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Engineering Note

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Project: MINOS DC Power Supplies
Doc. No: H031008A

Subject: Master Crate Power Supply Wiring Harness

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General Description

1.1. The Master Crate is a standard VME product from Wiener (part number OB02.0026) powered by one of their standard power supplies. The only voltage presently used is the +5V, however the crates are wired for all voltages available from the supply should they be needed in the future.

1.1.1. Output rails are 5V/230A; 3.3V/115A; 12V/46A; 12V/46A

1.1.2. The wiring is 90°C for the welding cable and 105°C for the 6AWG wiring.

1.1.3. Cable sizing is 230A-2/0; 115A-2/0; 46A-6AWG

2. Master Crate Backplane

2.1. Rear View of Backplane showing the power rail connections.

Figure 1 VME Crate

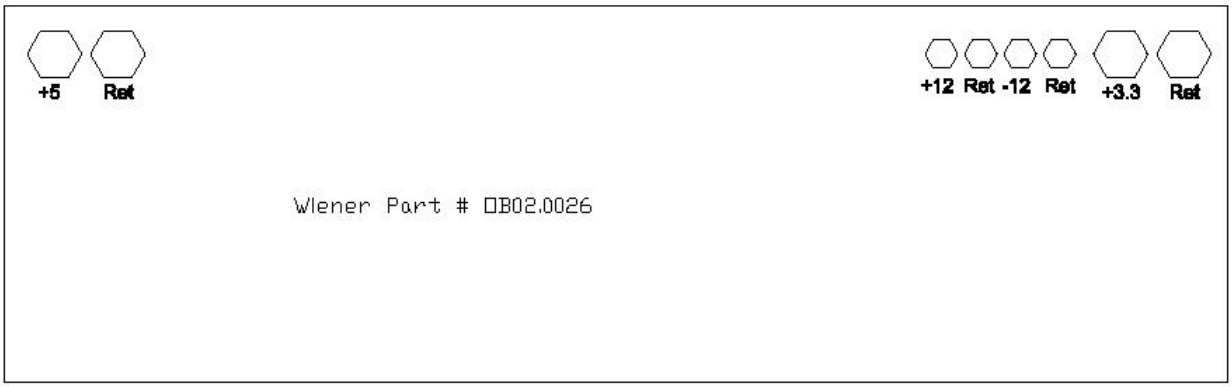


Figure 2 Crate Voltage Connection Definitions

3. Wiener Power Supply Connections

3.1. Rear View of the Wiener Power Supply.

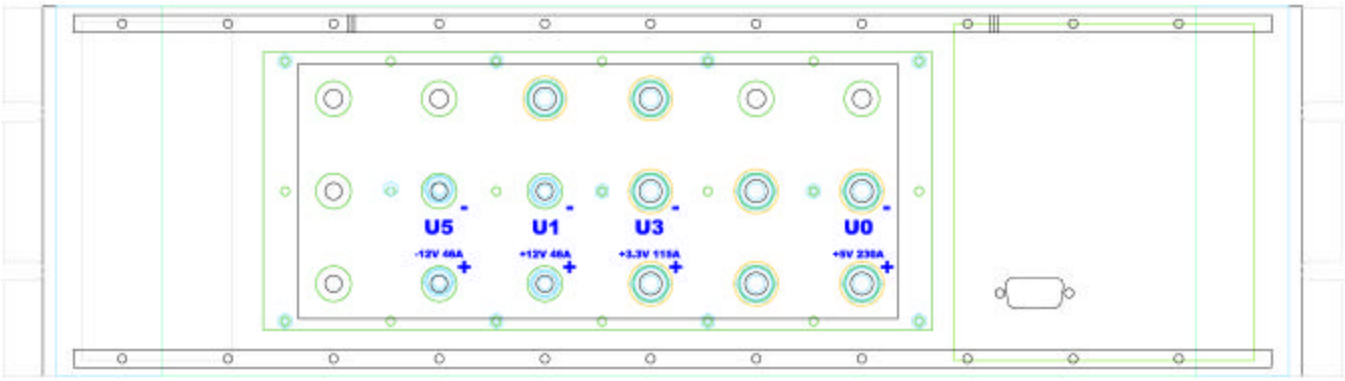
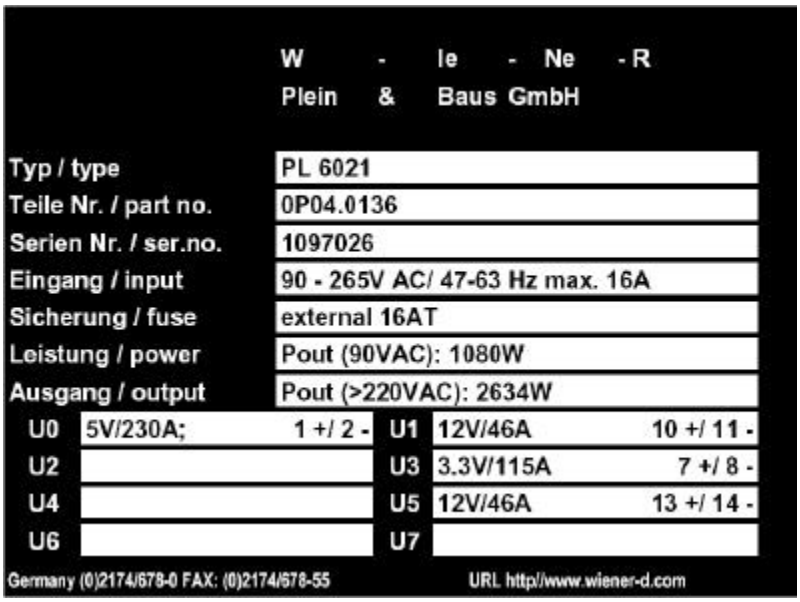


