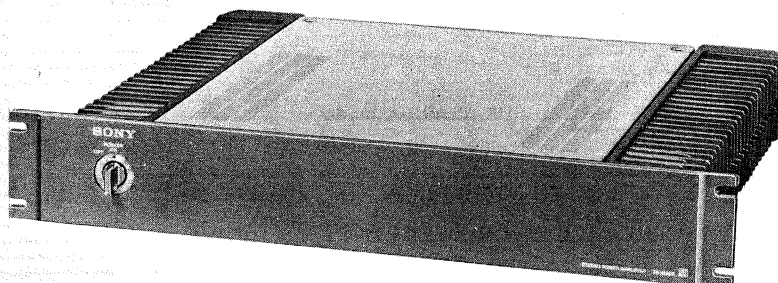


TA-N86B

US Model
Canadian Model
AEP Model
UK Model



STEREO POWER AMPLIFIER

SPECIFICATIONS

GENERAL


Power Requirements:	120 V ac, 60 Hz (US, Canadian model) 220 – 240 V ac, 50/60 Hz (AEP, UK model)
Power Consumption:	210 W (US model) 510 VA (Canadian model) 450 W (AEP, UK model)
Dimensions:	Approx. 480 (w) x 80 (h) x 380 (d) mm 18 ⁷ / ₈ (w) x 3 ¹ / ₈ (h) x 15 (d) inches Including projecting parts and controls
Weight:	Approx. 8.0 kg, 17 lb 10 oz (net) Approx. 8.6 kg, 18 lb 15 oz (in shipping carton)

POWER AMPLIFIER SECTION


Continuous RMS Power Output:	(US, Canadian model)
Class A and B Operation:	with 8 Ω loads, both channels driven, from 20–20,000 Hz, with no more than 0.007% total harmonic distortion
Mono Amp Operation:	with 8 Ω loads, from 20–20,000 Hz, with no more than 0.015% THD

Class A	18 W + 18 W
Class B	80 W + 80 W (8 Ω) 90 W + 90 W (4 Ω)
Mono	180 W

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND  MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT
À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE  SUR LES DIAGRAMMES SCHEMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

– Continued on page 2 –

SONY[®]

SERVICE MANUAL

TA-N86B

(AEP, UK model)

Less than 0.007% THD, both channels driven simultaneously, 8 Ω

(In mono amp operation: less than 0.015%, 8 Ω)

	20 Hz – 20 kHz
Class A	18 W + 18 W
Class B	80 W + 80 W (8 Ω) 60 W + 60 W (4 Ω)
Mono	120 W

According to DIN 45500

Class A	18 W + 18 W
Class B	80 W + 80 W
Mono	120 W

Damping Factor: 70 (1 kHz, 8 Ω)

Harmonic Distortion:

		20 Hz–20 kHz	5 Hz–50 kHz
Rated output	Class A	0.007%	0.02%
	Class B	0.007%	0.02%
	Mono	0.015%	0.07%
½ rated output	Class A	0.0025%	0.005%
	Class B	0.0035%	0.007%
	Mono	0.008%	0.03%
1W output	Class A	0.001%	0.006%
	Class B	0.003%	0.007%
	Mono	0.008%	0.025%

Intermodulation (IM)

Distortion:

(60 Hz : 7 kHz = 4 : 1)

Rated output	Class A	0.004%
	Class B	0.004%
	Mono	0.005%
½ rated output	Class A	0.002%
	Class B	0.003%
	Mono	0.004%
1W output	Class A	0.002%
	Class B	0.003%
	Mono	0.004%

Power Bandwidth (IHF): 5 Hz – 45 kHz (Class B, 8 Ω, 0.007%)
5 Hz – 60 kHz (Class A, 8 Ω, 0.007%)
5 Hz – 30 kHz (Mono, 8 Ω, 0.015%)

Frequency Response: DC – 200 kHz +0 dB (DIRECT input)
-1 dB (C COUPLED input)
7 Hz – 200 kHz +0 dB (C COUPLED input)
-1 dB

S/N Ratio: Greater than 120 dB, short-circuited input

Residual Noise: 25 μV (8 Ω, network A)

Inputs:

	Gain			Impedance		
	Class A	Class B	Mono	Class A	Class B	Mono
DIRECT						
C COUPLED (3 Hz cutoff frequency 6 dB/oct slope)	27.4 dB	27.4 dB	33.4 dB	50 kΩ	50 kΩ	50 kΩ

Outputs: SPEAKER terminals
Class B: Accept speakers of 4 – 16 Ω
Class A and Mono amp: Accept speakers of 8 – 16 Ω

