MINOX

35 PE

Type 10730

Ersatzteile
Reparatur

Spare Parts
Repairs

Pièces de rechange
Réparation

Repuestos
Reparación

MINOX GmbH Optische und Feinmechanische Werke
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Telex 482986 minox d

E

Following Numbers have been changed:

	10850 35000	in	10750 35000	
	10800 68000	in	10750 68000	
	10720 19400	in	10720 19450	PLIII
	10720 50400	in	10720 50450	PL III
	10800 53200	in	10720 53400	First Magnet

Following Numbers have been changed

PO 2375	22090 01521	in	22090 01529	
	02209 03332	in	02209 33332	
PO 2373	10730 19400	in	10730 19450	
	10730 50400	in	10730 50450	
	00000 33021	in	10750 01004	
	01080 01005	in	10750 01005	
	01080 45000	in	10750 44000	
	10850 12019	in	10750 12019	

No. 02209 01589 not available as separate part, this is integrated in back cover No. 22090 03333

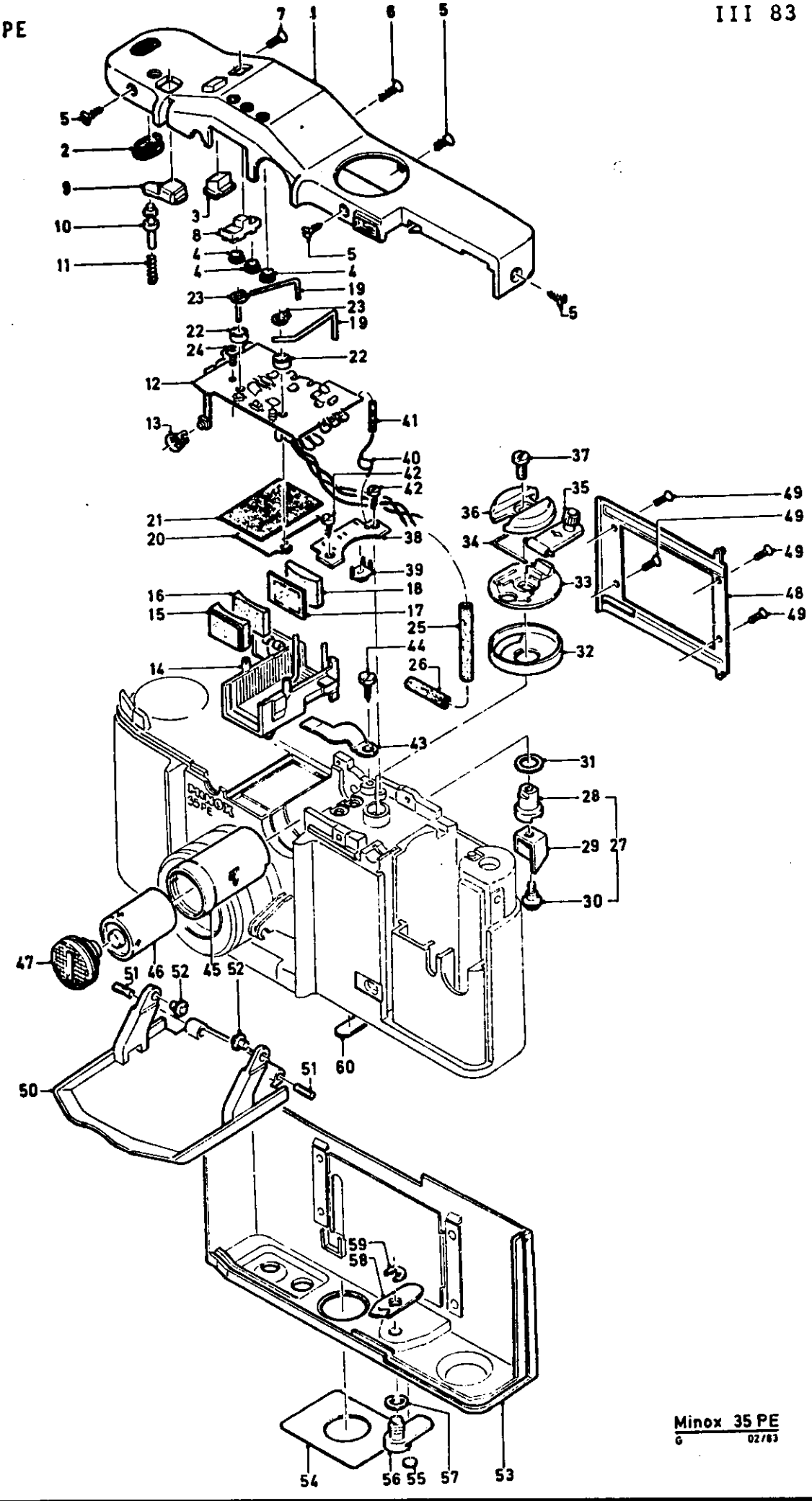
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Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr / Part no / No. de piece / No de pieza
1	1	Body cap, mounted	10730 38000
2	1	. Frame counter window	10750 38002
3	1	. Push-button	10720 38022
4	3	. Hood	10720 38009
5	4	Screw, countersunk machine Bg 1.6 x 2.5 mm	10800 40003
	S	Screw, countersunk machine M 2 x 2.5 mm	00300 80050
6	1	Screw, countersunk machine Bg 1.6 x 4 mm	10800 40004
	S	Screw, countersunk machine M 2 x 4 mm	00301 65014
7	1	Screw, countersunk machine M 1.4 x 2.5 mm	10750 12048
8	1	Sliding switch 2 x, complete	10850 46000
9	1	Shutter release button, green	10720 40001
10	1	Shutter release pin	10750 03001
11	1	Shutter release spring	10800 03002
12	1	Printed circuit board, complete	10730 19400
13	1	. Sleeve	10750 16007
14	1	. Viewfinder, complete	10730 20000
15	1	. . Front lens element I	10800 18111
16	1	. . Front lens element II	10800 18002
17	1	. . Viewfinder mask	10720 18004
18	1	. . Eyepiece	10800 18113
19	2	. . Light guide	10720 04004
20	1	. . Cover	10750 18008
21	1	. . Cover strip	10730 18007
22	2	. Spacing sleeve	10720 04014
23	2	. Retainer ring G 2.0	00310 72000
24	1	Screw, fillister M 1.4 x 2 mm	00301 32000
25	1	Insulating tubing, long	10800 12034
26	1	Insulating tubing, short	10800 12037
27	1	Spool take-up cam, complete	10800 14000
28	1	. Spool take-up cam	10800 14001
29	1	. Take-up cam clip	10800 14002
30	1	. Screw, shoulder	10800 14003

S = Substitute

Bild-Nr Fig no	Stck qty	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr. / Part no / No. de piece / No de pieza
31	1	Washer 7.3 ø x 5.05 ø x 0.05 mm	00310 30000
32	1	Light-trap plate	10730 12001
33	1	Rewind cam	10750 12124
34	1	Stop spring	10750 13101
35	1	Crank arm, complete	10750 11000
36	1	Rewind cam cover	10750 12026
37	1	Screw, fillister M 2 x 4 mm	00201 83050
38	1	Base plate, complete	10720 21400
39	1	. Trim resistor R 10, see Page 22	
40	1	. Resistor R 9, see Page 22	
41	1	. Insulating tubing	10800 21002
42	2	Screw, fillister Bg 1.4 x 3mm	00301 10050
43	1	Retaining clip	10750 12009
44	1	Screw, fillister Bg 2.2 x 4 mm	00301 36050
45	1	Battery tube	10800 12106
46	(1)	Battery Varta V 27 PX Mallory PX 27	
47	1	Battery cover	10800 45000
48	1	Film feed	10750 39000
49	4	Screw, countersunk machine M 1.4 x 2.5 mm	00300 99000
50	1	Front flap PE	10730 26014
51	2	Grooved alignment pin	00340 37050
52	2	Latch pin	10800 26016
53	1	Body back	10730 43000
54	1	. DIN/ASA label	10720 43002
55	1	. Indicator disc	10800 43006
56	1	. Lock	10850 43001
57	1	. Spring washer	10800 43005
58	1	. Lock plate	10800 43003
59	1	. Retainer washer 2.3	00210 24000
60	1	Disc	10750 40005