Figure 3 Power Supply Back

3.2. Wiener label defining the output terminal configuration.



W - Ie - Ne - R
Plein & Baus GmbH

Typ / type	PL 6021
Teile Nr. / part no.	0P04.0136
Serien Nr. / ser.no.	1097026
Eingang / input	90 - 265V AC/ 47-63 Hz max. 16A
Sicherung / fuse	external 16AT
Leistung / power	Pout (90VAC): 1080W
Ausgang / output	Pout (>220VAC): 2634W

U0	5V/230A;	1 +/ 2 -	U1	12V/46A	10 +/ 11 -
U2			U3	3.3V/115A	7 +/ 8 -
U4			U5	12V/46A	13 +/ 14 -
U6			U7		

Germany (0)2174/678-0 FAX: (0)2174/678-55 URL http://www.wiener-d.com

Figure 4 Power Supply Output Configuration

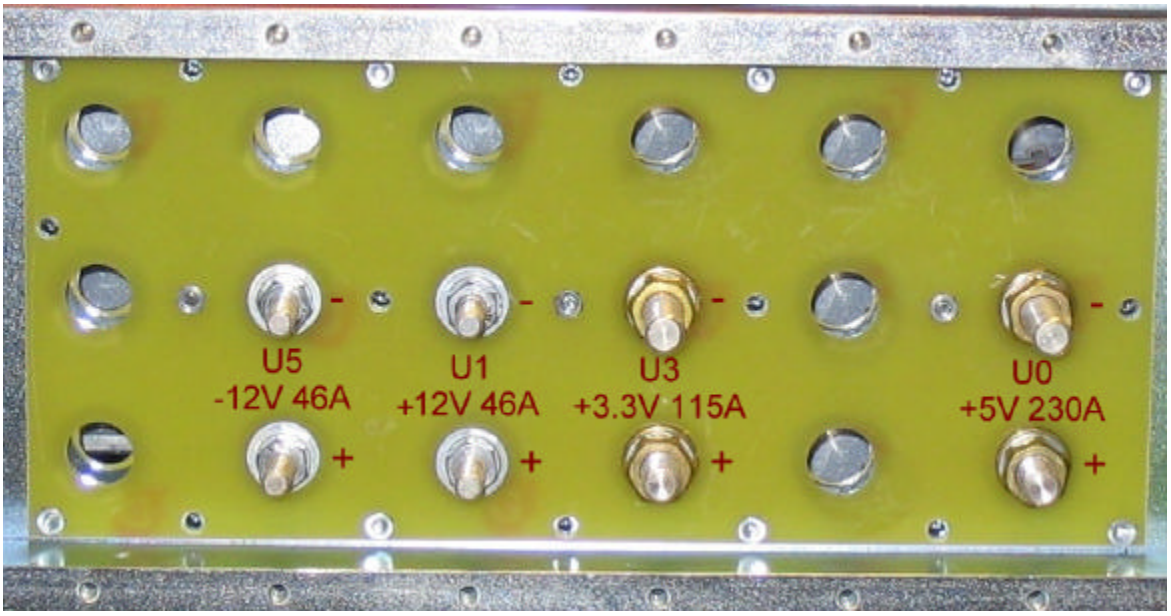


Figure 5 Rail Voltages

3.3. This is the output configuration of the power supply terminals as seen from the rear of the supply.

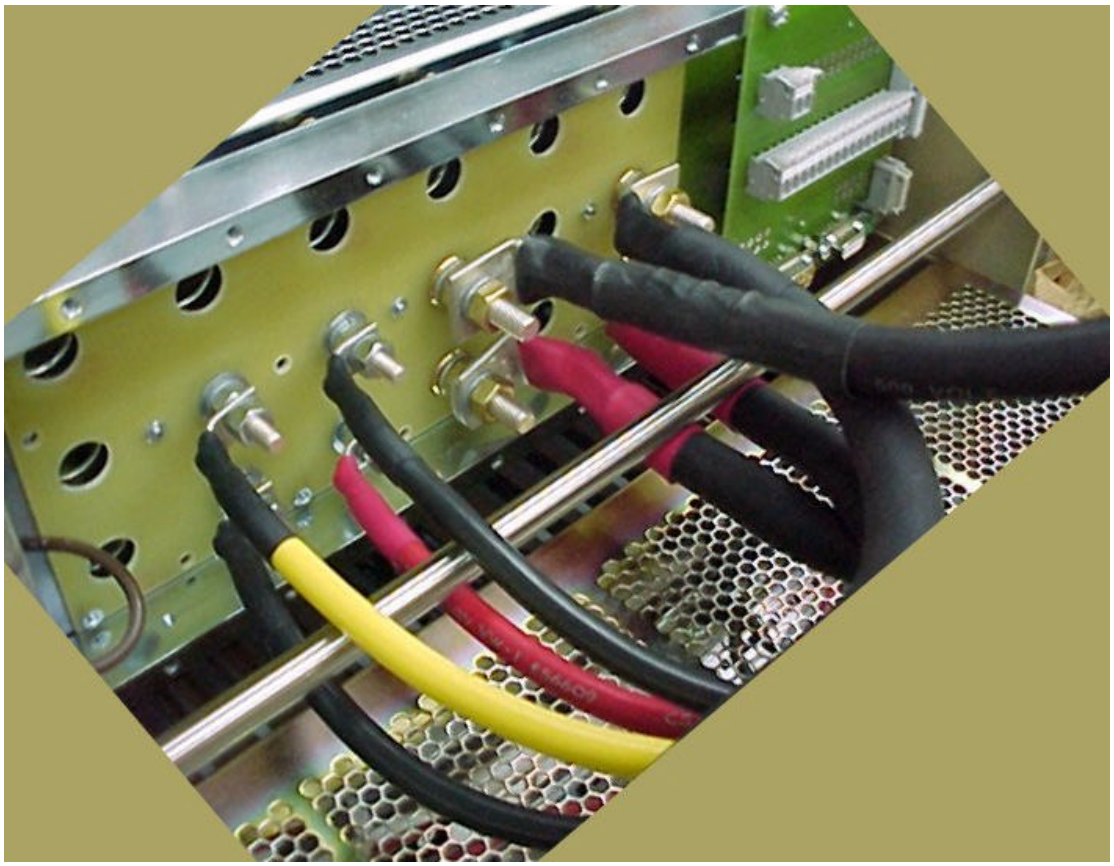


Figure 6 Power Supply connections

4. The Crate Wiring

4.1. The power supply is mounted above the crate and wired directly to it as seen in the photo below.

Figure 7 Complete Unit

The power supply mounting bar across the back and G10 insulating pieces on the crate connections prevent the lead lugs from turning and shorting to each other. Table 1 NEC 310-17 was used to select the wire gauge that will handle the full current available from the supply. The cables are less than 2 feet in length and in open air.