0 dB = 0.775 V

MODEL IDENTIFICATION

Specification Label

US model

SONY	
STEREO POWER AMPLIFIER	
MODEL NO.	TA-N86B
SERIAL NO.	
AC 120 V	60 Hz 210 W
MADE IN JAPAN	

Canadian model

SONY	
STEREO POWER AMPLIFIER	
MODEL NO.	TA-N86B
SERIAL NO.	
AC 120 V	60 Hz 510 VA
MADE IN JAPAN	

AEP, UK model

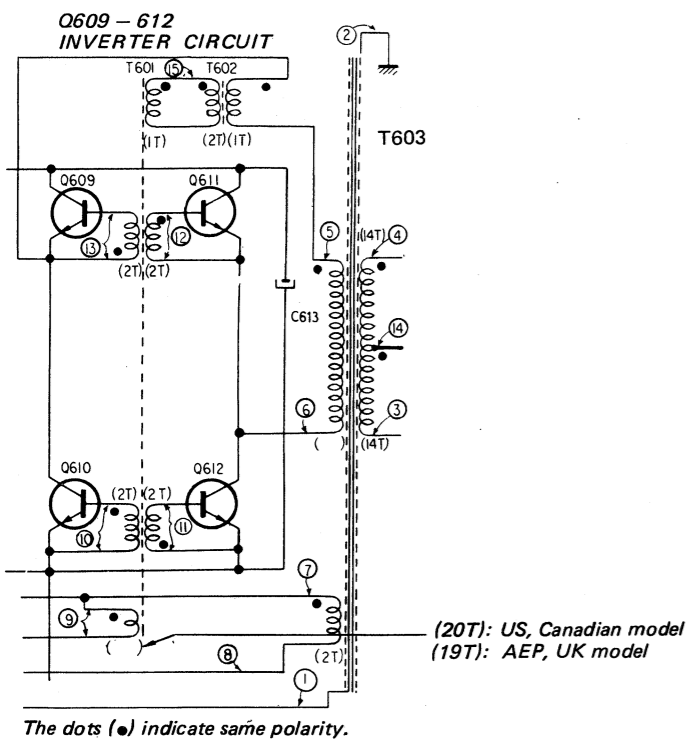
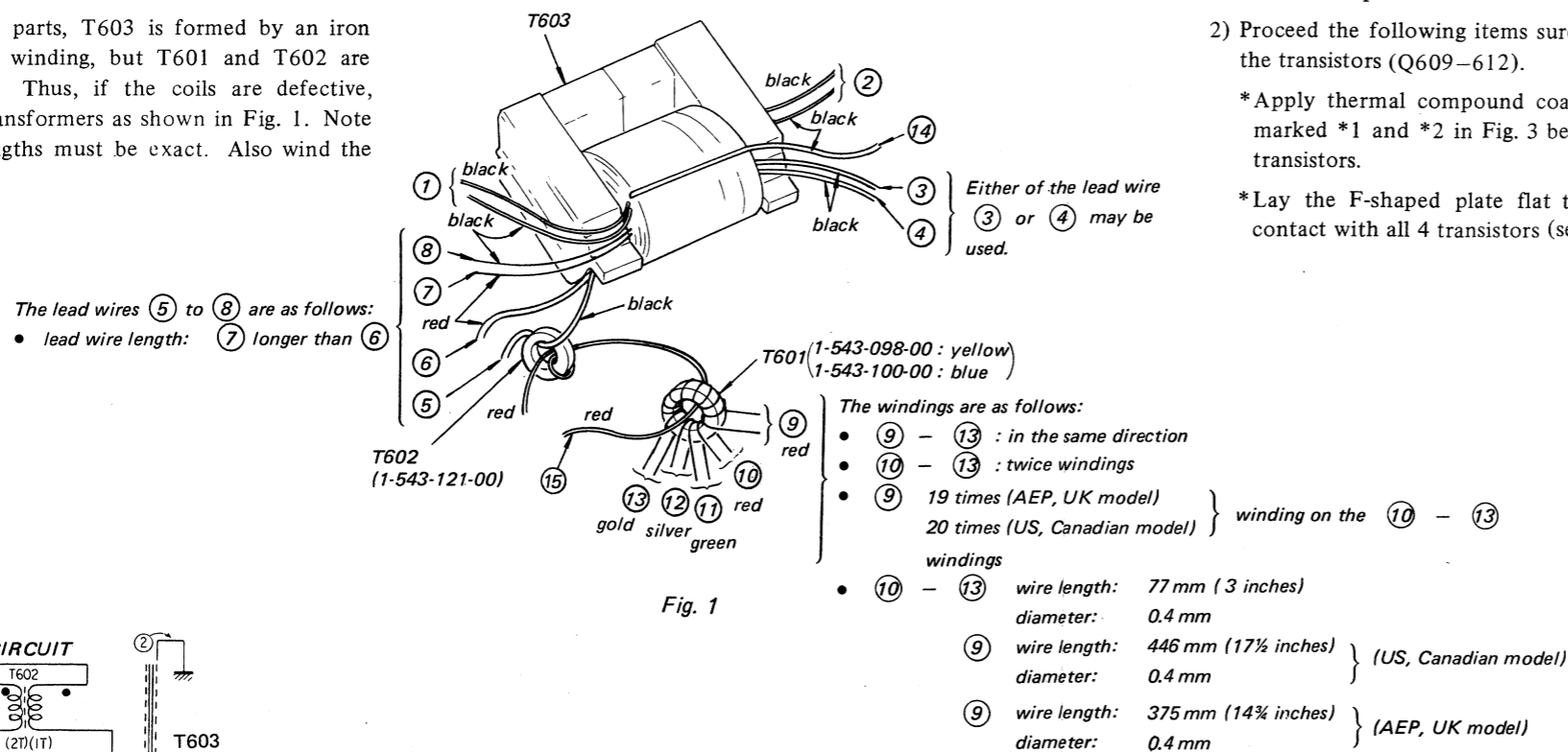
SONY	
STEREO POWER AMPLIFIER	
MODEL NO.	TA-N86B
SERIAL NO.	
	220 ~ 240 V 50/60 Hz 450 W
MADE IN JAPAN	

SERVICING NOTES

1. REPLACEMENT OF THE TRANSFORMERS IN THE PULSE-LOCKED POWER-SUPPLY CIRCUIT

The lead wire arrangement for each of T601-603 in the inverter circuit are shown in Figs. 1 and 2.

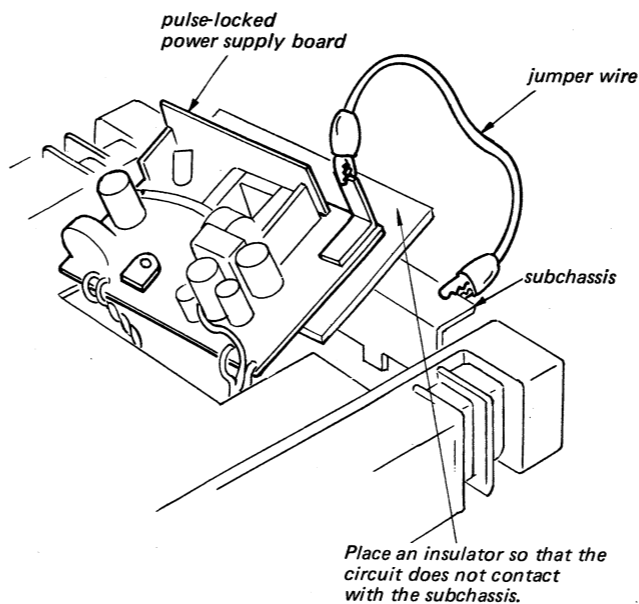
As the repair parts, T603 is formed by an iron core and a coil winding, but T601 and T602 are only iron core. Thus, if the coils are defective, arrange a new transformers as shown in Fig. 1. Note that the lead lengths must be exact. Also wind the coil carefully.