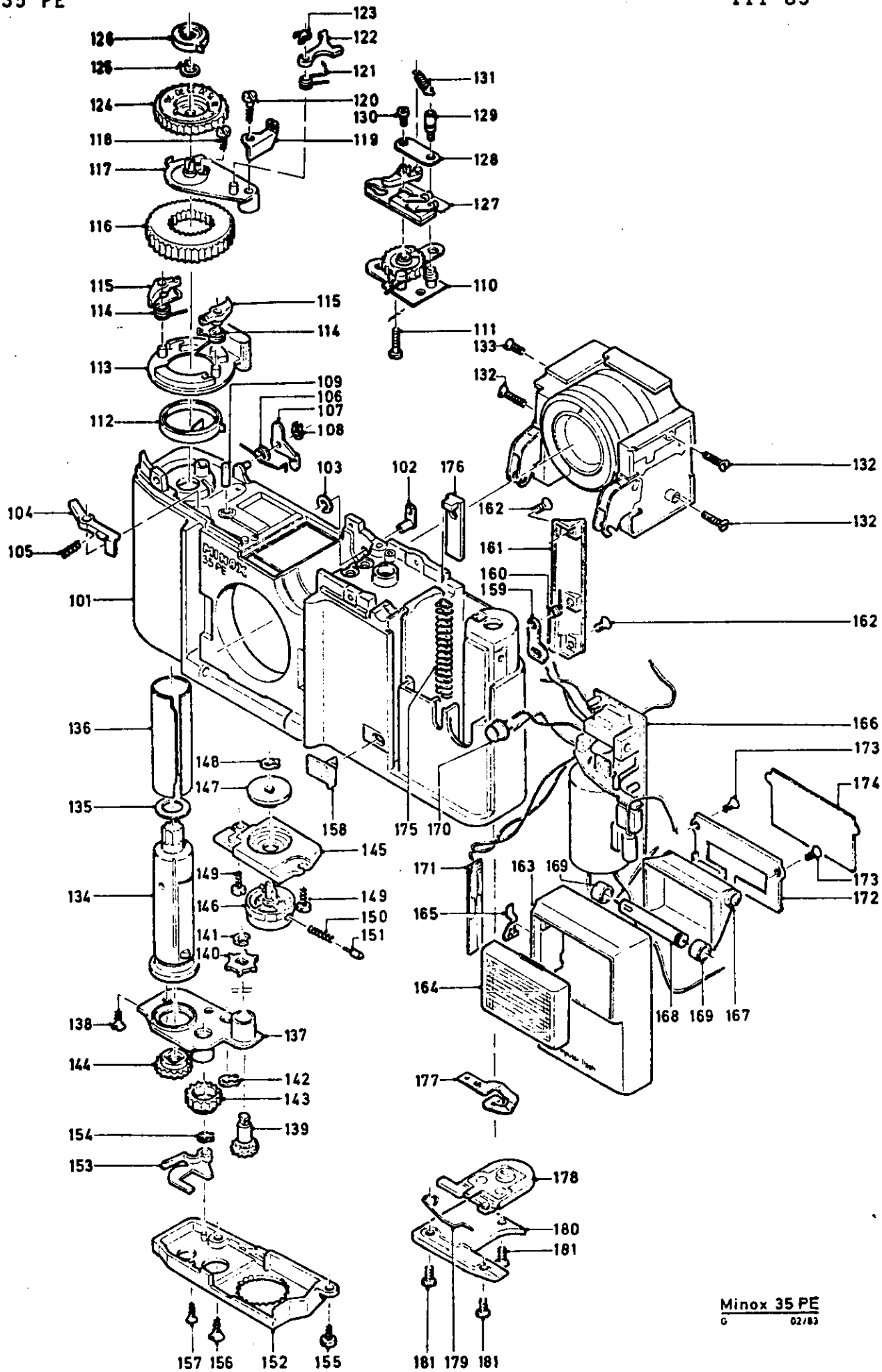

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Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./ No. de piece / No de pieza
101	1	Body, riveted	10730 01000
102	1	. Rivet solder tag	00330 21000
103	1	. Negative contact	10800 01005
104	1	Shutter release block	10800 12007
105	1	Drag spring	10800 12008
106	1	Torsion spring	10800 12011
107	1	Re-set latch	10800 12010
108	1	Retainer ring G 1.5	00310 71000
109	1	Winder pin	10800 26001
110	1	Base plate, complete	10850 02000
111	1	Screw, fillister M 1.4 x 6.5 mm	10800 12044
112	1	Torsion spring for conical spring washer	10750 12041
113	1	Conical spring washer	10750 12040
114	2	Torsion spring for tension latch	10800 12043
115	2	Tension latch	10800 12042
116	1	Winder wheel	10800 12012
117	1	Bottom plate	10850 06003
118	1	Screw, fillister Bg 2 x 3.5 mm	00300 90000
119	1	Angle bracket	10750 12046
120	1	Screw, fillister Bg 2 x 8.4 mm	10800 12027
	(1)	Screw, fillister Bg 1.9 x 7.8 mm	00301 40050
	S	Screw, fillister M 2.3 x 8 mm	00301 27050
121	1	Torsion spring	10750 12047
122	1	Stop latch	10800 06001
123	1	Retaining ring G 1.5	00310 71000
124	1	Film counter wheel	10750 12019
125	1	Retainer ring G 2.0	00310 72000
126	1	Flat spiral spring	10800 12020
127	1	Sliding switch, complete	10720 09000
128	1	Guide plate	10800 12016
129	1	Lining	10800 12017
130	1	Screw, fillister M 1.4 x 2 mm	00301 31000
131	1	Tension spring	10800 12018

S = Substitute

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./ No. de piece / No de pieza
132	3	Screw, countersunk machine ▣ M 1.6 x 5 mm	00301 62014
133	1	Screw, countersunk machine ▣ M 1.6 x 3.5 mm	00301 64014
134	1	Sleeve, complete	10850 30200
135	1	Washer, 9.5 ø x 6.9 ø x 0.3 mm	00311 42000
136	1	Expansion tube	10850 36002
137	1	Drive plate	10750 36106
138	1	Screw, countersunk machine Bg 1.6 x 2.5 mm	10750 36020
139	1	Cogwheel	10750 36003
140	1	Film transport wheel	10750 36104
141	1	Retainer washer 1.9 mm	00210 84000
142	1	Retainer ring G 2.0	00310 72000
143	1	Idler wheel	10850 36018
144	1	Transfer wheel	10800 36209
145	1	Resistor plate, complete	10720 35000
146	1	. Adjusting knob	10720 35003
147	1	. Catch plate	10850 33000
148	1	. Retainer ring G 2.0	00310 72000
149	2	Screw, fillister Bg 1.4 x 3.5 mm	00301 22050
150	1	Pressure spring	10850 36010
151	1	Latch pin	10850 36016
152	1	Drive cover	10720 37000
153	1	. Sliding lock	10800 36131
154	1	. Retainer ring G 1.5	00310 71000
155	1	Screw, fillister Bg 2 x 2.8 mm	10800 12028
	S	Screw, fillister M 2.3 x 3 mm	00300 88050
156	1	Screw, countersunk machine Bg 2 x 5 mm	10800 36014
	S	Screw, countersunk machine M 2 x 6 mm	00201 13014
157	1	Screw, countersunk machine ▣ Bg 1.45 x 5mm	00301 24014
158	1	Unlocking button	10730 02003
159	1	Lock	10730 02002
160	1	Leg spring	10730 02004
161	1	Cover	10730 02005
162	2	Screw, countersunk machine ▣ Bg 1.7 x 2.8 mm	10730 02006

S = Substitute

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./ No. de piece / No de pieza
163	1	Reflector front plate	10730 05300
164	1	Diffuser PE	10730 92563
165	1	Contact spring	10730 05012
166	1	Flash electronics PE, complete	10730 06000
167	1	. Reflector PE	10730 91408
168	1	. Flash tube, see Page 24	
169	2	. Silicon tubing rings 3 x 5 mm	10730 92030
170	1	. Photo-transistor, see Page 23	
171	1	. Printed circuit board	10730 04001
172	1	Cover plate	10730 05100
173	2	Screw, countersunk machine	
		▮ Bg 1.7 x 2.8 mm	10730 02006
174	1	Plate	10730 05009
175	1	Pressure leaf spring	10730 02009
176	1	Guide piece	10730 05006
177	1	Battery contact spring I	10730 02001
178	1	Battery cover, complete	10730 03000
179	1	Lock spring	10730 02007
180	1	Floor plate	10730 02008
181	3	Screw, countersunk machine	
		▮ Bg 1.7 x 2.8 mm	10730 02006
	S	Screw, cheesehead	
		▮ Bg 1.7 x 3 mm	10730 05007
		FLASH TUBE COMPLETE	10730 91243
		FLASH BOARD HOLD DOWN	10730 02010

