DELTA ELEKTRONIKA BV

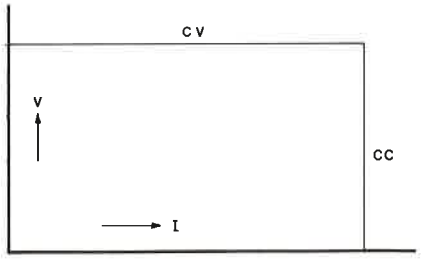
P.O. BOX 27
ZIERIKZEE
NETHERLANDS
TELEPHONE (01110) 3656

REGULATED POWER SUPPLY E 030-3

0-30 V, 0-3 A

DESCRIPTION

The power supply E 030-3 can be used as a constant voltage source with a limited current or as a constant current source with a limited open voltage. The change of mode occurs sharply at the crossing of the voltage and current settings.
A preregulator with silicon controlled rectifiers keeps the rectified voltage in accordance with the output voltage.
This means low dissipation in the transistors of the series regulator, so that no blower is needed for cooling.
The preregulator causes no interference on the mains.
The power supply is protected against any overload condition.



CONSTANT VOLTAGE OPERATION

Voltage control	10-turn potentiometer, range 0-30 V, resolution 0.02 %.
Remote programming	The voltage can be programmed by an external variable resistor of 0-5000 Ohm. Input on the front panel. Output voltage programming by an external voltage (0-30 V) on request.
Voltage regulation	2 mV for a + or − 10 % AC input voltage variation. 10 mV for a 100 % load change.
Temp. coeff.	2.10^{-4} per °C from maximum output voltage.
Ripple voltage	0.1 mV r.m.s.

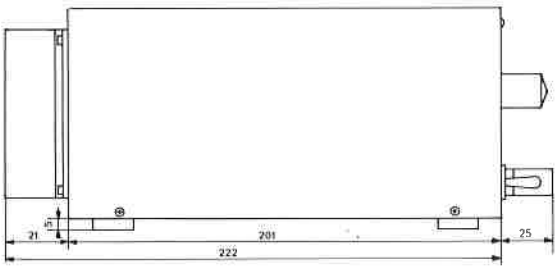
Output impedance	Maximum 4 milli-ohm at DC Maximum 0.1 Ohm up to 100 kHz load frequency.
Recovery time	15 micro seconds for recovery to within 30 mV of steady state voltage after a step load change from 10 % tot 100 %.

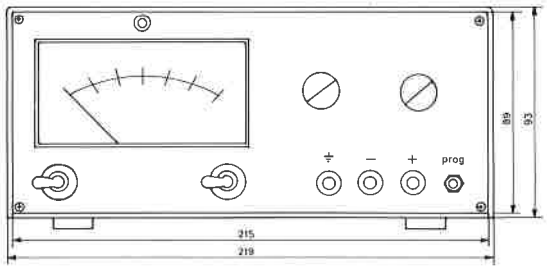
CONSTANT CURRENT OPERATION

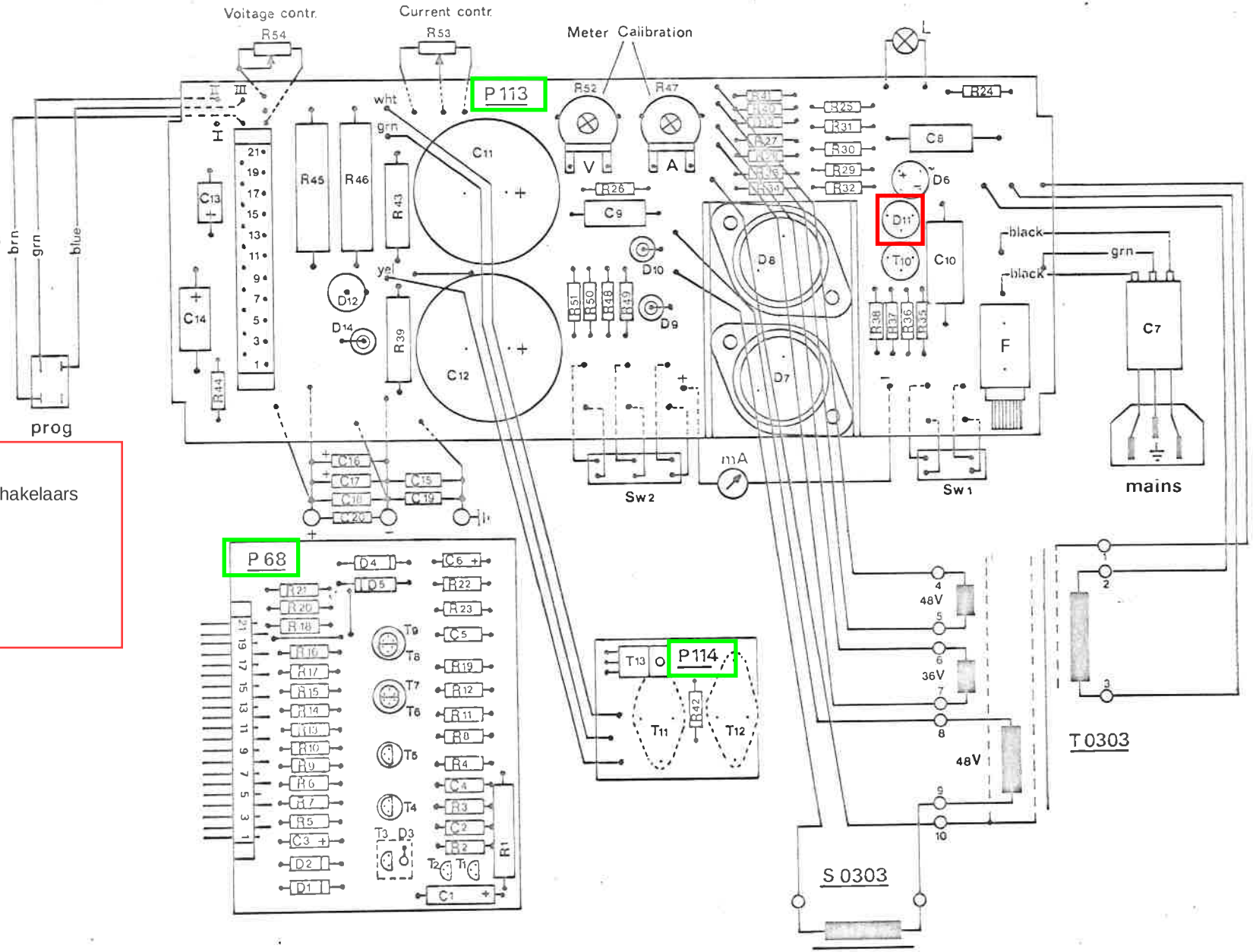
Current control	Single turn potentiometer, range 0-3 A, resolution 0.02 %.
Current regulation	1 mA for a + or – 10 % AC input voltage varation. 5 mA for a maximum output voltage swing.
Temp. coeff.	5.10^{-4} per °C from maximum output current.
Ripple current	0.5 mA r.m.s.