2. PULSE-LOCKED POWER SUPPLY BOARD REPAIRING

This set has a pulse-locked power-supply circuit which is quite different from a conventional power-supply circuit. The pulse-locked power-supply directly rectifies and smooths the ac input power to produce the higher dc voltages required in the power supply circuit. When servicing this set, note the following.

- 1) To prevent unwanted radiation due to pulse signals in the pulse-locked power-supply circuit, the pulse-locked power-supply board is shielded by the aluminum diecast box.
- 2) The negative circuit of the secondary rectifier in the pulse-locked power-supply circuit is grounded by screws in the aluminum diecast box. When checking the pulse-locked power-supply board out of the box, use a jumper wire as shown.

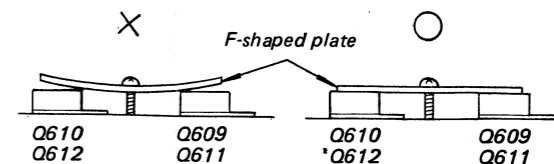
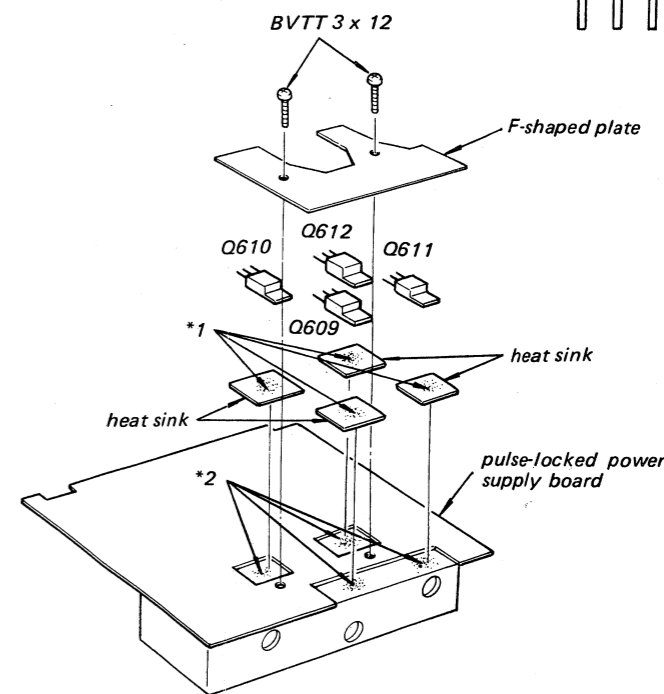
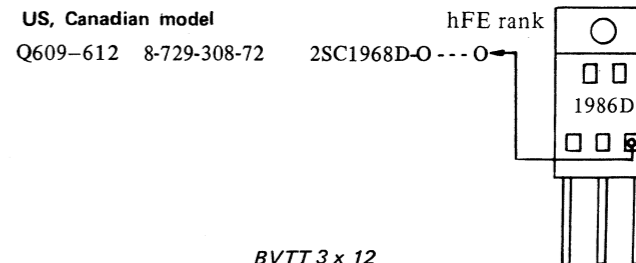
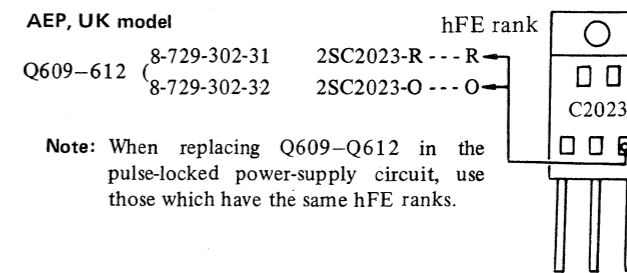


3. INVERTER CIRCUIT TRANSISTOR REPLACEMENT (Q609-612)

- 1) Be sure that there are no bits of solder and wire ends on the places marked *2 in Fig. 3.
- 2) Proceed the following items surely when replacing the transistors (Q609-612).

*Apply thermal compound coat to the positions marked *1 and *2 in Fig. 3 before mounting the transistors.

*Lay the F-shaped plate flat to ensure uniform contact with all 4 transistors (see Fig. 4).



SECTION 1
OUTLINE

1-1. CIRCUIT DESCRIPTION

[Switching of Class-A and Class-B Amplifiers]

The switching between the class-A and the class-B amplifiers is done by switching the bias voltage of the amplifier.

1. For the class-A amplifier, Q122 and Q123 (Q222 and Q223) are turned off by operating the reed relay RY101 (RY201). Therefore, the bias voltage for the class-A amplifier is determined by RT103 (RT203). The

B voltage is switched by RY601 to that for the class-A amplifier.

2. For the class-B amplifier, the reed relay RY101 (RY201) do not operate. RT103 (RT203) is short-circuited because Q122 and Q123 (Q222 and Q223) are turned on. As a result, the bias voltage for the class-B amplifier is determined by RT102 (RT202).