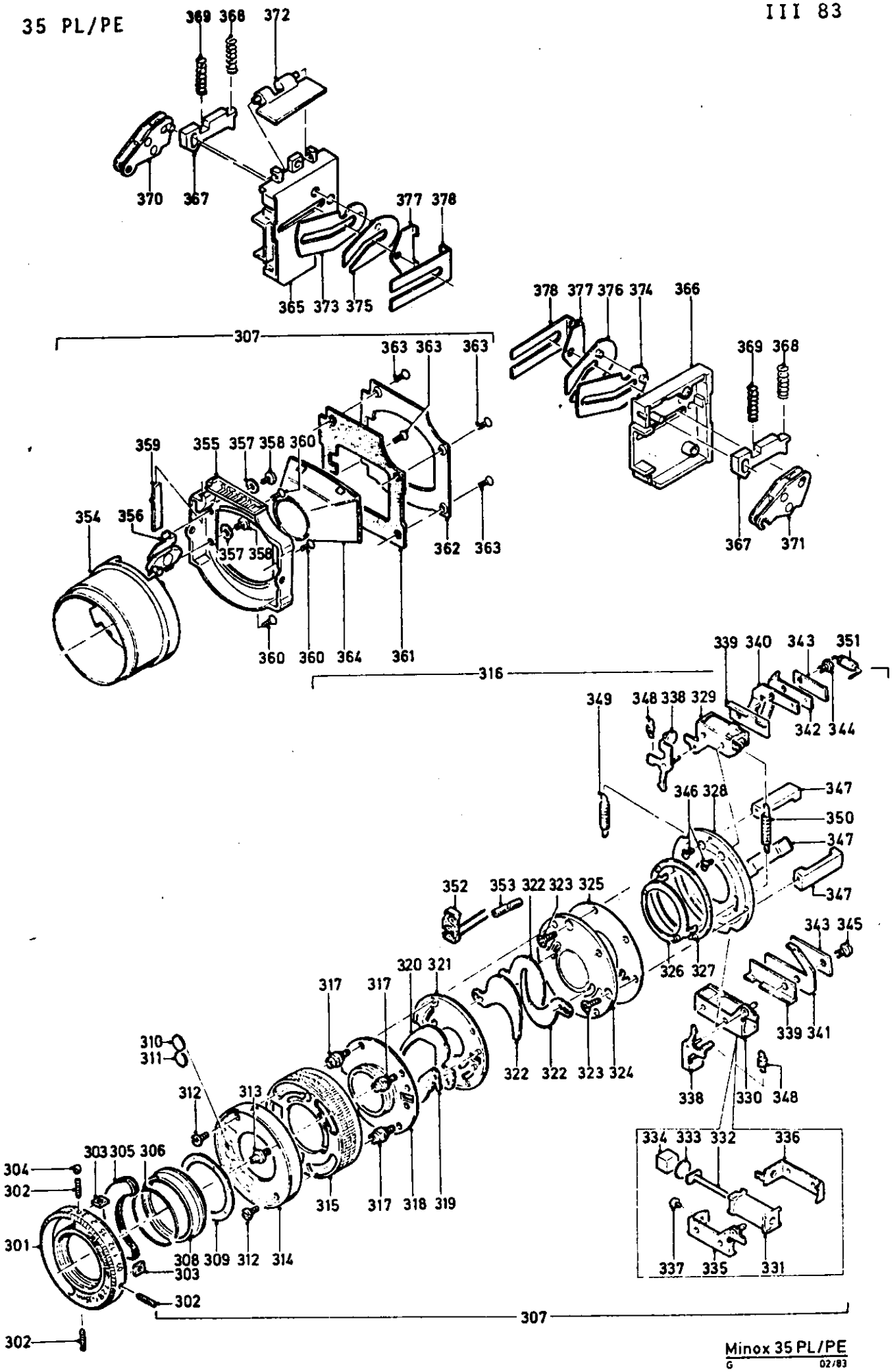

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Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr. / Part no. / No. de piece / No de pieza
301	1	Metre ring, complete	10750 81000
	(1)	Feet ring, complete	10750 82000
302	3	. Headless set screw M 1.4 x 5 mm	00203 24050
303	3	. Square nut M 1.4	10800 50005
304	1	Index pin	10720 50012
305	1	Window	10750 50006
306	1	Spacer ring	10750 50015
307	1	Lens PL II, complete	10720 50400
308	1	. Front lens element, complete	10750 80000
309	1	. Corrugated ring	10750 50011
310	1	. Cover disc	10720 50408
311	1	. Compensation filter 7 %	10800 50007
	(1)	. Compensation filter 10 %	10800 50020
	(1)	. Compensation filter 15 %	10800 50021
	(1)	. Compensation filter 20 %	10800 50022
	(1)	. Compensation filter 25 %	10800 50023
	(1)	. Compensation filter 30 %	10800 50024
	(1)	. Compensation filter 35 %	10800 50025
	(1)	. Compensation filter 40 %	10800 50026
	(1)	. Compensation filter 45 %	10800 50027
	(1)	. Compensation filter 50 %	10800 50028
	(1)	. Compensation filter 55 %	10800 50029
	(1)	. Compensation filter 60 %	10800 50030
	(1)	. Compensation filter 65 %	10800 50031
	(1)	. Compensation filter 70 %	10800 50032
	(1)	. Compensation filter 75 %	10800 50033
	(1)	. Compensation filter 80 %	10800 50034
	(1)	. Compensation filter 85 %	10800 50035
312	2	. Screw, fillister M 1.4 x 2 mm	10800 50003
313	1	. Butt screw	10800 50002
314	1	. Depth of focus control ring, complete	10720 73400
315	1	. Aperture control ring	10720 79401
316	1	. Shutter PL II, complete	10720 72400

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./ No. de piece/No de pieza
317	3	. . Threaded insert	10800 72003
318	1	. . Central lens element, complete	10750 71000
319	1	. . Diaphragm leaf II	10750 72002
320	1	. . Diaphragm leaf I	10750 70000
321	1	. . Spacer	10750 72404
322	3	. . Shutter leaf	10720 72401
323	3	. . Screw, countersunk machine Bg 1.4 x 5 mm	00301 39014
324	1	. . Achromatic lens, complete	10750 63000
325	1	. . Sliding disc	10800 64010
326	1	. . Switch disc II	10800 62000
327	1	. . Switch disc I	10800 61000
328	1	. . Filler base	10800 57200
329	1	. . Magnet I, complete	10720 53400
330	1	. . Magnet II, complete	10800 53100
331	2	. . . Coil	10800 52000
332	1	. . . Armature, 9.75 mm long, for Magnet I	10720 53404
	1	. . . Armature, 9.81 mm long, for Magnet II	10800 53003
	(1)	. . . Armature, 9.78 mm long, for Magnet II	10800 53103
	(1)	. . . Armature, 9.77 mm long, for Magnet II	10800 53104
	(1)	. . . Armature, 9.76 mm long, for Magnet II	10800 53105
333	1-2	. . . Adhesion point for Magnet I	10720 53011
334	2	. . . Permanent magnet	10800 53005
335	2	. . . Yoke I	10800 58100
336	2	. . . Yoke II	10800 53002
337	2	. . . Screw, fillister M 1.4 x 1.15 mm	00300 82050
338	2	. . Latch, complete	10800 51200
339	2	. . insulating plates	10800 54001
340	1	. . Contact spring I	10800 54005
341	1	. . Contact spring II	10800 54002
342	1	. . Adjuster plate	10800 54004
343	2	. . Printed circuit board	10800 54003
344	1	. . Screw, fillister M 1.4 x 2 mm	00300 97013
345	1	. . Screw, fillister M 1.4 x 1.8	00201 81014