REMAINING SPECIFICATIONS

Input voltage	220 V, 50 Hz. Other input voltages on request.
Parallel and series connection	Special design enables parallel and series operation without any precaution. Series connection up to 300 V.
Ambient temp.	– 20 to + 45 °C.
Output terminals	On front panel only, isolated from the case. Maximum voltage between output terminals and case 500 V.
Rack mounting	Two uncased units can be mounted side by side and with the addition of two H 6 brackets can be inserted in a 19" rack. For
Cooling	By natural convection cooling. The air must flow freely through the case and the vertical heat sink for effective cooling.
Meter	Meter with selector switch for voltage and current, accuracy 1.5 % f.s.
Finish	Light gray front panel with dark gray case.
Weight and size	5.7 kg, 219 x 93 x 222 mm.







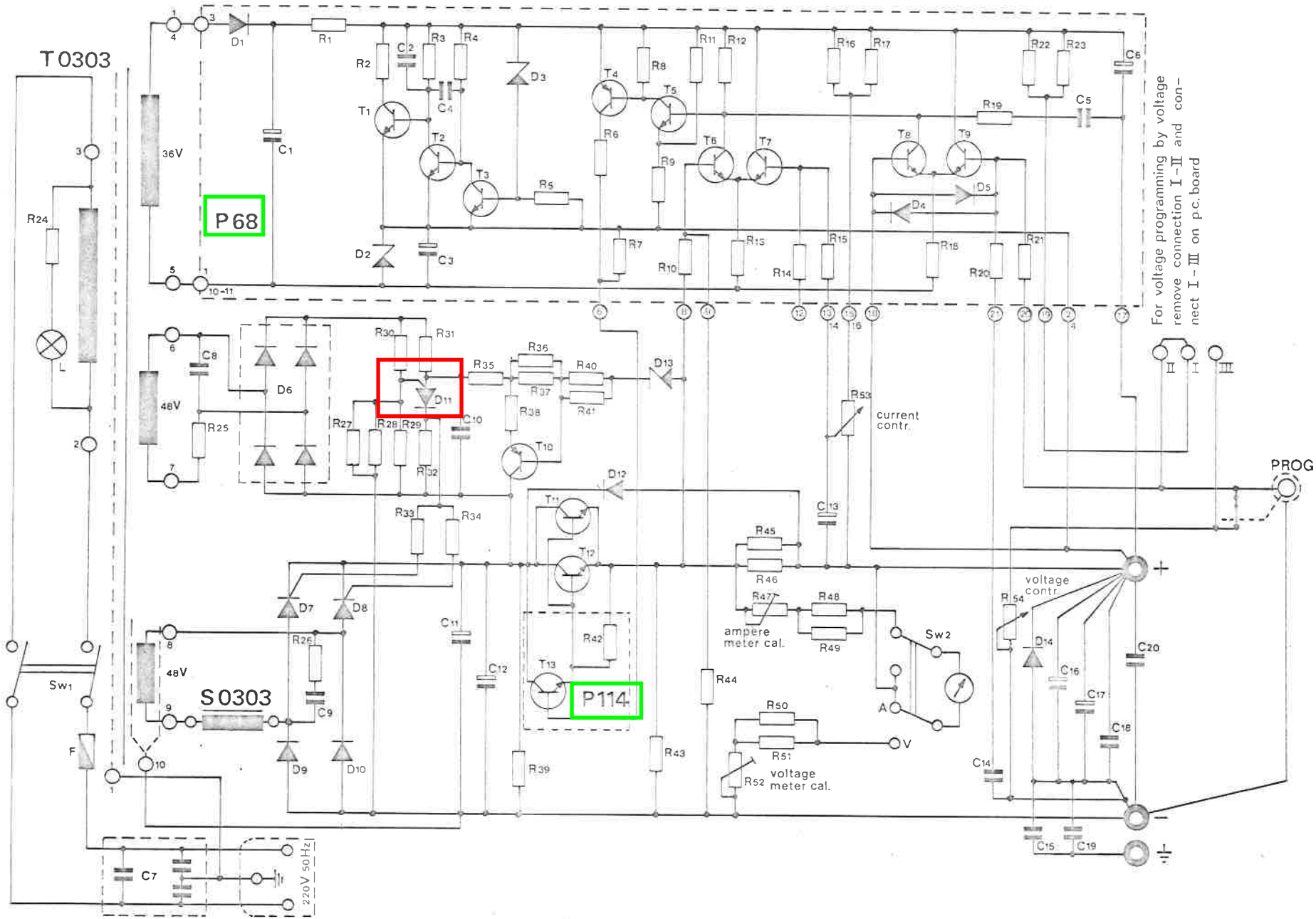
1 ste Serie

Chroom Metalen schakelaars
Neon Lampje
Getransistoriseerd
PUT = D13T1
P113 / P68 / P114/

vanaf : 1-3-1973

wiring diagram **E 030-3**

1-3-73



circuit diagram E 030-3

1-3-'73

R (Ohm)