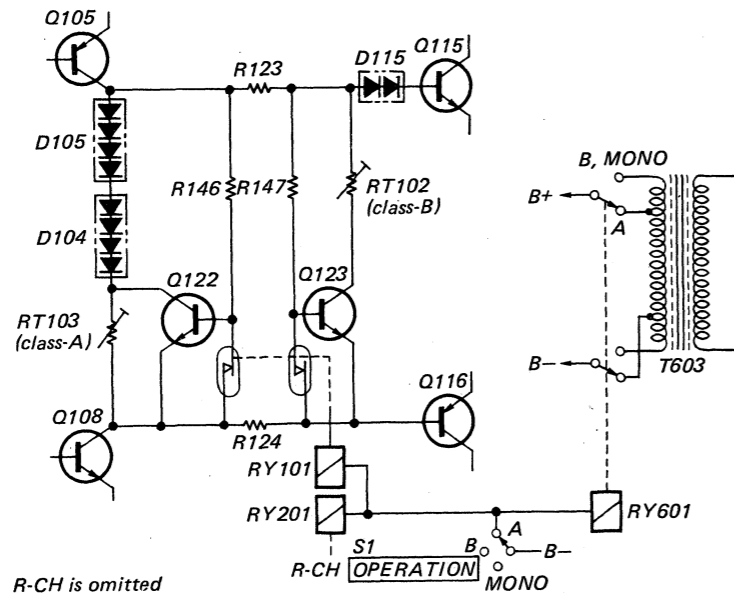


Fig. 1-1.

[MONO Operation]

The left and right channel amplifiers are connected and operated in series (BTL) as shown in Fig. 1-2.

Note that the output forms a balanced push-pull circuit, thus the output power becomes approximately double. The balanced output is obtained by using the original power amplifier input-output phase inversion and inserting a load in series between the each output hot side.

Thus, same but opposite phase signal is supplied to the left and right channel power amplifier inputs simultaneously. As a result, the power applied to the load is doubled.

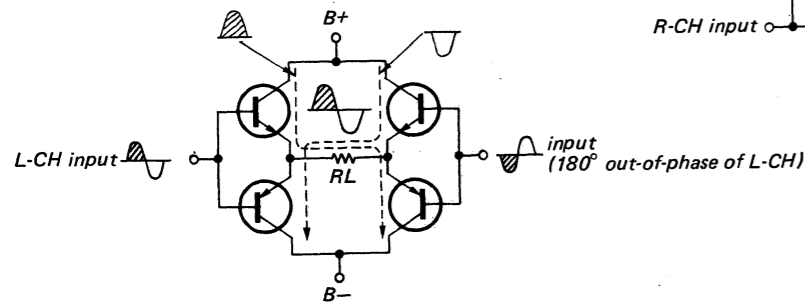


Fig. 1-2.

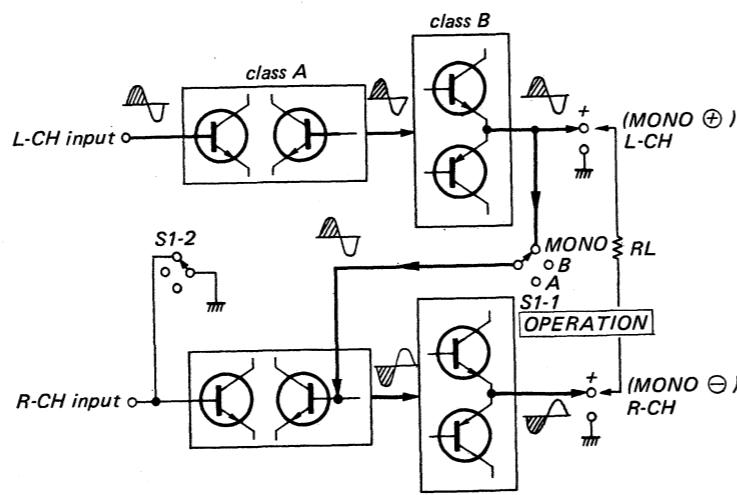
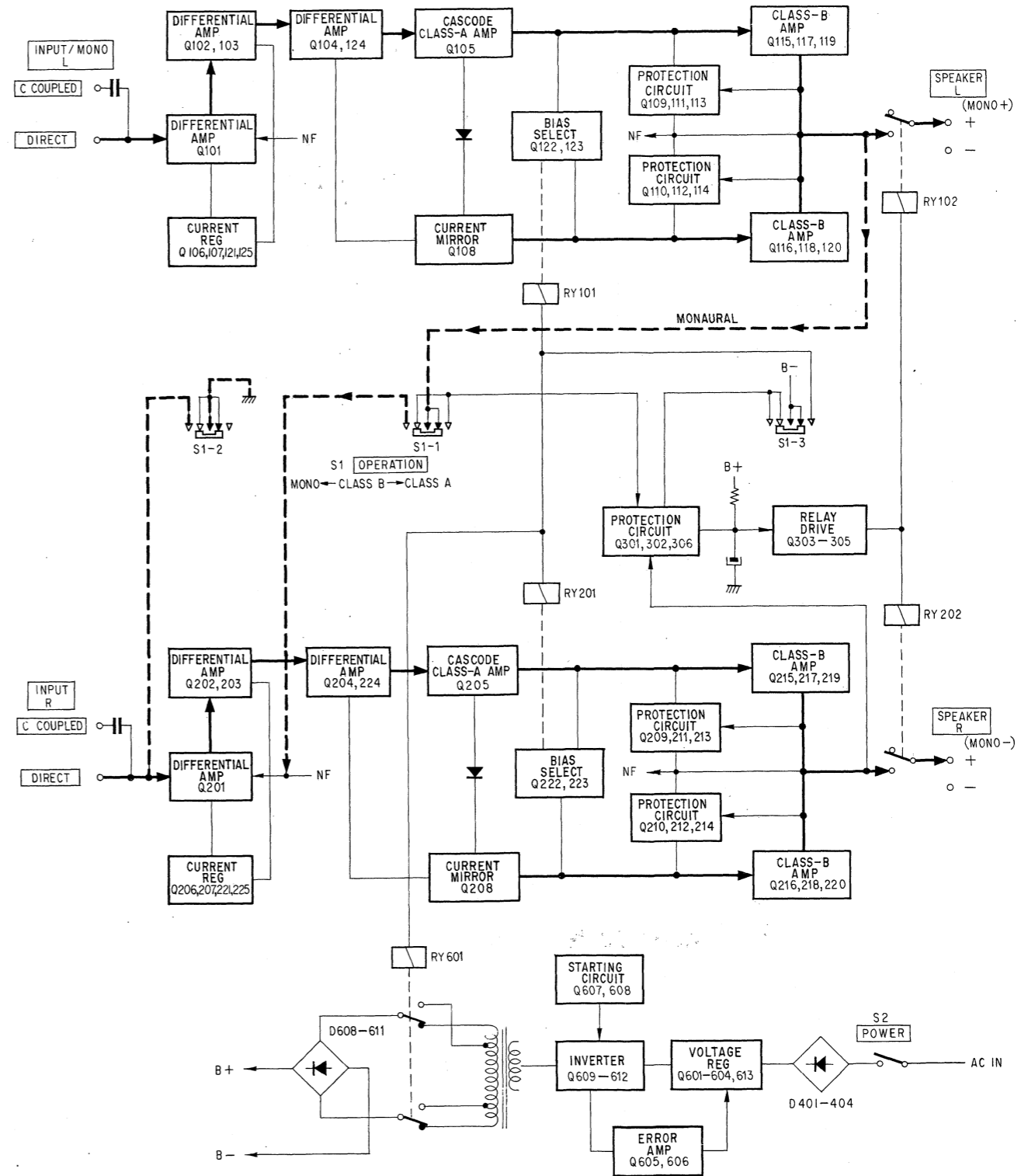