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr. / Part no. / No. de piece / No de pieza
		Electronic components	
		Components on the camera printed circuit board:	
IC	1	IC ULA 1 G 003	10750 16001
T 1	1	Transistor BCW 61 C	00363 25090
Th 1	1	Thyristor BRX 48	00364 36090
D 1	1	LED green	10720 16004
	S	LED green	00363 99090
D 2	1	LED orange	10750 16008
	S	LED orange	00363 89090
D 3	1	LED red	10720 16007
	S	LED red	00364 33090
D 4	1	Z diode 6V2	00362 33090
D 6	1	LED yellow	10730 16005
	S	LED yellow	00364 00090
D 7	1	Diode	10720 16006
	S	Diode	00360 15090
D 8	1	Z diode 2V8	00364 55090
R 2	1	Resistor 12 kOhm	00361 88090
R 3	1	Resistor 1 MOhm	00362 71090
R 4	1	Resistor 6.8 kOhm	00361 87090
	(1)	Resistor 8.2 kOhm	00363 98090
R 5	1	Resistor 4.7 kOhm	00363 80090
R 6	1	Resistor 4.7 kOhm	00363 80090
	(1)	Resistor 3.3 kOhm	00362 73090
	(1)	Resistor 2.7 kOhm	00361 85090
R 7	1	Resistor 10 kOhm	00361 83090
R 11	1	Resistor 1.5 kOhm	00364 44090
R 12	1	Resistor 2.2 kOhm	00362 34090
R 13	1	Resistor 270 kOhm	00363 16090
R 15	1	Resistor 22 kOhm	00364 62090
R 16	1	Resistor 1 kOhm	00363 17090

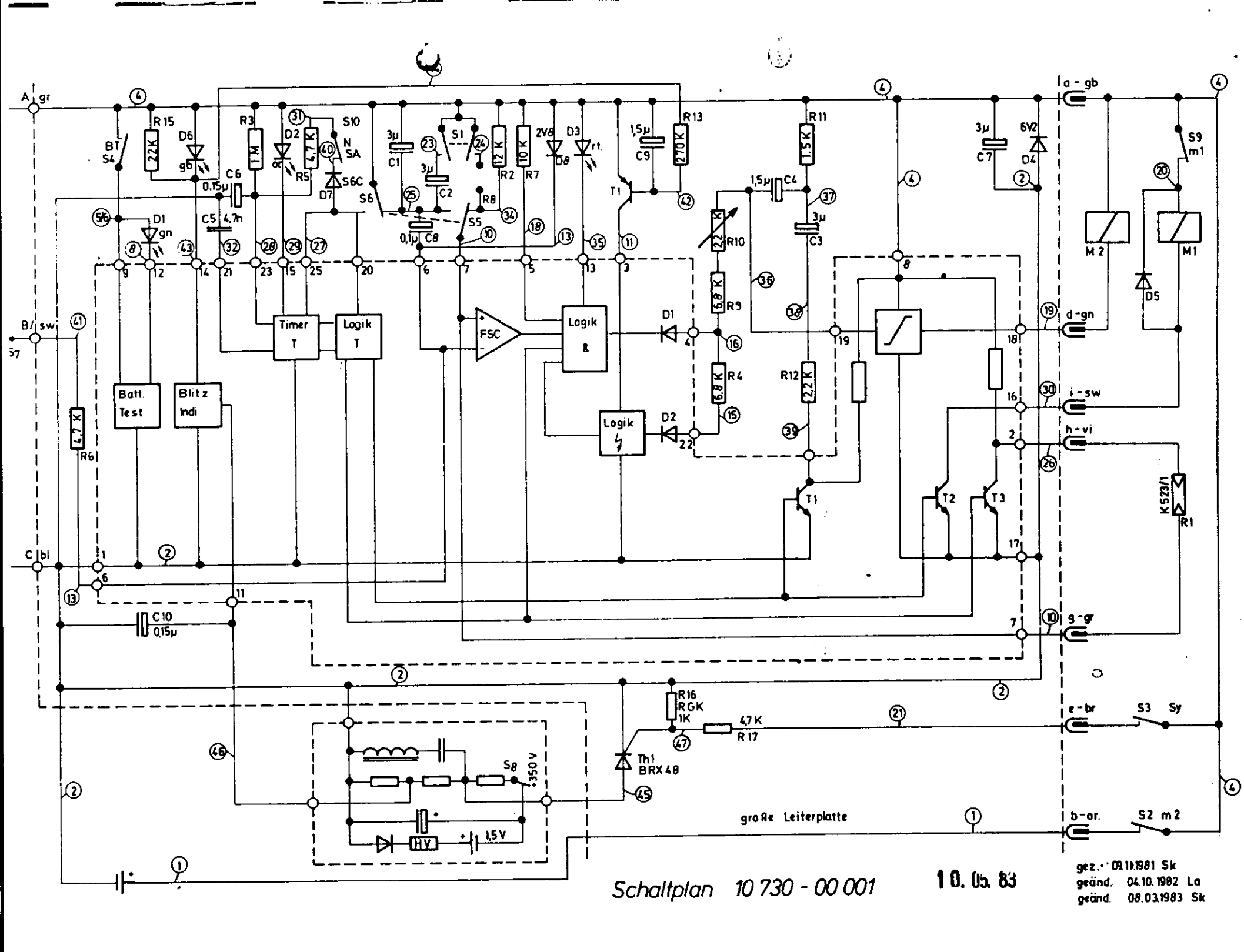
Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./No. de piece/No de pieza
346	4	. . Screw, countersunk machine M 1.4 x 1.6 mm	00300 95050
347	3	. . Base	10720 64401
348	2	. . Tension spring	10720 55402
349	1	. . Tension spring, 31 p, copper	10720 64403
350	1	. . Tension spring, 110 p	10800 64005
351	1	. . Diode D 5, see Page 23	
352	1	. Photo resistor	10720 68400
353	1	. Insulating tubing	10800 78020
354	1	. Lens barrel	10730 78401
355	1	. Light cover	10720 76400
356	1	. Retainer clip, complete	10720 75400
357	2	. Washer 4.5 ø x 1.52 ø 0.05 mm	00311 13050
358	2	. Screw, fillister M 1.4 x 1.5 mm	00301 58019
359	1	. Winder link	10800 78002
360	3	. Screw, countersunk machine M 1.4 x 4 mm	00301 08014
361	1	. Cover plate	10800 76003
362	1	. Retainer plate	10800 76004
363	4	. Screw, countersunk machine M 1.4 x 2.5 mm	00300 99000
364	1	Light funnel	10720 36013
365	1	Pivot hinge, right	10750 26005
366	1	Pivot hinge, left	10800 26003
367	2	Catch lever	10800 26008
368	2	Pressure spring	10800 26009
369	2	Pressure spring, copper	10800 26015
370	1	Pivot, right, complete	10850 22000
371	1	Pivot, left, complete	10850 23000
372	1	Winder flap	10800 26010
373	1	Cover leaf II, right	10800 27000
374	1	Cover leaf II, left	10800 28000
375	1	Cover leaf, right	10800 24000
376	1	Cover leaf, left	10800 25000
377	2	Cover slide	10800 26006
378	2	Cover strip	10800 26007

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion		Teil-Nr./Part no./ No. de piece / No de pieza
R 17	1	Resistor 4.7 kOhm		00363 80090
C 1	1	Capacitor 3 µF/6.3 V		00363 28090
C 2	1	Capacitor 3 µF/6.3 V		00364 03090
C 3	1	Capacitor 3 µF/6.3 V		00364 03090
C 4	1	Capacitor 1.5 µF/6.3 V		00364 02090
C 5	1	Capacitor 4.7 nF/40 V		00363 90090
C 6	1	Capacitor 0.15 µF/6.3 V		00361 91090
C 7	1	Capacitor 3 µF/6.3 V		00363 28090
C 8	1	Capacitor 0.1 µF/6.3 V		00363 84090
C 9	1	Capacitor 1.5 µF/6.3 V		00362 07090
C10	1	Capacitor 0.15 µF/6.3 V		00361 91090
A	1	Flex, grey, 120 mm long	gr	10800 12032
B	1	Flex, black, 120 mm long	sw	10800 12030
C	1	Flex, blue, 116 mm long	bl	10850 12031
a	1	Flex, yellow, 40 mm long	gb	10720 04003
b	1	Flex, orange, 28 mm long	or	10750 04005
d	1	Flex, green, 33 mm long	gn	10750 04007
e	1	Flex, brown, 34 mm long	br	10720 04009
g	1	Flex, grey, 44 mm long	gr	10720 04010
h	1	Flex, violet, 50 mm long	vi	10720 04011
i	1	Flex, black, 38 mm long	sw	10750 04006
	1	Flex + UB, orange, 36 mm long	or	10750 04013
	1	Flex - UB, blue, 28 mm long	bl	10800 12035
	1	Flex R 10, orange, 28 mm long	or	10750 04005
		Components on the base plate:		
R9	1	Resistor 6.8 kOhm		00361 87090
	(1)	Resistor 3.3 kOhm		00362 73090
	(1)	Resistor 3.9 kOhm		00361 86090
R10	1	Trim resistor 2.2 kOhm		00364 72090

Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion		Teil-Nr./Part no./ No. de piece / No de pieza
		Components in the lens:		
D 5	1	Diode		10800 78021
	S	Diode		00360 15090
R 1	1	Photo resistor		10720 68400
a	1	Flex, yellow, 33 mm long	gb	10800 78010
b	1	Flex, orange, 46 mm long	or	10800 78016
d	1	Flex, green, 62 mm long	gn	10720 78413
e	1	Flex, brown, 43 mm long	br	10800 78011
g	1	Flex, grey, 33 mm long	gr	10800 78012
h	1	Flex, violet, 63 mm long	vi	10720 78409
i	1	Flex, black, 33 mm long	sw	10800 78015
	1	Flex M1 - M2, yellow, 39 mm long		10800 78019
		Components belonging to flash unit:		
T 21	1	Transistor 2 N 2270 C		10730 91235
T 22	1	Photo-transistor BP 101/2		22090 01504
Th21	1	Thyristor BRX 48/49		10730 93691
Th22	1	Thyristor 666 - 400		22090 01548
D 21	1	Diode 1 N 4007		22090 01505
D 22	1	Z diode ZPD 11		22090 01550
D 23	1	Diode 1 N 4007		22090 01505
D 24	1	Diode 1 N 4148		22090 01552
R 21	1	Resistor 470 Ohm		10730 91777
R 22	1	Resistor 9.1 kOhm		10730 91247
R 23	1	Resistor 1 MOhm		10730 92064
R 24	1	Resistor 1 MOhm		10730 92064
R 25	1	Resistor 100 kOhm		10730 92101
R 26	1	Resistor 2.2 kOhm		10730 92080
R 27	1	Resistor 1 kOhm		10730 92084
R 28	1	Resistor 1 kOhm		10730 92084
R 29	1	Trim resistor 4.7 kOhm		10730 92078

S = Substitute

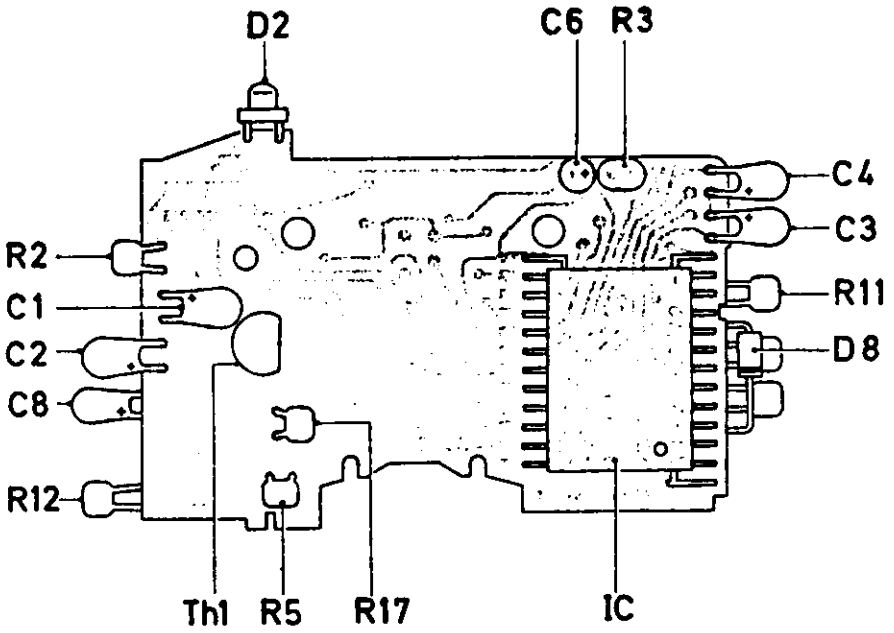
Bild-Nr Fig no	Stck. qty.	Teilebezeichnung / Part name Designation / Designacion	Teil-Nr./Part no./ No. de piece / No de pieza
R 30		Resistor on the printed circuit board	
C 21	1	Capacitor 180 µF/330 V	10730 91965
C 22	1	Capacitor 0.1 µF/250 V RM 10	22090 01555
C 23	1	Capacitor 0.1 µF/100 V RM 7.5	10730 92086
C 24	1	Capacitor 33 nF/63 V	10730 92089
C 25	1	Capacitor 10 nF/50 V RM 2.5	22090 01507
C 26	1	Capacitor 10 nF/50 V RM 2.5	22090 01507
TR 1	1	Transformer	10730 92088
TR 2	1	Firing coil	10730 92085
L	1	Flash tube	10730 92075
	1	Printed circuit board, large	10730 92032
	1	Printed circuit board, small	10730 92031

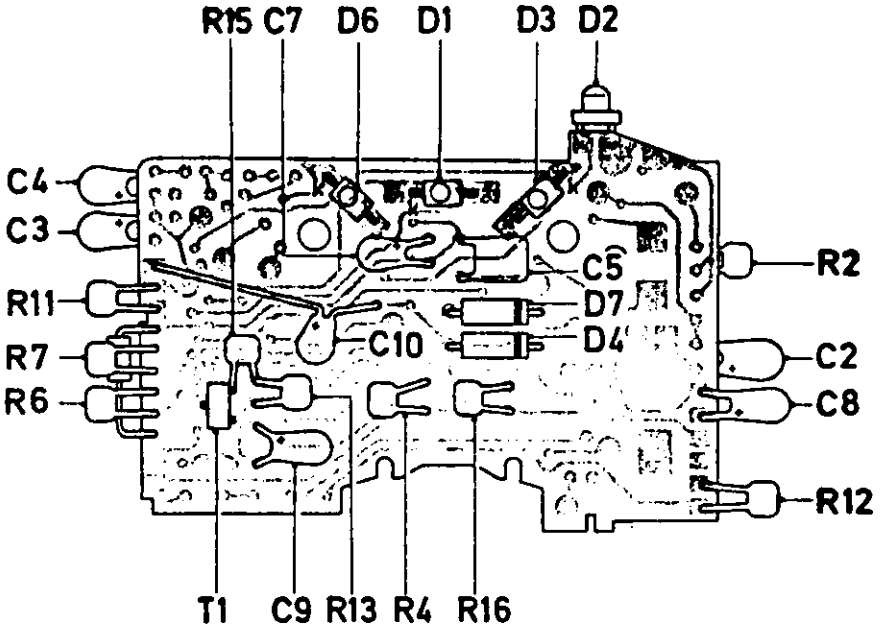

A gr
B/ sw
C bl
BT S4
R15 22K
D6 gb
R3 1M
D2 ge
R5 4,7K
S10 N SA
S6C
D7
C6 0,15µ
C5 4,7n
D1 gn
S6
C1 3µ
C2 3µ
S1
R2 12K
R7 10K
2V8
D3 rt
R8
S5
C8 0,1µ
T1
C9 1,5µ
R13 270K
R11 1,5K
C4 1,5µ
R10 2,2K
C3 3µ
C7 3µ
D4 6V2
S9 m1
M2
M1
D5
a - gb
d - gn
i - sw
h - vi
g - gr
e - br
b - or.
S3 Sy
S2 m2
K523/1
R1
T2
T3
R9 6,8K
R4 6,8K
R12 2,2K
R6 4,7K
Timer T
Logik T
FSC
Logik &
Logik
D1
D2
Batt. Test
Blitz Indi
C10 0,15µ
R16 RGK 1K
R17 4,7K
Th1 BRX 48
Sθ
350 V
HV
1,5 V
große Leiterplatte
Schaltplan 10 730 - 00 001
10. 05. 83
gez.: 03.11.1981 Sk
geänd. 04.10.1982 La
geänd. 08.03.1983 Sk