1 = 820 1 W
2 = 150
3 = 10 k
4 = 10 k
5 = 150
6 = 33
7 = 1 k
8 = 2,2 k
9 = 2,2 k
10 = 470
11 = 2,7 k
12 = 22 k
13 = 6,8 k
14 = 470
15 = 470
16 = CR
17 = 18 k
18 = 6,8 k
19 = 150
20 = 470
21 = 470
22 = CR
23 = 1,2 k
24 = 560 k
25 = 560
26 = 330
27 = 27 k
28 = 12 k
29 = 2,2 k
30 = 2,7 k
31 = 15 k
32 = 47
33 = 10
34 = 10
35 = 3,3 k
36 = 15 k
37 = 100 k
38 = 220
39 = 2,2 k 1 W
40 = CR
41 = 220 k
42 = 10
43 = 1,5 k 1 W
44 = 5,6 M
45 = 1 7 W WW
46 = 1 7 W WW
47 = 1 k 1 turn
48 = 1,5 k
49 = 12 k
50 = 330 k
51 = 33 k
52 = 1 k 1 turn
53 = 5 k 1 turn Colvern
54 = 5 k 10 turn Bourns

F = fuse 2 A delay, 5 x 20 mm

E 030-3 (1-8-1973)

C (microfarad)

1 = 47 63 V
2 = 0,01 250 V
3 = 22 25 V
4 = 0,01 250 V
5 = 0,047 250 V
6 = 22 25 V
7 = 0,07 + 2 x 2500 pF 250 V
8 = 1 250 V
9 = 0,47 250 V
10 = 0,22 63 V
11 = 2200 63 V
12 = 2200 63 V
13 = 10 35 V
14 = 10 100 V
15 = 0,1 630 V
16 = 100 63 V
17 = 100 63 V
18 = 0,33 100 V
19 = 10 kpF 500 V
20 = 10 kpF 500 V

D

1 = 1N 4003 TI
2 = ZY 6,2 ITT
3 = ZY 6,2 ITT
4 = 1N 4148 ITT
5 = 1N 4148 ITT
6 = W01 GI
7 = 2N 3668 RCA
8 = 2N 3668 RCA
9 = 60 S1 IR
10 = 60 S1 IR
11 = D 13 T 1 GE
12 = MR 1031 B Mot.
13 = ZD 5,1 ITT
14 = 60 S1 IR

T

1 = BC 182 TI
2 = BC 182 TI
3 = BC 182 TI
4 = BC 212 TI
5 = BC 182 TI
6 = BC 182 TI
7 = BC 182 TI
8 = BC 182 TI
9 = BC 182 TI
10 = BC 212 TI
11 = 2N 3055 RCA
12 = 2N 3055 RCA
13 = TIP 29 A TI

WW= wire wound resistor

CR= calibration resistor

All other resistors metalfilm $\frac{1}{2}$ W 2%

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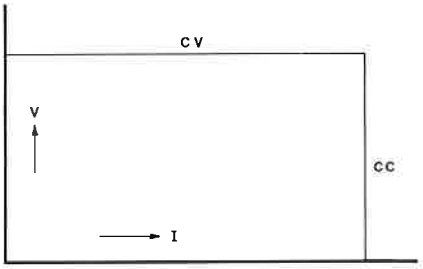
REGULATED POWER SUPPLIES

E 015 – 2	0 – 15 V	0 – 2	A
E 030 – 1	0 – 30 V	0 – 1	A
E 030 – 3	0 – 30 V	0 – 3	A
E 060 – 0.6	0 – 60 V	0 – 0.6	A
E 0300 – 0.1	0 – 300 V	0 – 0.1	A
E 018 – 0.6 D	± 0 – 18 V	0.6	A

DESCRIPTION

E 015-2, E 030-1 and E 060-0.6



These power supplies are of the linear transistor series regulator type. They can be used as a constant voltage source with a sharply limited current, or as a constant current source with a sharply limited open voltage. Both limits are continuously variable from zero to full range. The change of mode occurs at the crossing of the voltage and current settings.
A ten-turn potentiometer is used to provide a high resolution voltage control. For current control a single turn potentiometer (resolution 0,1%) is used to enable an approximate indication of the current setting.

E 030-3 and E 0300-0.1

These models also have a linear transistor series regulator which however is preceeded by an SCR pre-regulator for better efficiency.
This pre-regulator keeps the rectified voltage in accordance with the output voltage to keep dissipation in the power transistors low.

E 018-0.6 D

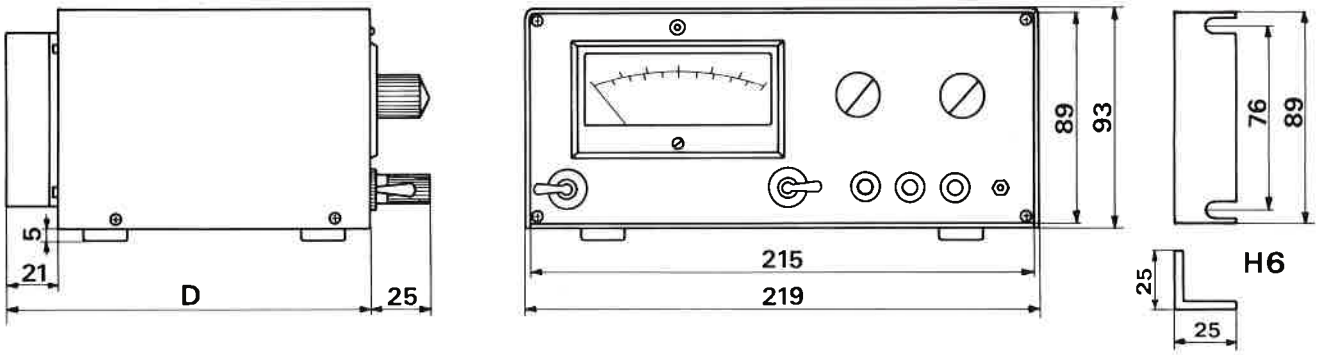
This model has been designed to supply plus and minus 15 volts for design work with operational amplifiers. It provides a plus 0 – 18 V and a minus 0 – 18 V which are tracking and can be varied with one ten-turn potentiometer. With the second potentiometer the ratio of the positive and negative voltage can be varied between ½ and 2. The positive and negative outputs have coupled overload protection circuits. This means that both output voltages will decrease proportionally if one is overloaded. Also if one output is short circuited, both outputs will drop to zero. The E 018-0.6 D has a fixed constant current overload characteristic. Independent of the ratio setting, the positive and negative output can never exceed a limit of about 18,5 V.