Fig. 1-3.

1-2. BLOCK DIAGRAM

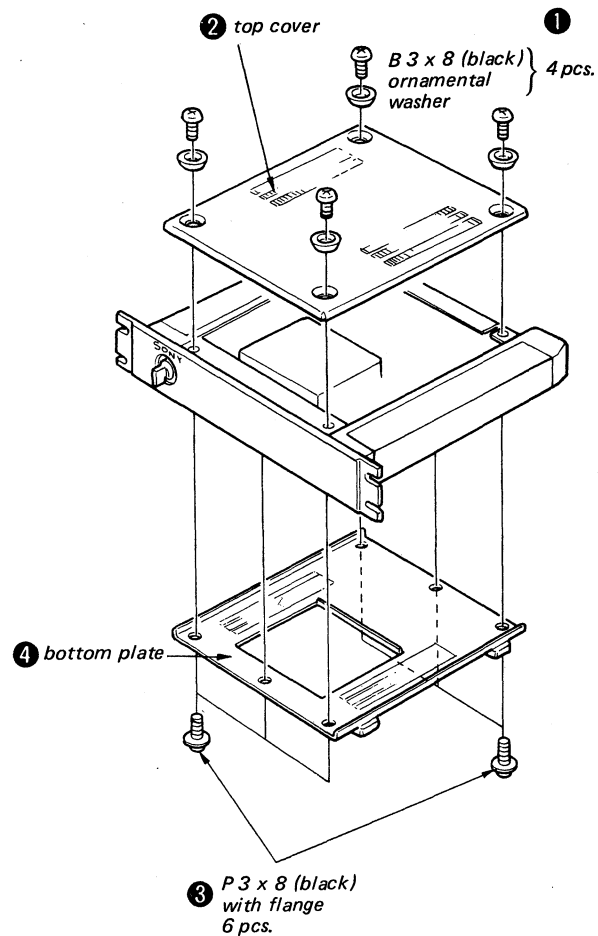


SECTION 2
DISASSEMBLY

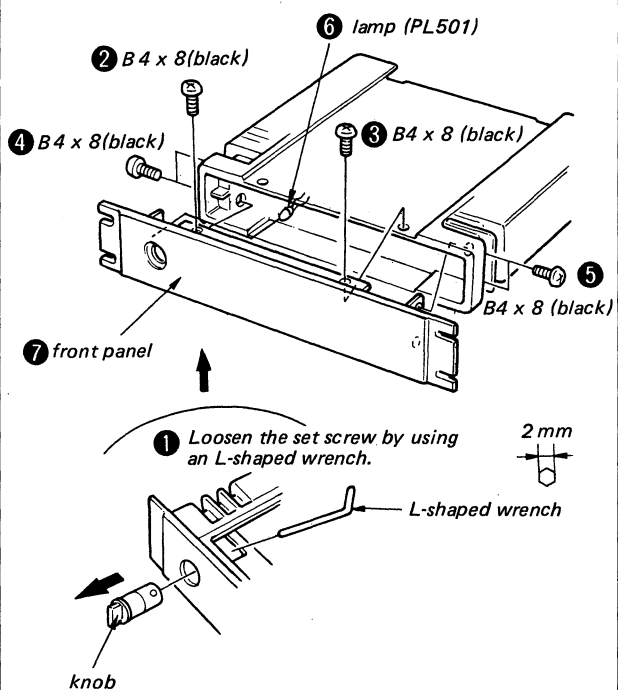
- Follow the disassembly procedure in the numerical order given.

Top Cover and Bottom Plate Removal

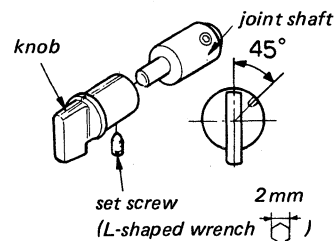
Note: The power amp board can be checked by removing the top cover and the bottom plate.