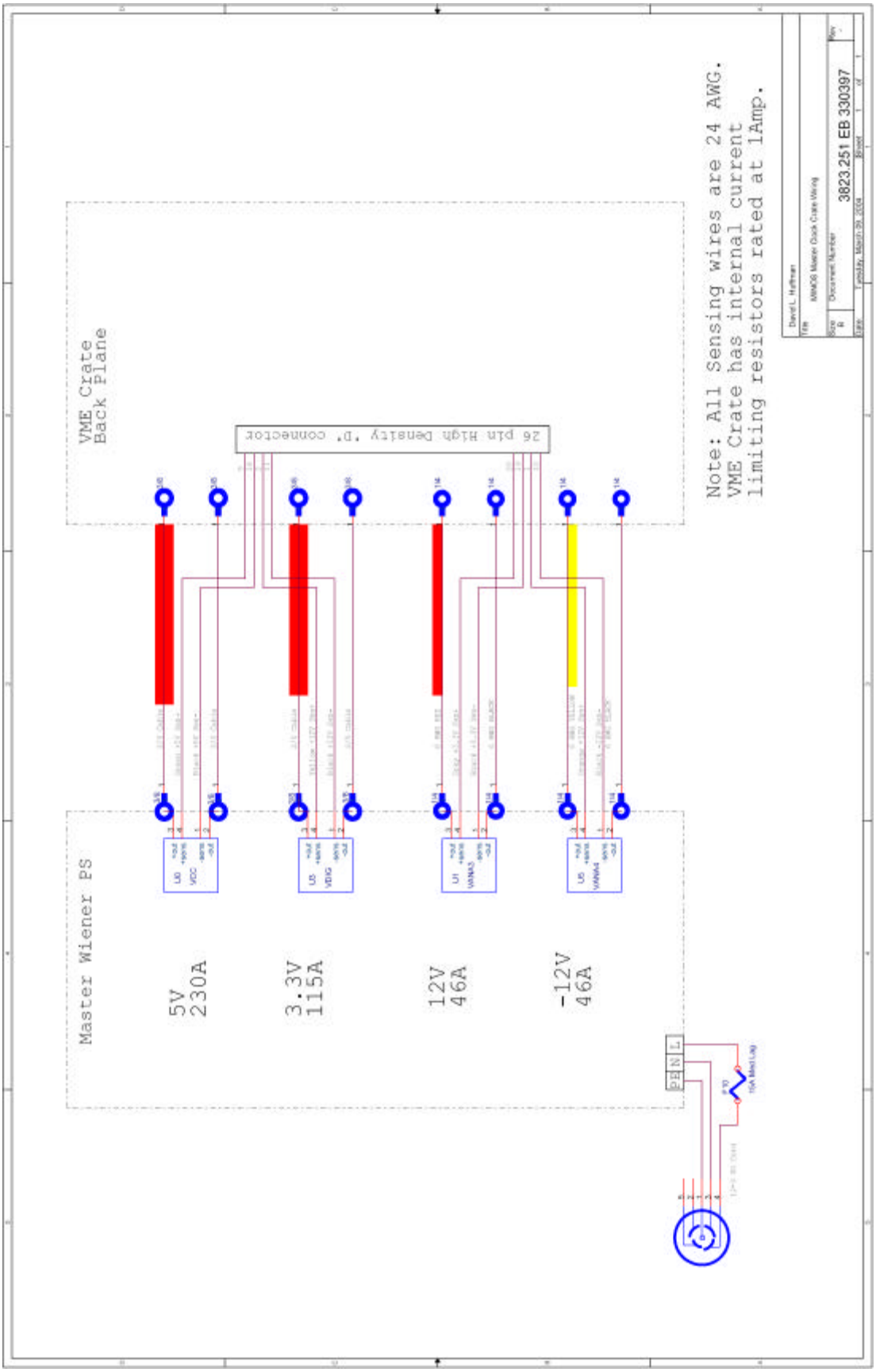


Figure 8 Wiring Schematic

5. Polycarbonate (Lexan) cover details

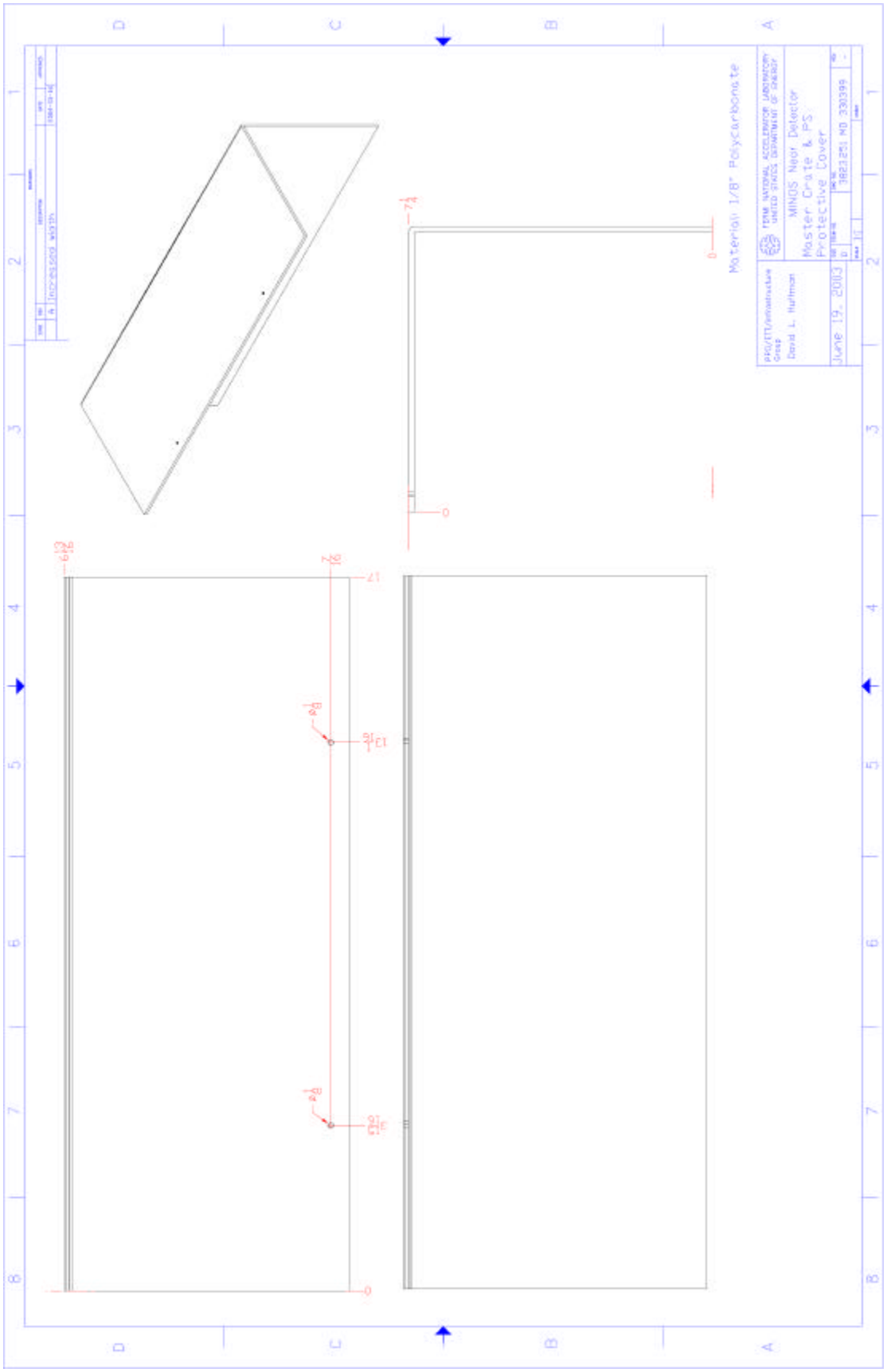


Figure 9 Polycarbonate Cover

6. Wiener chassis modification

6.1. Holes for the rear mounting bar and AC line cord strain-relief.

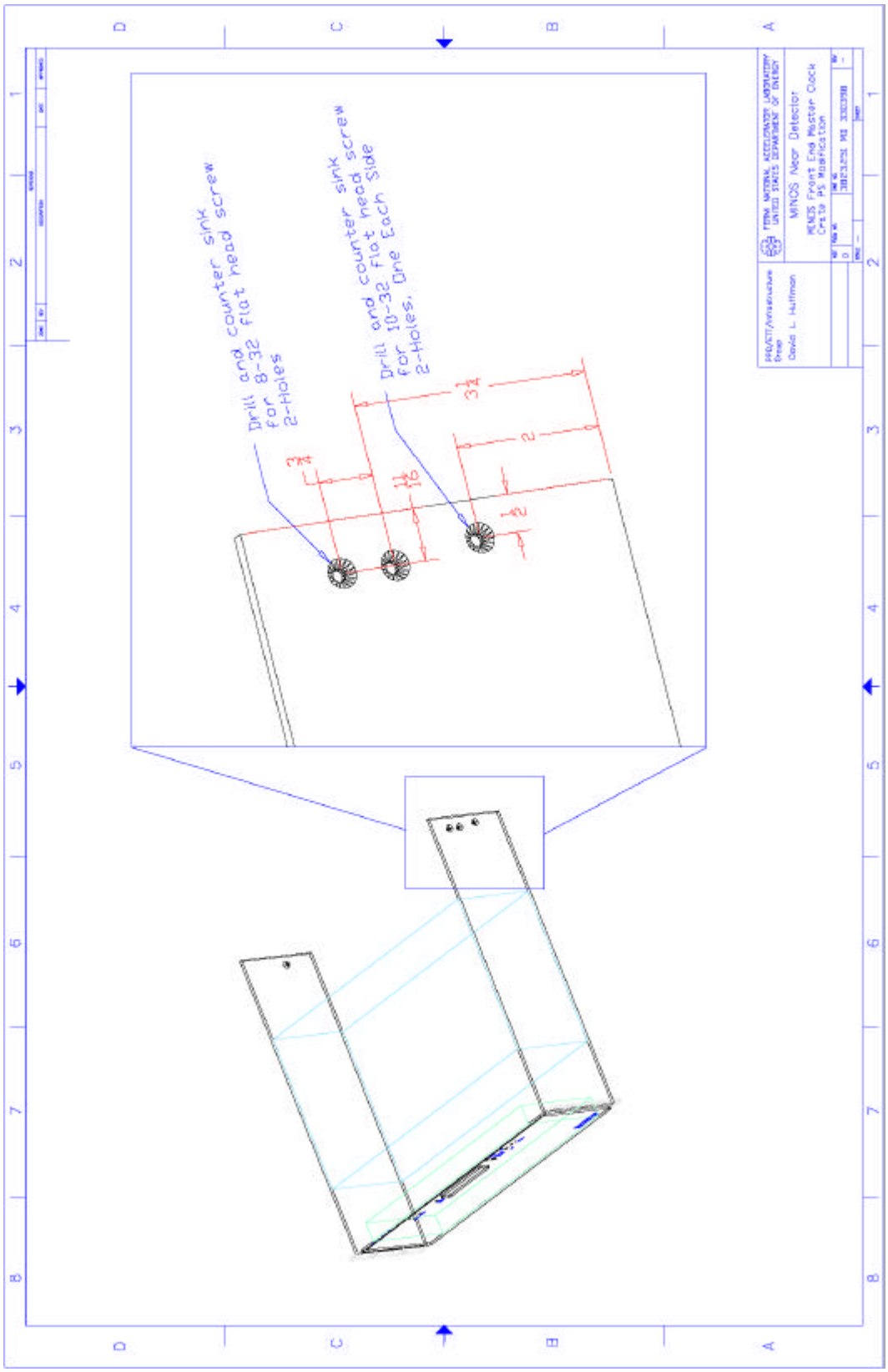


Figure 10 Wiener Chassis Modifications

7. AC input fusing.

7.1. The AC input requires fusing of the input circuit. An inline fuse is added to the input panel and a 15 Amp Medium Lag Fuse 250V installed. The AC cord to the supply is 12 AWG 3-wire SO type cord with a 20 Amp plug.

7.1.1. The brown wire is removed from the back of the input terminal and connected to one side of the fuse. A new brown wire on the other side of the fuse is attached back to the connector.