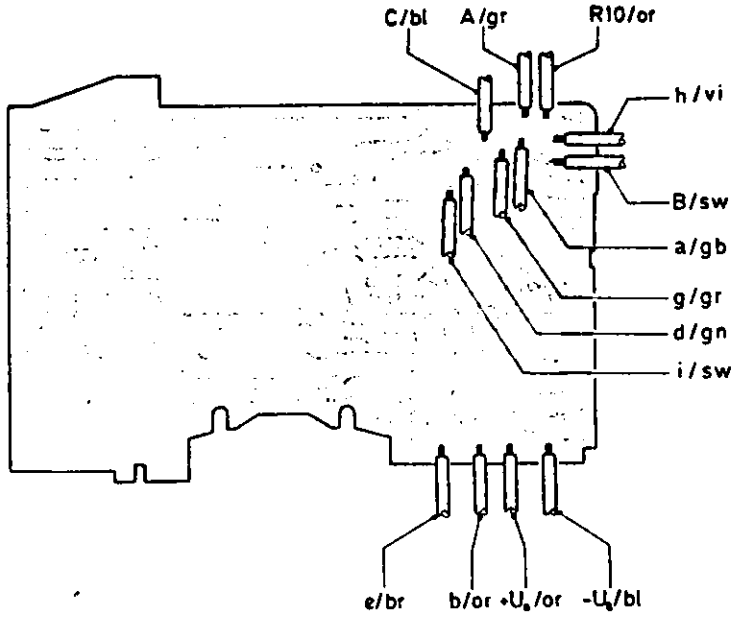
Switching functions:

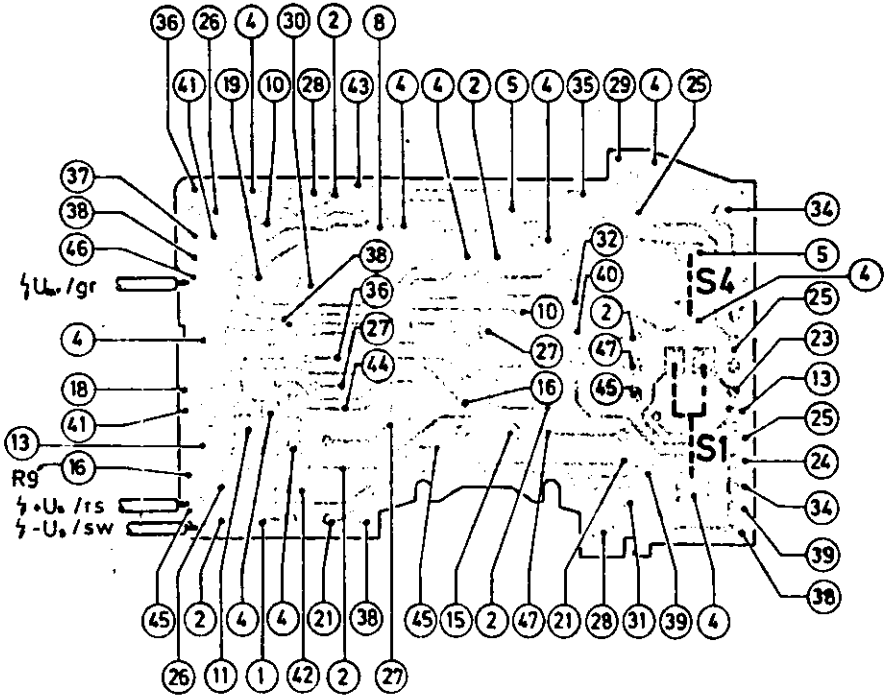
S 1 Counterlight switch (2x slide, Fig. 8)
S 2 Contact breaker m_2 (switch disc II, Fig. 326 or shutter ring II, Fig. 226)
S 3 Flash contact (on filter base, Fig. 328 or printed circuit board, Fig. 230)
S 4 Batterie check (pressure over push button, Fig. 4 on printed circuit board, Fig. 13)
S 5, S 6 Shutter release switch (sliding switch, Fig. 127)
S 7 DIN-ASA switch (resistor plate, Fig. 145)
S 8 Commutator for automatic-flash exposure time (flash switch, Fig. 14)
S 9 Contact breaker m_1 (switch disc I, Fig. 327 or shutter ring I, Fig. 227)
S 10 Self timer switch (sliding switch T in vierwfinder, Fig. 20)
S 11 Main switch (light cover, Fig. 355 - viewfinder, Fig. 20)

Switchings x = Contact closed	S 2	S 3	S 5		S 6		S 9	S 11
			a	b	a	b		
Camera wound up, front flap closed	x			x		x	x	
Camera wound up, front flap open	x			x		x	x	x
Camera released		x	x		x			x