Front Panel Removal

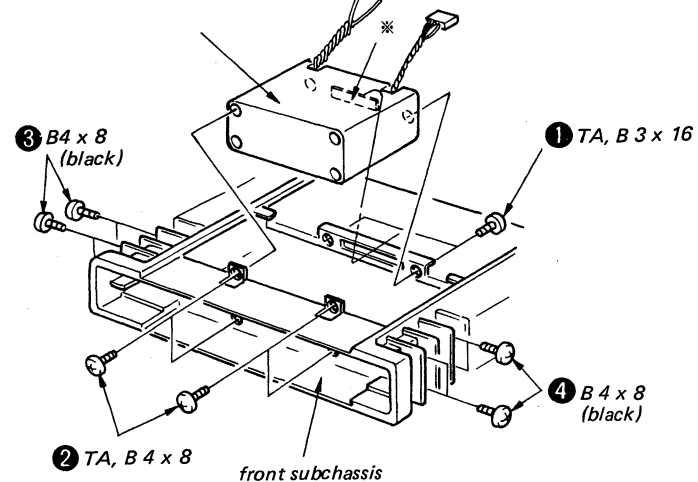


Note: When the knob is installed to the joint shaft, refer to the figure below.

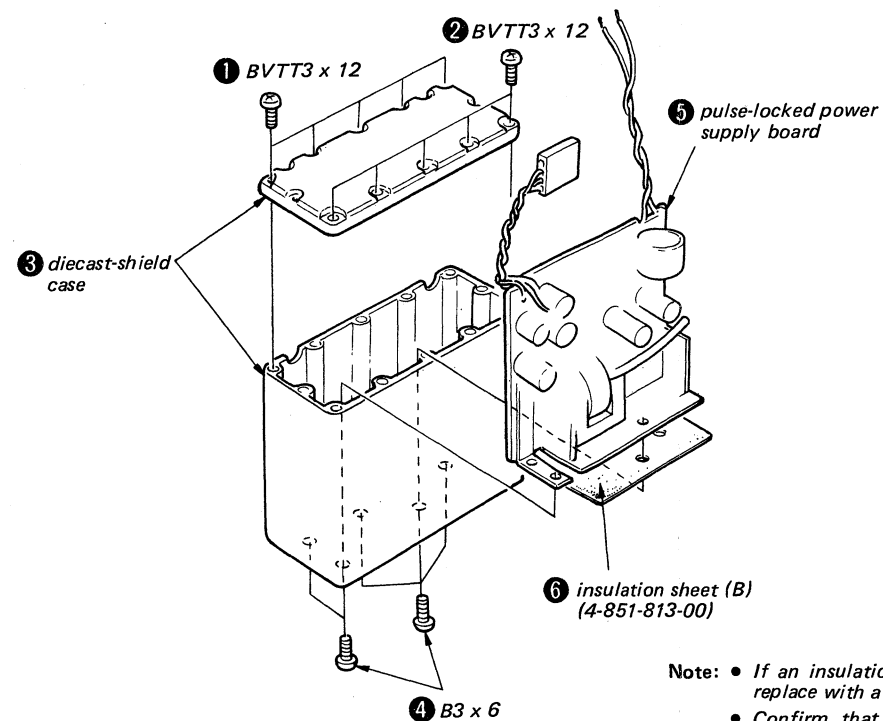


Pulse-locked Power Supply Section Removal

- 5 pulse-locked power supply section (Note: Take care that the portion marked * is hooked to the chassis.)



Pulse-locked Power Supply Board Removal



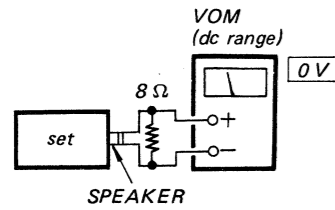
- If an insulation sheet is defective, replace with a new one.
- Confirm that there are no scraps of solder or lead wire on any insulation sheet (B).

SECTION 3
ADJUSTMENTS

- Note:** 1. DC BIAS and DC BALANCE adjustments should be performed about several minutes later after the POWER switch (S10) is turned on.
2. Repeat DC BIAS and DC BALANCE adjustments two or three times.
3. After replacing the power transistors, DC BIAS and DC BALANCE adjustments should be performed.

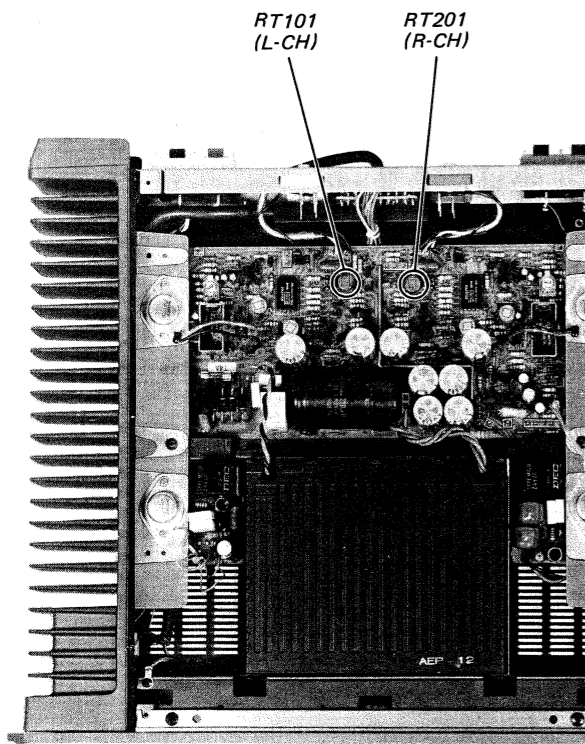
DC Balance Adjustment

Procedure:
- Power Amp Board -



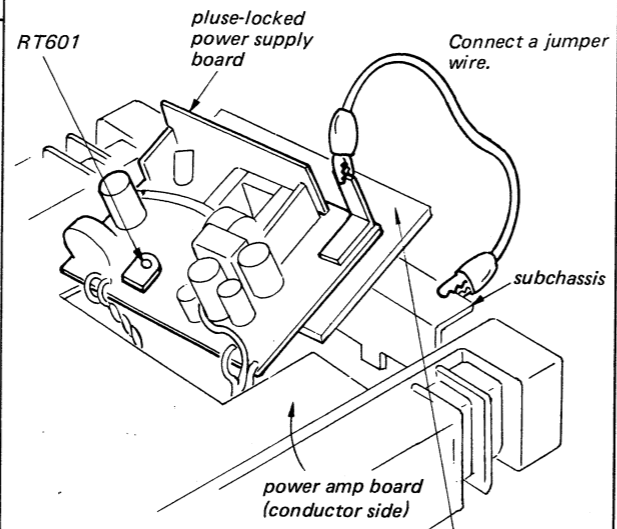
Adjust RT101 (L-CH) and RT201 (R-CH) for 0 V reading on the VOM.