7.1.2. A hole is made in the panel and the fuse attached with a #6 screw and nut.

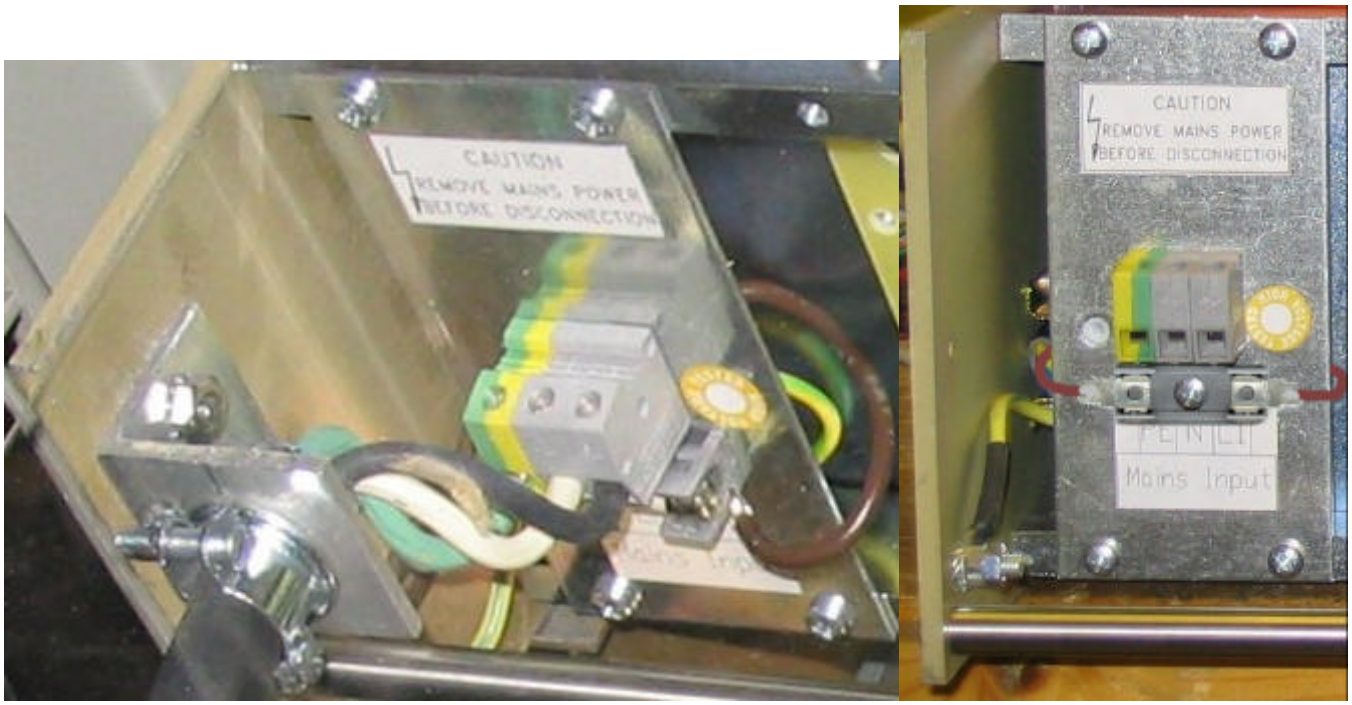


Figure 11 AC Fusing

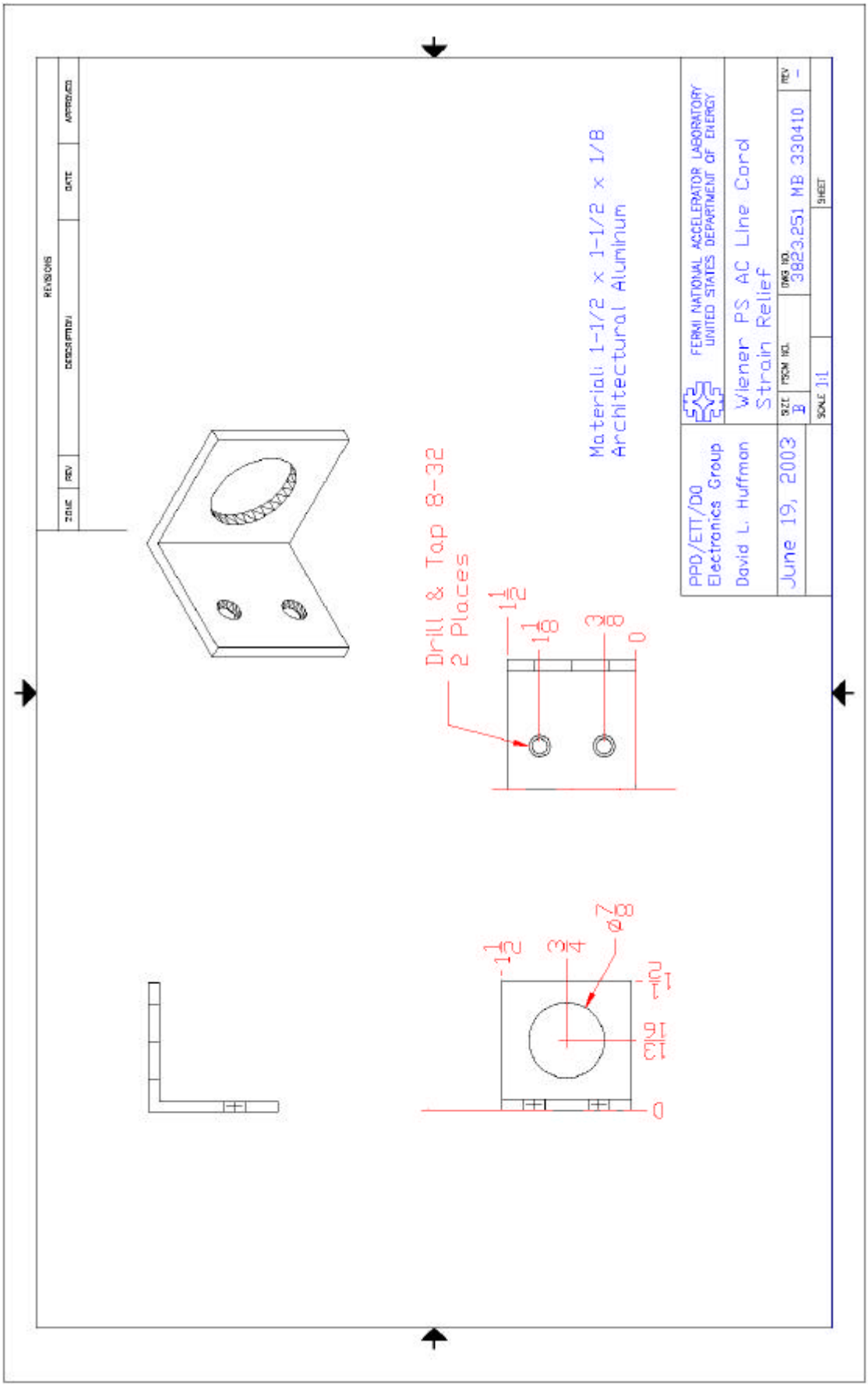


Figure 12 AC Strain Relief

8. Completed cabling with clear plastic (Lexan) cover

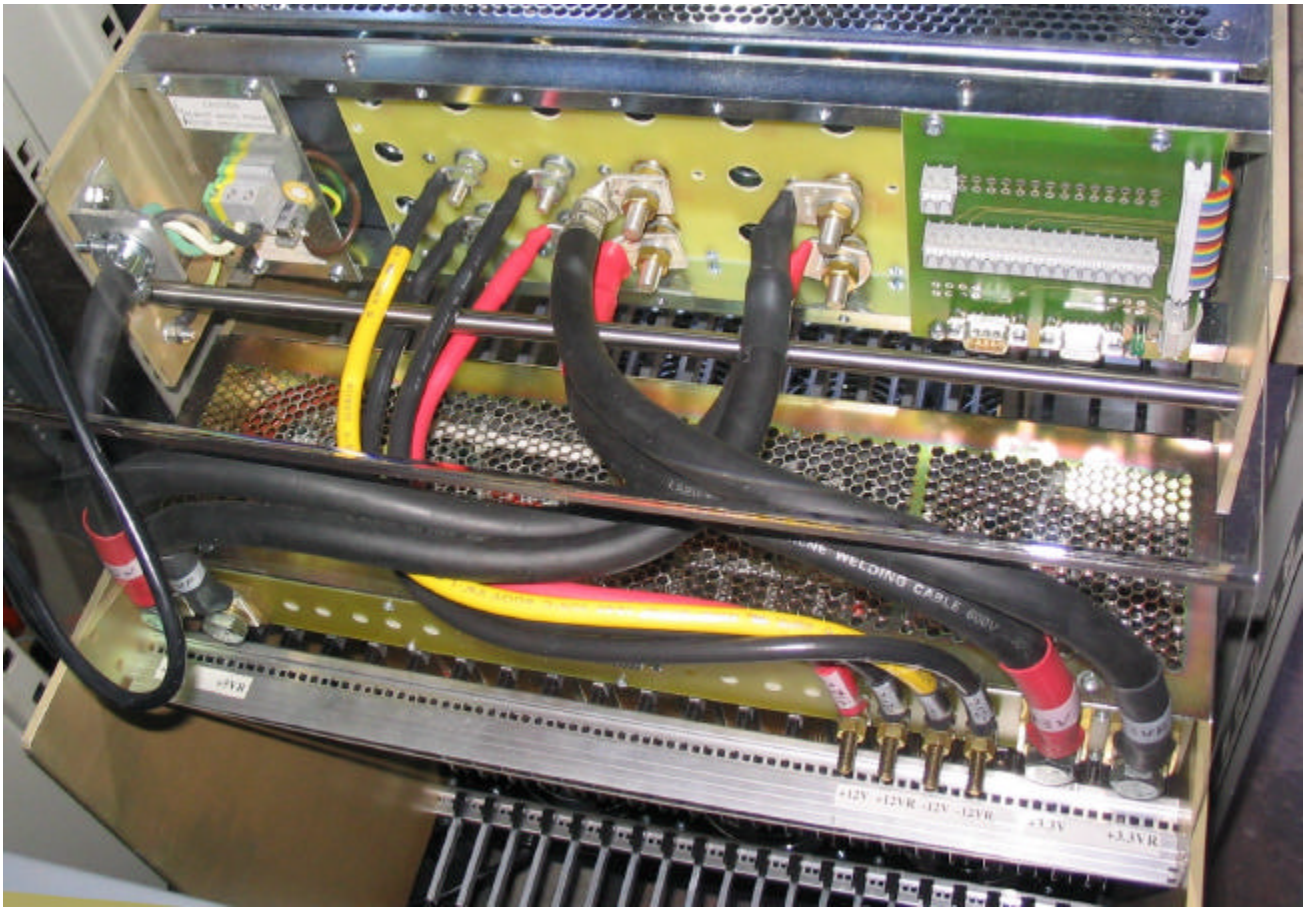


Figure 13 Photo of Completed Unit

9. Bill Of Materials for Additional parts

Item	Quantity	Part	Manufacture	Description	Unit Cost	
