRCUIT DIAGRAM	
DWG 8704000-001	B
SCALE: 1 of 1	REV
DRAWN: M. SMITH	DATE: 1/15/75
CHECKED: KEB, PPE	
ENGINEER: MBB, PTE	
DO NOT COPY, DISPLAY, OR USE DRAWING WITHOUT AUTHORIZATION	