Adjustment Location
- Power Amp Board -



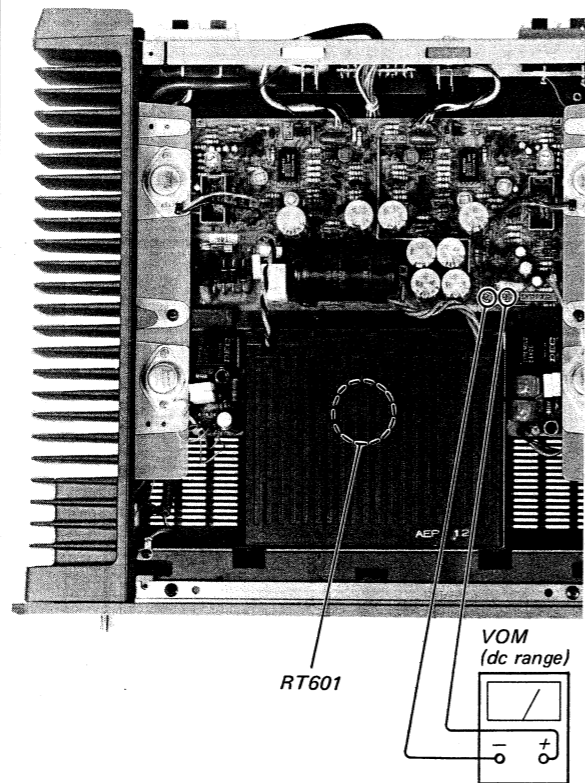
DC Voltage Adjustment

- Procedure:**
1. Connect a jumper wire.
 2. Set the OPERATION switch (S1) to "CLASS B".
 3. Adjust RT601 for 90 V reading on the VOM.



Place an insulator so that the circuit does not contact with the subchassis.

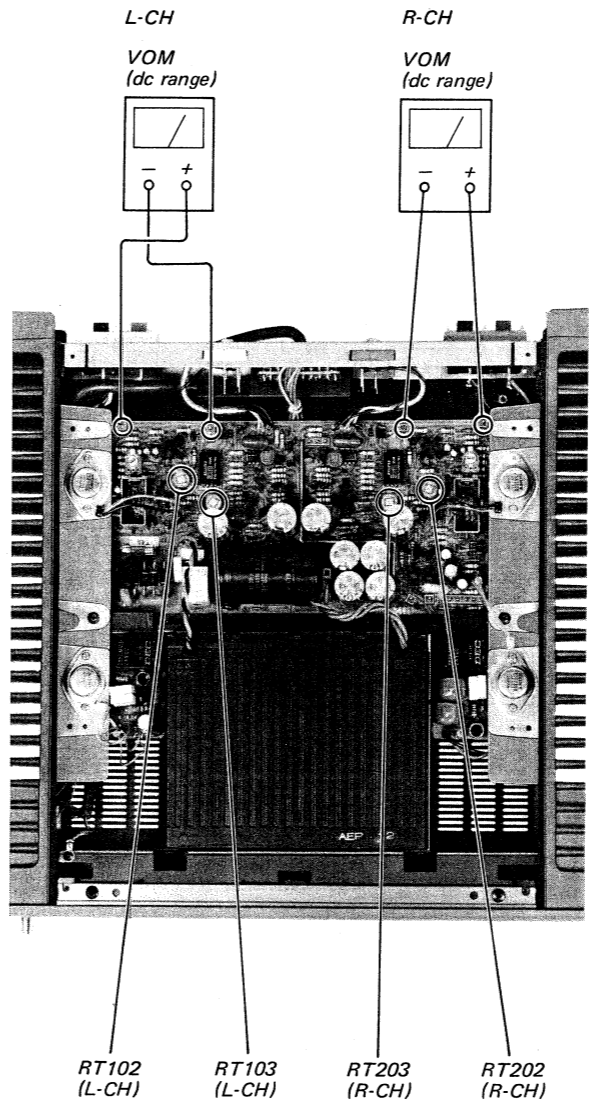
Adjustment Location
- Pulse-locked Power Supply Board -



DC Bias Adjustment

- Procedure:**
1. Set the OPERATION switch (S1) to "CLASS A".
 2. Adjust RT103 (L-CH) and RT203 (R-CH) for 350 mV dc on the VOM.
 3. Set the OPERATION switch (S1) to "CLASS B".
 4. Adjust RT102 (L-CH) and RT202 (R-CH) for 20 mV dc on the VOM.

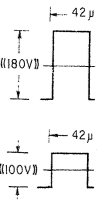
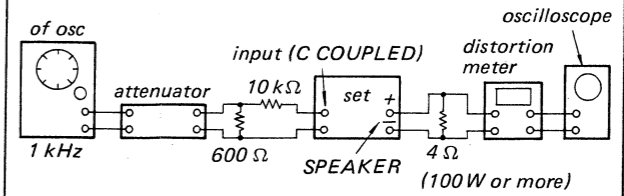
Adjustment Location
- Power Amp Board -