				Wiring		
1	8	1110-	Fermi Stock	6 AWG 1/4" Ring Tongue Terminal	$	0.14
2	4	1110-	Fermi Stock	2/0 5/16" Ring Tongue Terminal	$	0.16
3	4	1110-	Fermi Stock	2/0 5/16" Ring Tongue Term. Right Angled	$	0.17
4						
5	18		Prestoflex	2/0 Welding Cable	$	1.00
6	18		Weico	6 AWG Yellow	$	1.00
7	18		Weico	6 AWG Red	$	0.70
8	18		Weico	6 AWG Black	$	0.70
10				**AC Fusing**		
11	6	1210-111000	Fermi Stock	8-32 Nut with captured star washer	$	0.02
12	1	3823.251-MD-330410	Custom	AC Line Cord Strain Relief Bracket	$	4.67
13	1	1115-153600	Fermi Stock	Cord Strain Relief	$	1.65
14	1	1120-232000	Fermi Stock	Fuse Holder 3AG	$	0.74
15	1	1120-106000	Fermi Stock	15 Amp Medium Lag Fuse 250V	$	0.73
16				**Protective Cover**		
17	1	3823.251-MD-330399	Custom	Protective Cover, Polycarbonate	$	10.00
18	2	0965A2PG3X10		3mm x 10mm flat head screw 18-8 SS	$	0.03