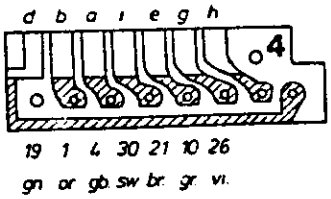

D2
C6
R3
C4
C3
R2
C1
R11
C2
D8
C8
R12
Th1
R5
R17
IC

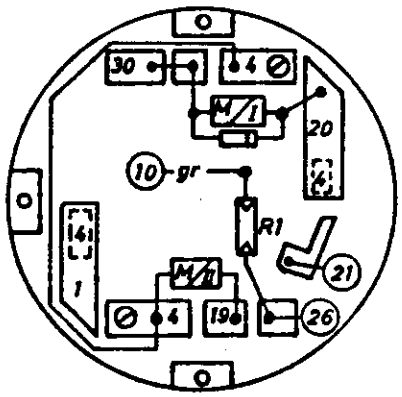

R15
C7
D6
D1
D3
D2
C4
C3
C5
R2
R11
D7
C10
D4
R7
C2
R6
C8
R12
T1
C9
R13
R4
R16


C/bl
A/gr
R10/or
h/vi
B/sw
a/gb
g/gr
d/gn
i/sw
e/br
b/or
+Us/or
-Us/bl


S4
S1
Rg
+Us/rs
-Us/sw

Lens, Fig. no. 307

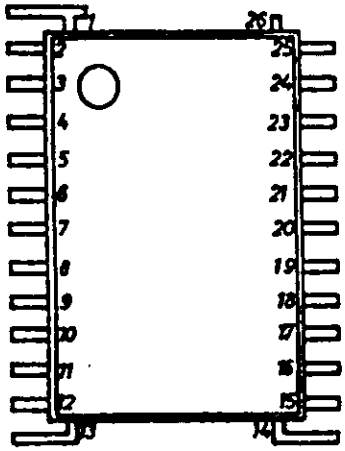




Part. no. 10720 50400

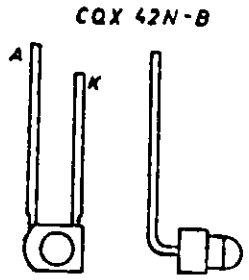
Semiconductor

IC



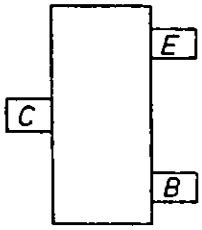
Part no. 10750 16001

D 2



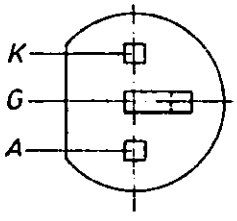
Part no. 10750 16008

T 1



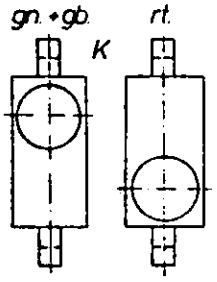
Part no.
00363 25090

Th 1

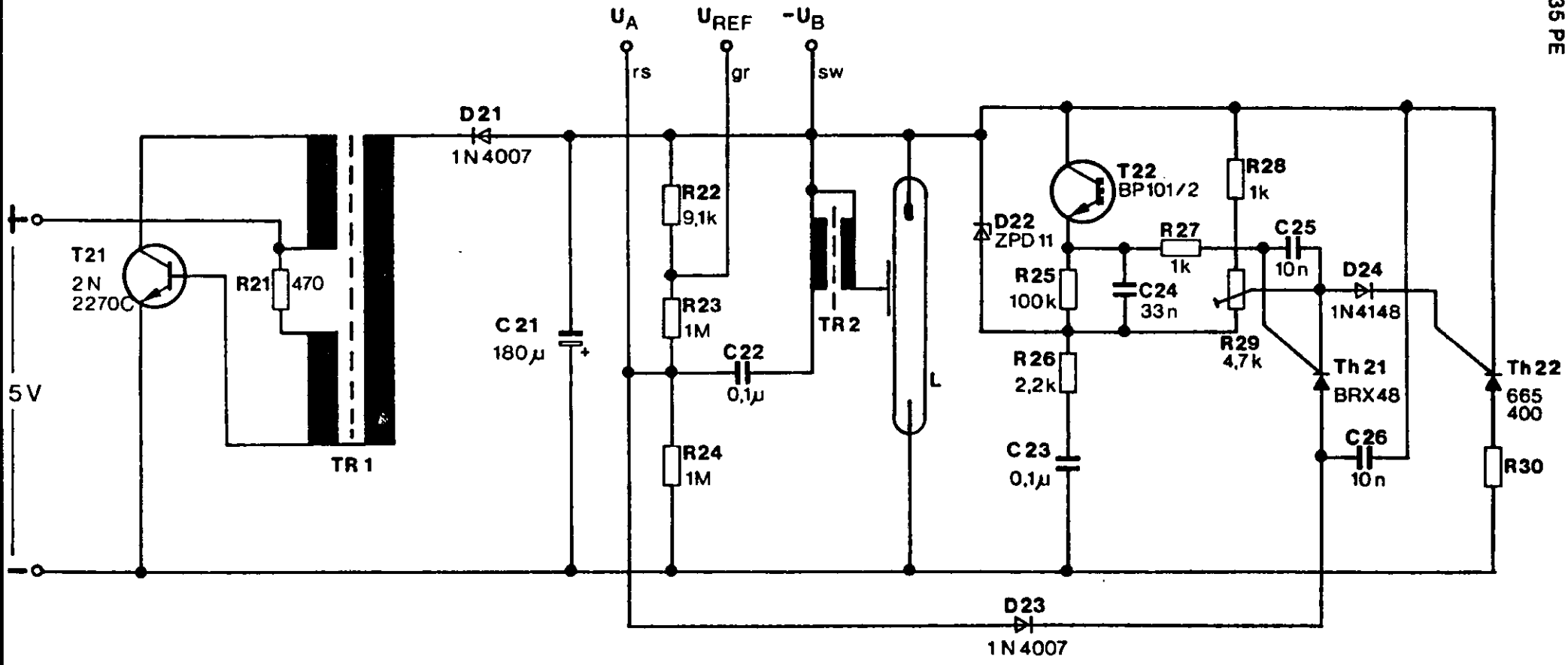


Part no.
00364 36090

D1+D6 D3



Part no. 10720 16004 gn
10730 16005 gb
10720 16007 rt



MINOX 35 PE

Schaltplan – Blitzgerät
Circuit diagram – Flash

PRECAUTIONS WHEN HANDLING THE MINOX 35 PE

The MINOX 35 PE incorporates a built-in electronic flash unit that operates internally at 350 V DC. Upon contact, this voltage causes considerable electrical shocks, so that certain precautionary measures have to be observed during repair and checking work.

The DC voltage is always present at the flash electrolytic capacitor if the unit has been switched on and the capacitor has not been completely discharged. When flashing normally with a 1.5 V battery or battery substitute inserted, renewed charging of the electrolytic capacitor starts immediately after triggering of the flash, with the result that a voltage has again been built up by the time the reflector is slid down.

Flashing can only cause almost complete discharge if, with the electrolytic capacitor in the charged condition, the battery or the battery substitute is removed, followed immediately by triggering of a flash. For those units which do not flash in such a case, e.g. due to a defect in the firing circuit, the electrolytic capacitor retains its full voltage.

If the unit is not used, the voltage on the electrolytic capacitor does not reduce completely to zero until after several hours or days. For this reason, it is necessary to ensure that the electrolytic capacitor is discharged before carrying out any work on the MINOX 35 PE.
The electrolytic capacitor must be discharged in different ways, according to the degree to which the camera has been stripped down.

I. Camera completely assembled with battery tube, camera electronics and connected flexes from the flash unit.

Discharge occurs between the negative contact of the camera battery internally in the battery tube and the negative contact of the flash unit battery with the aid of a special discharge cable.
To this end, first the adaptor must be inserted into the battery tube of the camera and then connected to the negative contact terminal of the flash battery. If this is down in the reverse order, accidental touching of the positive contact of the camera battery will cause irreparable damage to the camera electronics.

II. Camera partially stripped down, flash unit flexes are not connected.

If the unit is charged up again in this condition with the flexes not connected, discharge must take place by connecting the black flex to the negative contact of the flash unit battery at the bottom of the camera via a 1 k Ohm resistor.
Time for discharge: approx. 5 s.

C a u t i o n ! Important note!

1. Direct connection from the negative contact of the flash battery to the positive contact of the camera battery results in irreparable damage to the camera electronics.

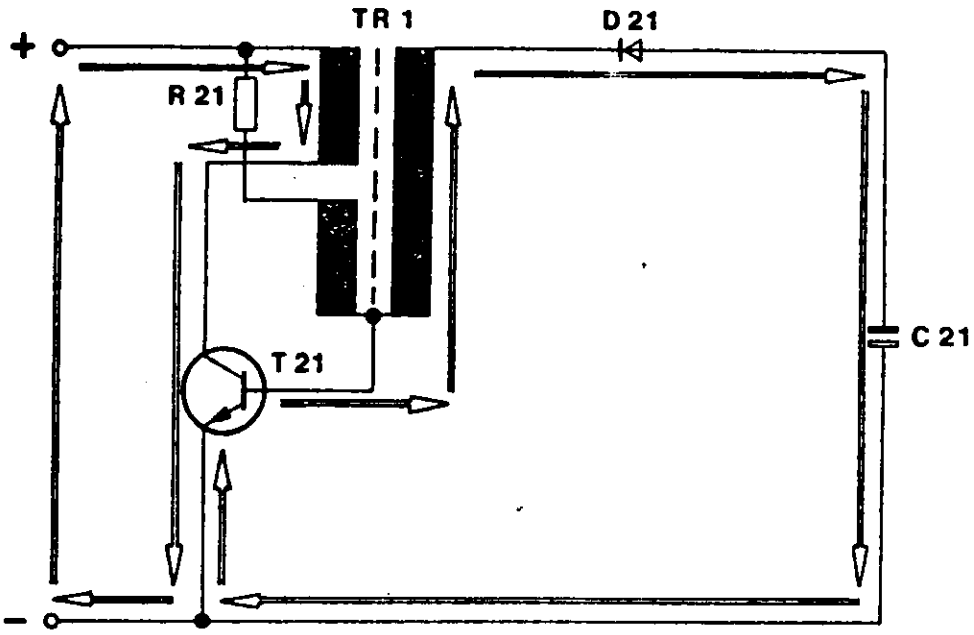
2. When working with a battery substitute for the camera battery, if the flash electrolytic capacitor is still charged, considerable electrical shocks are caused by simultaneously touching the negative contact of the flash battery and that of the battery substitute.

3. During repair work on the camera electronics or the flash unit electronics, it is also necessary to make trials with the electrolytic capacitor charged up, e.g. in order to test the trigger circuit.
When doing so, ensure that only one hand at any time touchs the components of the camera electronics or of the flash unit electronics either directly or via a metal tool.

4. In order to protect against possible residual voltages, the electrolytic capacitor should be discharged - as described under I. or II. above - prior to any work, if the charge condition of the electrolytic capacitor is not exactly known.

Functional description of the MINOX 35 PE built-in flash unit

1. Voltage transformer 3 V - 360 V



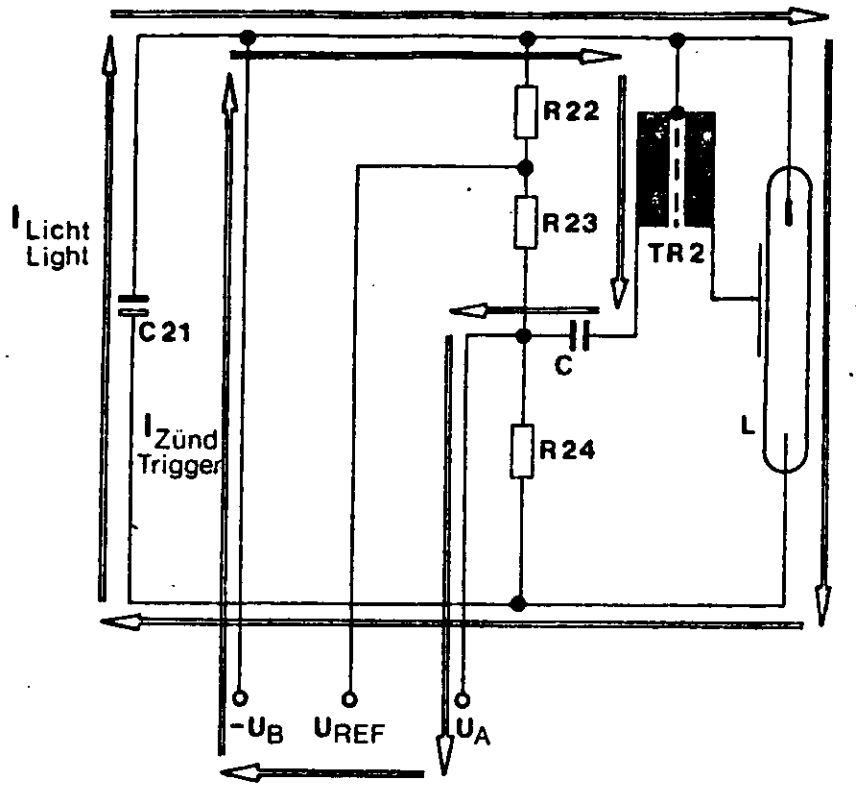
The power required for the flash is generated via a switching regulator.