SPECIFICATIONS

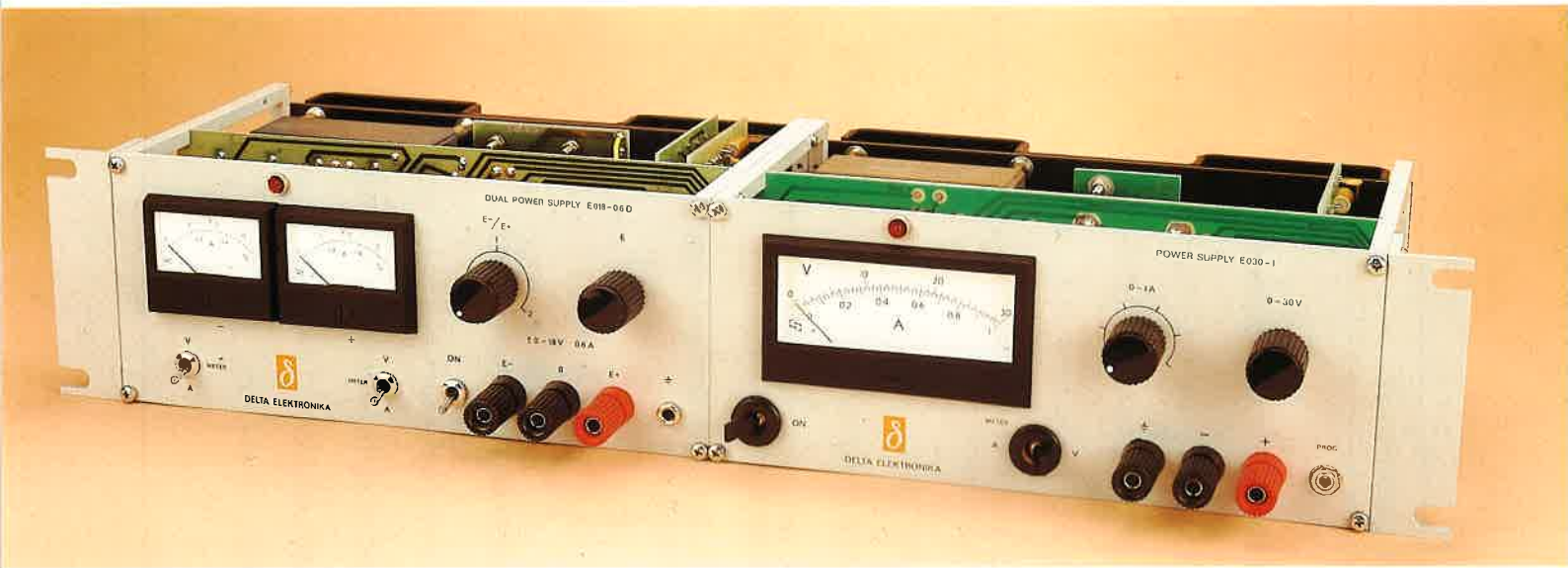
Input voltage	220 V 50 Hz standard. Other input voltages at special order.
Input-output insulation	1500 V AC rms 1 minute (VDE 0550).
Max. voltage between output and case	500 V DC.
Max. ambient temperature	45°C.
Meter	Accuracy 1.5 % of fsd, selector switch for voltage and current measurement.
Parallel and series connection	Units can be connected parallel and in series. Series connection up to 300 V.
Weight and size	2.8 kg 219 x 93 x 154 mm 30 Watts type. 5.7 kg 219 x 93 x 222 mm E 030-3

SPECIFICATIONS	E 015-2	E 030-1	E 030-3	E 060-0.6	E 0300-0.1	E 018-0.6 D
CONSTANT VOLTAGE MODE						
Line regulation for 198—242 V variation	1 mV	2 mV	2 mV	4 mV	10 mV	5 mV
Load regulation for 0 – 100% variation.	2 mV	4 mV	4 mV	8 mV	20 mV	5 mV
Temp. coefficient per °C (% of V max)	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %
Drift per 8 hours under constant conditions after 15 minutes warm up	0.1 %	0.1 %	0.1 %	0.1 %	0.1 %	0.1 %
Ripple voltage, rms	0.1 mV	0.1 mV	0.1 mV	0.1 mV	0.5 mV	0.1 mV
Output impedance at 100 kHz load frequency	100 mΩ	100 mΩ	100 mΩ	100 mΩ	10 Ω	100 mΩ
Recovery time to within 30 mV after a step load change from 10 to 100%	15 µS	15 µS	15 µS	15 µS	30 µS	15 µS
Remote programming of output voltage by resistance	0–5 kΩ	0–5 kΩ	0–5 kΩ	0–10 kΩ	–	–
CONSTANT CURRENT MODE						
Line regulation for 198 – 242 V variation	0.3 mA	0.3 mA	0.4 mA	0.3 mA	0.03 mA	–
Load regulation for zero to max. load	2 mA	2 mA	4 mA	2 mA	0.5 mA	–
Temp. coefficient per °C (% of I max.)	0.05 %	0.05 %	0.05 %	0.05 %	0.05 %	–
Ripple current rms	0.1 mA	0.1 mA	0.1 mA	0.1 mA	0.1 mA	–

Simple construction and use of high quality components forms unique reliable unit.



For E 030-3 D = 222 mm, for all other models D = 154 mm.