Table 1 NEC 310-17

Table 310-17. Allowable Ampacities of Single-Insulated Conductors Rated 0 Through 2000 Volts in Free Air, Based on Ambient Air Temperature of 30°C (86°F)

Size	Temperature Rating of Conductor (See Table 310-13)						Size
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
AWG or kcmil	Types TW, UF	Types FEPW, RH, RHW, THHW, THW, THWN, XHHW, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RH, RHW, THHW, THW, THWN, XHHW	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	AWG or kcmil
	COPPER			ALUMINUM OR COPPER-CLAD ALUMINUM			
18	—	—	18	—	—	—	—
16	—	—	24	—	—	—	—
14*	25	30	35	—	—	—	—
12*	30	35	40	25	30	35	12*
10*	40	50	55	35	40	40	10*
8	60	70	80	45	55	60	8
6	80	95	105	60	75	80	6
4	105	125	140	80	100	110	4
3	120	145	165	95	115	130	3
2	140	170	190	110	135	150	2
1	165	195	220	130	155	175	1
1/0	195	230	260	150	180	205	1/0
2/0	225	265	300	175	210	235	2/0
3/0	260	310	350	200	240	275	3/0
4/0	300	360	405	235	280	315	4/0
250	340	405	455	265	315	355	250
300	375	455	505	290	350	395	300
350	420	505	570	330	395	445	350
400	455	545	615	355	425	480	400
500	515	620	700	405	485	545	500
600	575	690	780	455	540	615	600
700	630	755	855	500	595	675	700
750	655	785	885	515	620	700	750
800	680	815	920	535	645	725	800
900	730	870	985	580	700	785	900
1000	780	935	1055	625	750	845	1000
1250	890	1065	1200	710	855	960	1250
1500	980	1175	1325	795	950	1075	1500
1750	1070	1280	1445	875	1050	1185	1750
2000	1155	1385	1560	960	1150	1335	2000

Table 2 Welding Cable Specs.

WELDING CABLE PRESTOFLEX® INSULATED

90°C - 600 Volt.

Use... As power feed leads from the welding power source to the electrodes.

Conductor... Stranded bare copper.

Insulation... EPDM

Temperature Rating... 90°C.

Voltage Rating... 600 Volts

Features... High tear strength jacket with excellent resistance to abrasion and impact. Superior flexibility even down to -67°F with good flame resistance. Special stranded conductor for added flexibility and easy handling.

Specification Data:

AWG	No. of Ends	Insulation Thickness (In.)	Nominal O.D. Inches	Approx. lbs/Mft.
6	280	0.80	.356	127
4	440	0.80	.403	181
3	552	0.85	.441	223
2	704	0.90	.485	278
1	880	0.95	.529	341
1/0	1112	0.105	.591	429
2/0	1408	0.104	.635	524
3/0	1760	0.105	.685	640
4/0	2224	0.115	.764	803

Note:
· All sizes available on 1000 foot or 500 foot reels. One length per reel.
· 34 gauge stranded conductors available on special orders.
· Black is standard, other colors are available on special orders.

Spark Tested for 600 volts.
Prestolite has established a voltage rating procedure incorporating the IPCEA-S-19-81 D.C. spark test.

AWG	Voltage (KV)
6-2	22.5
1-4/0	27.0

Table 3 Weico Wire Specification

weicowire.com

WEICO

WIRE, CABLE & TUBING

ABOUT US
Corporate Info
Weico Services
Contact Weico

PRODUCTS
Wire & Cable
Magnet Wire
Tubing
Technical

Quick Order ONLINE

HOOK-UP WIRE

1015 UL MTW
CSA TEW

Characteristics:
- Temperature Range: -40°C to +105°C
- Voltage Rating: 600V
- Passes UL VW-1 Flame Test

Description:
Stranded Tinned Copper,
Color Coded Polyvinylchloride Insulation,
.032" Nominal Insulation Thickness

*Click on a part number below for pricing and ordering online

WEICO NO.	CONDUCTOR SIZE	CONDUCTOR STRAND	NOM. O.D. (IN)
3224	24	7/32	.088
3222	22	7/30	.095
3220	20	10/30	.102
3218/1	18	Solid	.104
3218	18	16/30	.112
3216	16	26/30	.125
3214	14	41/30	.142
3212	12	65/30	.156
3210	10	105/30	.184
3208*	8	133/29	.265
3206**	6	133/27	.341

*UL 1028 **UL 1283

COLORS			
0 - Black	3 - Orange	6 - Blue	9 - White
1 - Brown	4 - Yellow	7 - Violet	
2 - Red	5 - Green	8 - Gray	

STRIPES: Any of the above colors are available in any combination of stripes up to a maximum of three stripes.

Standard Put-Ups: 100 ft., 1000 ft.