After connecting the operating voltage, a collector current of about 2-3 A flows, initiated by the base bias (R_{21}). Due to the transformer coupling, a positive voltage arises at the base point of the high-voltage winding. T_{21} remains conducting until the collector winding is saturated. This phase can be referred to as the current flow phase. Upon saturation of the primary winding, the base voltage decreases and the transistor commences to block. The magnetic field in the transformer collapses and induces an AC voltage of about 350 - 370 V in the high-voltage winding. At the base point of the high-voltage winding, a negative potential arises, which blocks T_{21} until induction has stopped (blocking phase). The sequence then recommences from the beginning. The oscillating frequency is about 16 kHz.

2. Trigger circuit

The energy stored in the trigger capacitor (C_{22}) (charged up via R_{22}, R_{23} and R_{24}) is released instantaneously by a short-circuit of U_A to chassis earth (thyristor or switch).

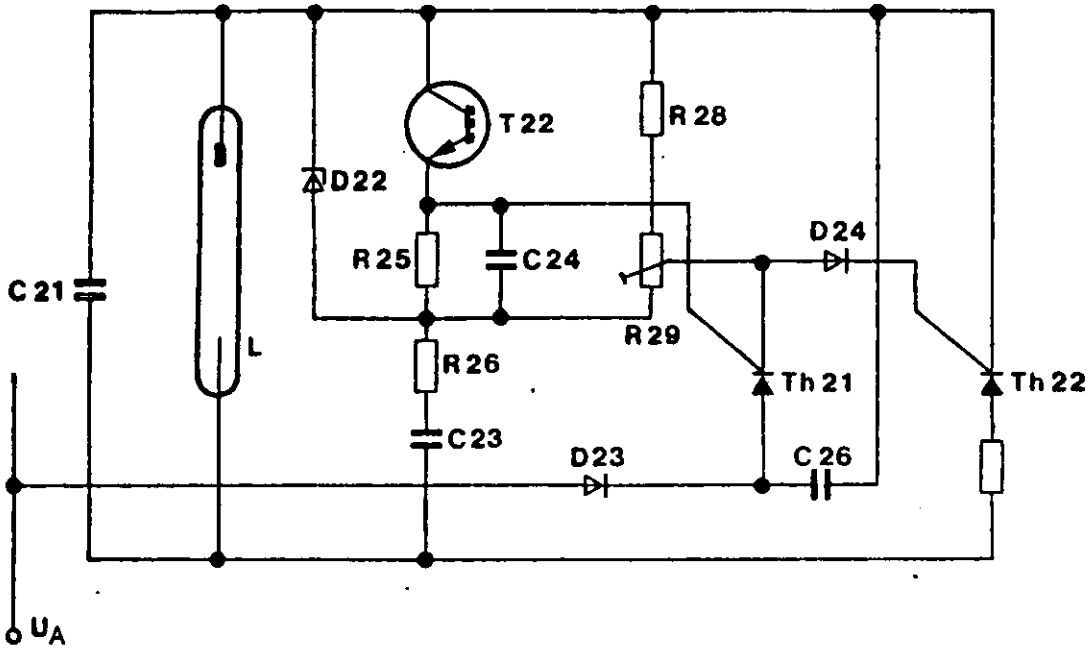
The discharge current flows via the primary winding of the trigger transformer, and via C_{22} back to the primary winding. The trigger transformer and the trigger capacitor thereby form a series oscillating circuit, the resonance frequency of which is about 800 kHz - 1 MHz. Thereby the resonance current induces the high voltage in the secondary winding (high-voltage winding). This ionizes the gas in the flash tube L, i.e. makes it conducting. Once the flash tube is triggered, then, with the current flow from C_{21} via the flash tube and back again, light emission takes place until the current drops below the holding current of the flash tube.



3. Voltage generation by the light regulation circuit

If the flash tube is conducting (triggered), the high discharge current (C_{21} and L) causes a high negative pulse at C_{21}. This pulse is integrated by the timing circuit consisting of R_{26} and C_{23}, so that a negative voltage component is present at Z diode D_{22}, which is stabilized to the Zener voltage by the Z diode. This voltage supplies the light quantity regulation circuit.

In order for the light quantity regulation circuit to become active only due to its own flash, the somewhat more complicated solution is chosen via this circuit. Voltage for the Th_{21} is tapped from the trigger voltage. This is supplied to C_{26} and decoupled from the trigger voltage via diode D_{23}. During the period of its own flash, the charge in C_{26} is capable of triggering via Th_{21} and the diode in the cathode-gate path to Th_{22}.



4. Operation of the light quantity regulation circuit

Regulation of the light quantity is always downwards, i.e. it is only possible to regulate downwards from 100% of the light quantity in the direction 0%. In this case, the principle of parallel quenching is applied. Flash tube L is triggered, and upon attaining the correct light quantity, the residual charge in C_{21} is dissipated via a charging capacitor C_{21} in parallel to thyristor Th_{22}, thus stopping light emission prematurely.

The sequence as a whole is as follows:
C_{21} is charged to a value corresponding to the nominal power of the flash unit. If the flash tube is now triggered via the trigger circuit, the operating voltage for regulation of the light quantity appears at Z diode D_{22}. If the photo-transistor registers light, a collector current flows which charges up C_{24}. If the voltage at the gate of Th_{21} exceeds the cathode voltage set with R_{29}, Th_{21} triggers. This in turn triggers Th_{22}. This causes the residual charge in C_{21} to be instantaneously dissipated and the flash tube extinguishes. C_{24} is discharged via resistor R_{25} which is connected in parallel to it, so that the conditions are identical for the next flash.

MINOX 35 PL/PE Testing Programme

1. Basic Measurement

B	L	R_i Ω	ASA	LM mlxs	Remarks
A	D	15	25	80 - 640	
A	M	15	25		set same value as in previous measurement with R 10

2. Filter Selection (from basic measurement)

LM mlxs	F %	LM mlxs	F %	LM mlxs	F %
80 - 120	85	241 - 260	60	381 - 420	35
121 - 160	80	261 - 280	55	421 - 460	30
161 - 180	75	281 - 320	50	461 - 500	25
181 - 200	70	321 - 340	45	501 - 540	20
201 - 240	65	341 - 380	40	541 - 580	15
581 - 620	7	621 - 640	0		

3. Final Measurement

B	L	R_i Ω	ASA	LM mlxs	Remarks
A	D	15	25	320 - 800	after selection of neutral density filter recalibrate R 10
A	D	15	100	128 - 192	
A	H	8	200	40 - 120	
A	H	15	200	60 - 160	
A	D	15	400	20 - 60	
A	M	15	400	20 - 60	
A	H	15	400	28 - 100	
A	H	15	25	400 - 1400	
A	H	15	50	240 - 680	
A	H	15	100	120 - 300	
A	H	27	100	120 - 560	
A	M	15	100	100 - 240	
T	M	15	100	100 - 240	
2x	M	15	100	200 - 680	
ϟ	M	15	100	600 - 2400	
A	D	15	400 → 32		D 3 flashes
A	D	15	25 → 64		D 3 off
B		27			D 1 on

Legend

a) B = Mode of operation
- A = Programme automatic
- T = Timer switched on
- 2x = Couter light switched on
- ϟ = Flash time
- B = Battery check

b) L = Luminance (brightness), colour temperature = 4700 °K

L	cd/m²	ftlmp	asb
H	8000	2300	25000
M	1000	290	3125
D	125	36	390

c) R_i = Internal resistance of the voltage source at U = 5.4 V

d) LM = Light quantity at the film plane

e) F = Tone density of the compensation filter