Two uncased units can be mounted side by side, with the addition of two H6 brackets they can be inserted in a 19'' rack.

R = Ohm

1	=	680 1W
2	=	270
3	=	CR
4	=	470
5	=	3,9 k
6	=	6,8 k
7	=	1,8 k
8	=	1 M
9	=	470
10	=	—
11	=	27 k
12	=	CR
13	=	470
14	=	47
15	=	470
16	=	470
17	=	15 k
18	=	CR
19	=	1,8 k
20	=	CR
21	=	CR
22	=	3,3 k
23	=	560
24	=	330
25	=	27 k
26	=	12 k
27	=	2,2 k
28	=	2,7 k
29	=	15 k
30	=	47
31	=	10
32	=	10
33	=	3,3 k
34	=	15 k
35	=	100 k
36	=	220
37	=	2,2 k 1W
38	=	CR
39	=	270 k
40	=	10
41	=	1,5 k 1W
42	=	5,6 M
43	=	1 7W WW
44	=	1 7W WW
45	=	1 k trim.
46	=	1,5 k
47	=	12 k
48	=	180 k
49	=	33 k
50	=	2 k trim.
51	=	5 k potm.
52	=	5 k 10 turn. potm.
53	=	CR
54	=	CR

T 1	=	BC 182	TI
2	=	BC 212	TI
3	=	2N3055	RCA
4	=	2N3055	RCA
5	=	BD 239	RCA

C = microfarad

1	=	47	63 V
2	=	22	25 V
3	=	0,047	250 V
4	=	2,2	35 V tt
5	=	CC	
6	=	22	25 V
7	=	CC	
8	=	1	250 V
9	=	0,47	250 V
10	=	0,22	63 V
11	=	2200	63 V
12	=	2200	63 V
13	=	10	40 V
14	=	10	100 V
15	=	0,1	630 V
16	=	—	
17	=	220	63 V
18	=	0,33	100 V
19	=	0,01	500 V
20	=	0,01	500 V
21	=	0,07+2x2500	250 V
22	=	0,0001	250 V
23	=	0,0001	250 V
24	=	0,0001	250 V
25	=	0,01	250 V
26	=	CC	

D 1	=	1N4003	TI
2	=	ZY 6,2	ITT
3	=	1N825	ITT
4	=	1N4148	ITT
5	=	1N4148	ITT
6	=	1N4148	ITT
7	=	1N4148	ITT
8	=	B125C1000	Herman
9	=	2N3668	RCA
10	=	2N3668	RCA
11	=	60 S 1	IR
12	=	60 S 1	IR
13	=	D 13 T 1	GE
14	=	60 S 1	IR
15	=	ZD 5,1	ITT
16	=	60 S 1	IR
17	=	1N4148	ITT
18	=	133 HR	Sloan

IC1	=	SN72741 P	TI
IC2	=	SN72747	TI

F = Fuse 2 A delay 5 x 20 mm.
CR = Calibration resistor.
CC = Calibration capacitor.
WW = Wire wound resistor.
tt = tantalum
All other resistor 0,4 W 2% metal film.

Modifications	Date	App.	
(Led) R22, D17, D18	2-'82	Vr	Title: Part list E030-3
C25, R53/P211b, R54, C26	2-'82	Vr	
Serial no 2498 and up.	Apr.'78	Vr	Date: Apr. '78

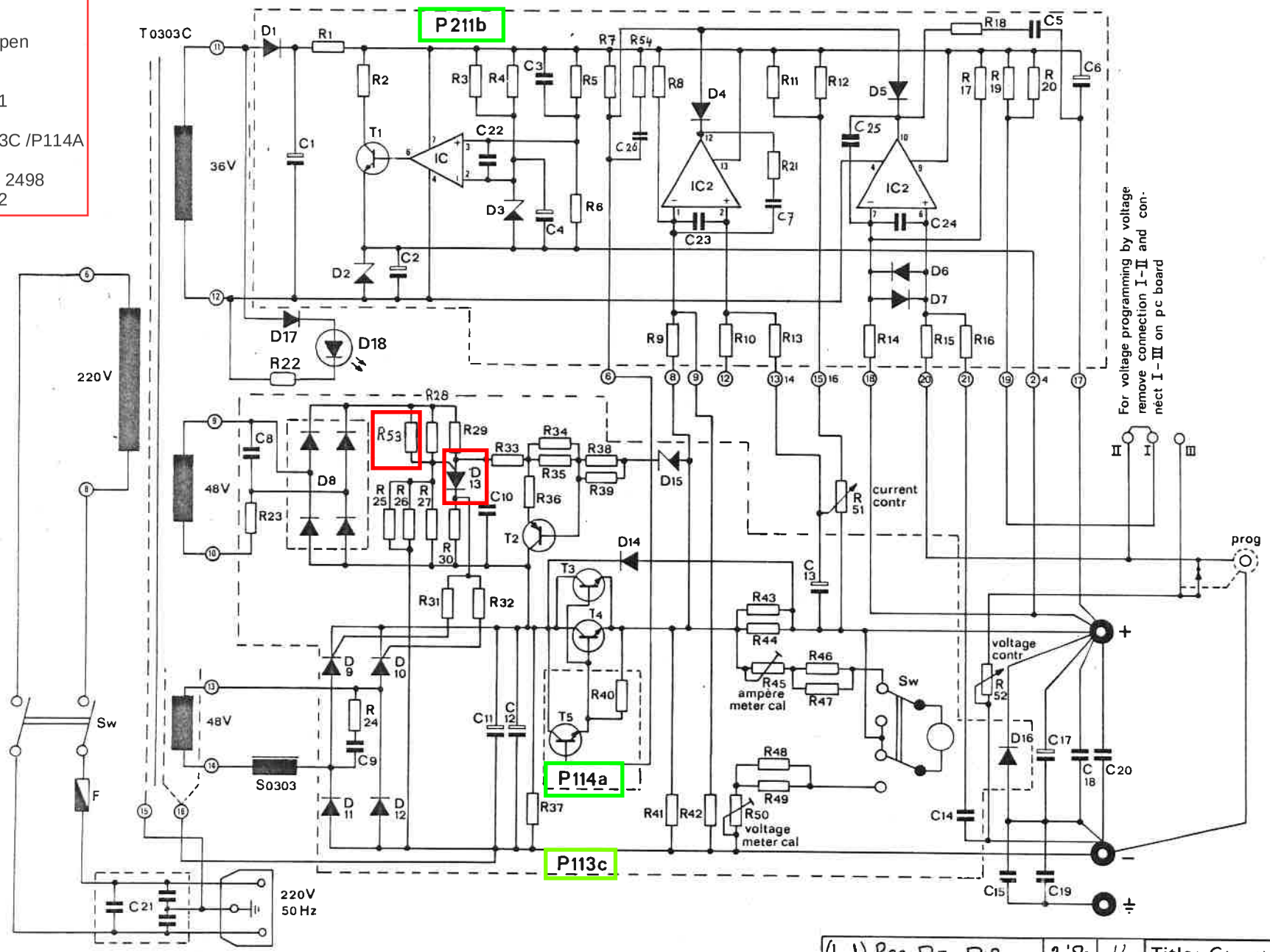
delta elektronika bv

2de Serie

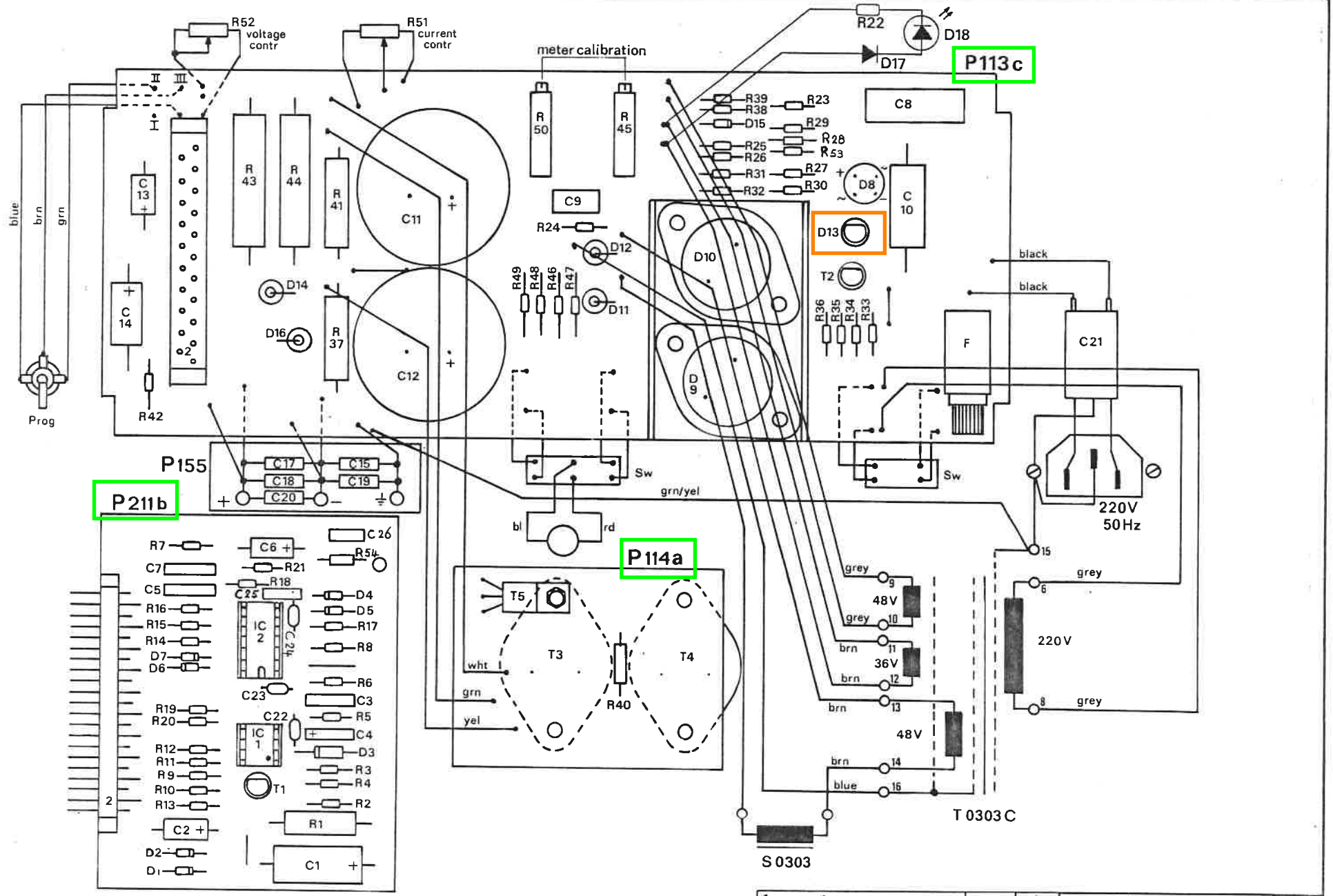
Zwarte Knoppen
Rode LED

PUT = D13T1
741/747
P211B / P113C /P114A

Vanaf: Serial 2498
4/1982



(Led) R22, D17, D18	2-'82	Vr.	Title: Circuit diagram E030-3
C25, R53 / P211b, R54, C26	2-'82	Vr	
Serial no 2498 and up	Apr. '78	Vr.	Date: Apr. '78
Modifications	Date	App	delta elektronika bv



(Led) R22, D17, D18	2.'82	Vr	Title: Wiring diagram p.c. boards E030-3
C25 / P211b, R54, C26	2.'82	Vr	
Serial no 2498 and up	Apr. '78	Vr	Date: Apr. '78
Modifications	Date	App	delta elektronika bv

R = Ohm

1 =	680	PR 52
2 =	270	
3 =	CR	
4 =	470	
5 =	3,9 k	
6 =	6,8 k	
7 =	1,8 k	
8 =	1 M	
9 =	470	
10 =	-	
11 =	27 k	
12 =	CR (270 k)	
13 =	470	
14 =	47	
15 =	470	
16 =	470	
17 =	15 k	
18 =	CR (100)	
19 =	1,8 k	
20 =	CR (8,25k)	
21 =	CR (68)	
22 =	3,9 k	
23 =	560	
24 =	330	
25 =	27 k	
26 =	12 k	
27 =	2,2 k	
28 =	2,7 k	
29 =	15 k	
30 =	47	
31 =	10	
32 =	10	
33 =	3,3 k	
34 =	15 k	
35 =	100 k	
36 =	220	
37 =	2,2 k	PR 37
38 =	CR (267 k)	
39 =	270 k	
40 =	10	
41 =	1,5 k	PR 37
42 =	5,6 M	
43 =	1	7W WW 58 ER
44 =	1	7W WW 58 ER
45 =	1 k	trim.
46 =	1,5 k	
47 =	12 k	
48 =	270 k	
49 =	33 k	
50 =	2 k	trim.
51 =	5 k	1 trn. potm.
52 =	5 k	10 trn. potm.
53 =	CR (47 k)	
54 =	-	
55 =	2,2 M	

T	1 =	BC 546 A	Siemens
	2 =	BC 556 A	Siemens
	3 =	2N3055	RCA
	4 =	2N3055	"
	5 =	BD 239 A	"

C = microfarad

1 =	100	63V	EB
2 =	22	25V	EB
3 =	0,047	250V	MKT1818
4 =	2,2	35V	TT
5 =	0,01	250V	MKT1818
6 =	22	25V	EB
7 =	0,047	250V	MKT1818
8 =	1	250V	MKT1822
9 =	0,47	100V	MKT1822
10 =	0,22	630V	MKT1813
11 =	2200	63V	EYV
12 =	2200	63V	EYV
13 =	10	40V	EB
14 =	10	100V	EB
15 =	0,1	630V	MKT1813
16 =	-		
17 =	220	63V	EG
18 =	0,33	250V	MKT1813
19 =	0,01	500V	GEX
20 =	0,01	500V	GEX
21 =	68 nF+2x2700 pF	250V	F1740
22 =	0,0001	500V	GEB
23 =	0,0001	500V	GEB
24 =	0,0001	500V	GEB
25 =	0,01	250V	MKT1818

D	1 =	1N4004G	Philips
	2 =	ZPY 6,2	ITT
	3 =	1N825	ITT
	4 =	1N4148	ITT
	5 =	1N4148	ITT
	6 =	1N4148	ITT
	7 =	1N4148	ITT
	8 =	KB10B250C1000	Hermann
	9 =	2N3668	RCA
	10 =	2N3668	RCA
	11 =	MR 751	Motorola
	12 =	MR 751	Motorola
	13 =	2N6027	Philips
	14 =	MR 751	Motorola
	15 =	ZPD 5,1	ITT
	16 =	MR 751	Motorola
	17 =	1N4148	ITT
	18 =	133 BR	Sloan

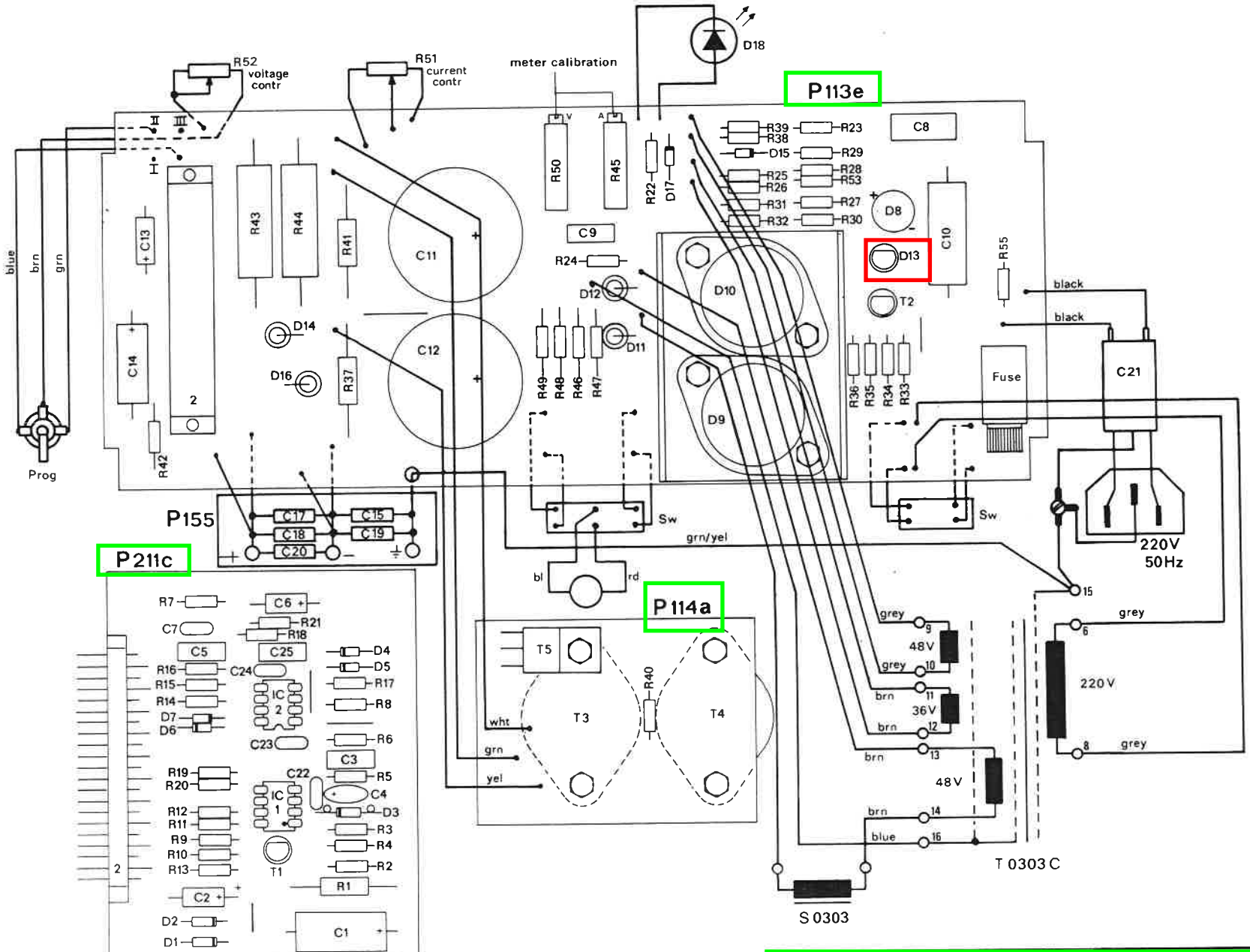
IC	1 =	TL 081 IP	TI
	2 =	TL 082 IP	TI

F = Fuse 2 A delay 5 x 20 mm

CR = Calibration resistor
WW = Wire wound resistor
MRS 25 = metal film 0,4 W 1%
PR 37 = " " 1,6 W 5%
PR 52 = " " 2,5 W 5%

All non specified resistors are of type MRS 25

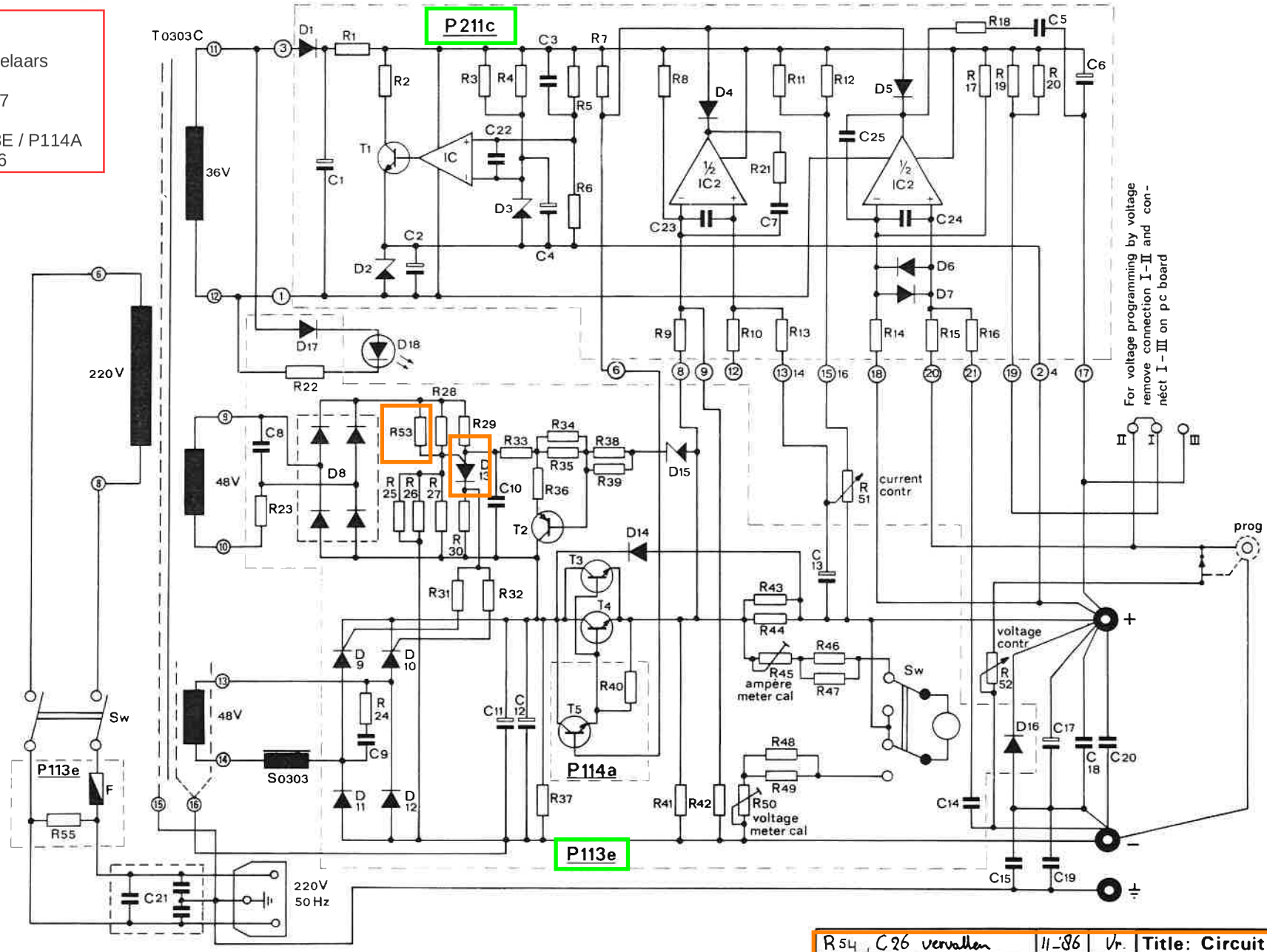
R54, C26 vervallen	11-'86	Vr.	Title: Part list E030-3
C10	7-'88	Vr.	Date: 4-'78
Modifications	Date	App.	delta elektronika bv



R54, C26 vervallen	11-'86	Vr.	Title: Wiring diagram
R55 (P113e)	8-'86	Vr.	E030-3
IC 1, 2 (P211c)	2-'86	Vr.	Date: 4-'78
Modifications	Date	App	delta elektronika bv

Derde Serie

Zwarte Schakelaars
Rode Led
PUT = 2N6027
TL081/082
P211C / P113E / P114A
Vanaf: 2/1986



R54, C26 vervallen	11-'86	Vr.	Title: Circuit diagram
R55 (P113e)	8-'86	Vr	E030-3
IC1,2 (P211c)	2-'86	Vr.	Date: 4-'78
Modifications	Date	App	delta elektronika bv