CLASS-B Amp Adjustments

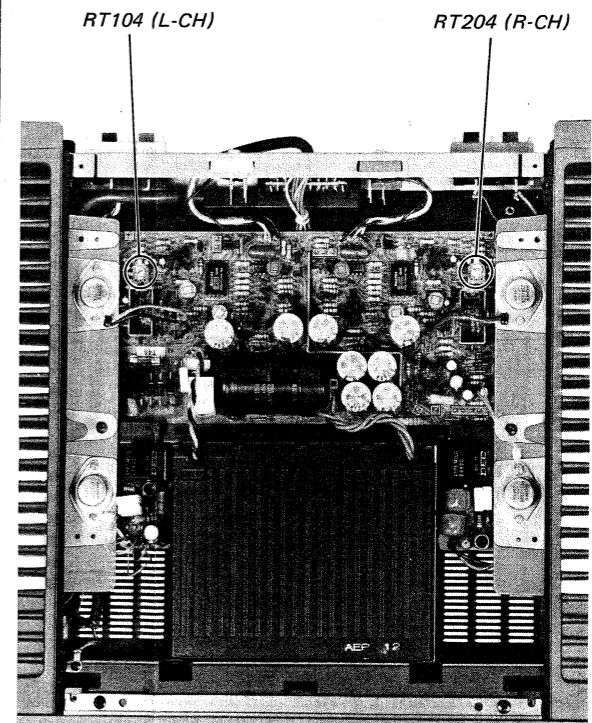
Setting:
OPERATION switch (S1): CLASS-B

Procedure:



1. Adjust the attenuator for specified reading as shown below.
19 V US, Canadian model
15.5 V AEP, UK model
2. Adjust RT104 (L-CH) and RT204 (R-CH) for 0.007% or less on the distortion meter or for waveform with no clip on the oscilloscope.

Adjustment Location
- Power Amp Board -



SECTION 4
DIAGRAMS

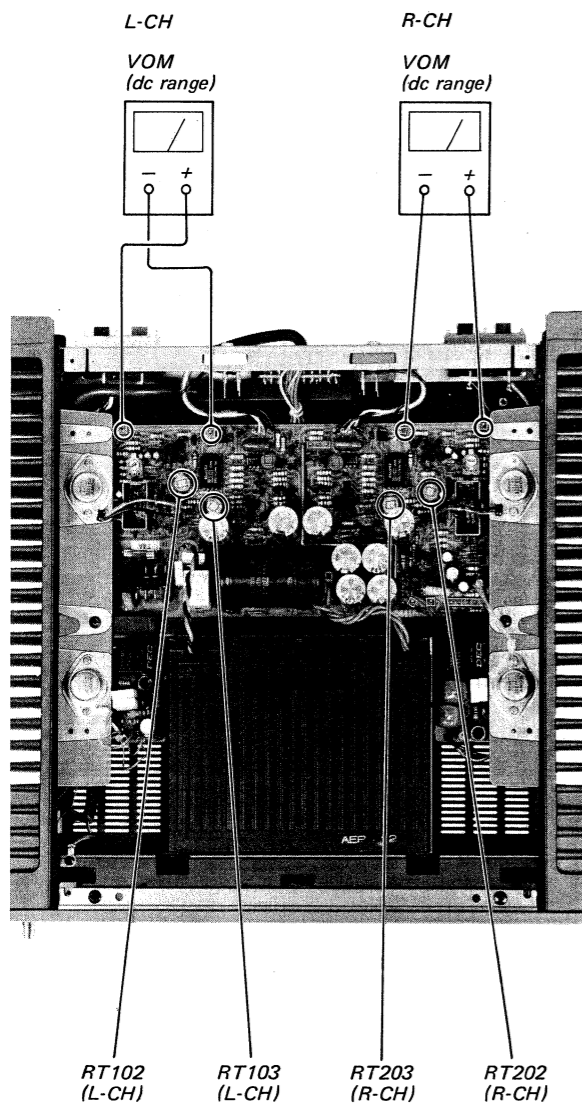
DC Bias Adjustment

Procedure:

1. Set the OPERATION switch (S1) to "CLASS A".
2. Adjust RT103 (L-CH) and RT203 (R-CH) for 350 mV dc on the VOM.
3. Set the OPERATION switch (S1) to "CLASS B".
4. Adjust RT102 (L-CH) and RT202 (R-CH) for 20 mV dc on the VOM.

Adjustment Location

- Power Amp Board -

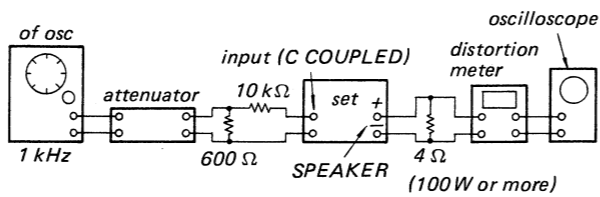


CLASS-B Amp Adjustments

Setting:

OPERATION switch (S1): CLASS-B

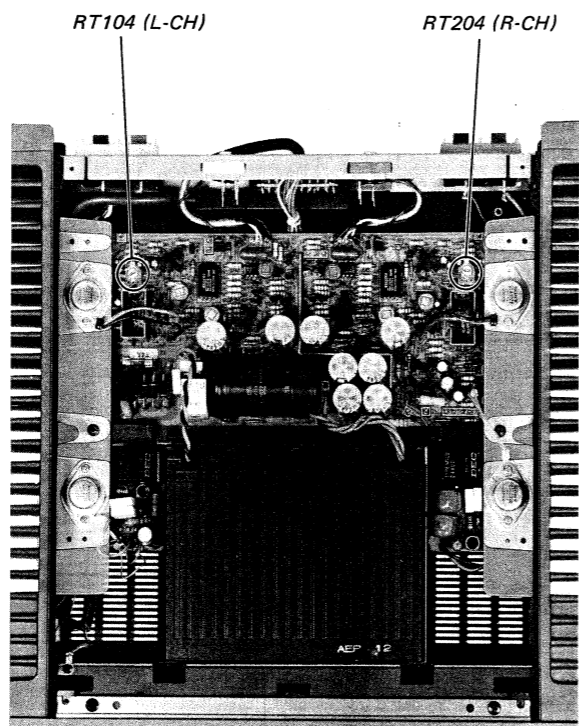
Procedure:



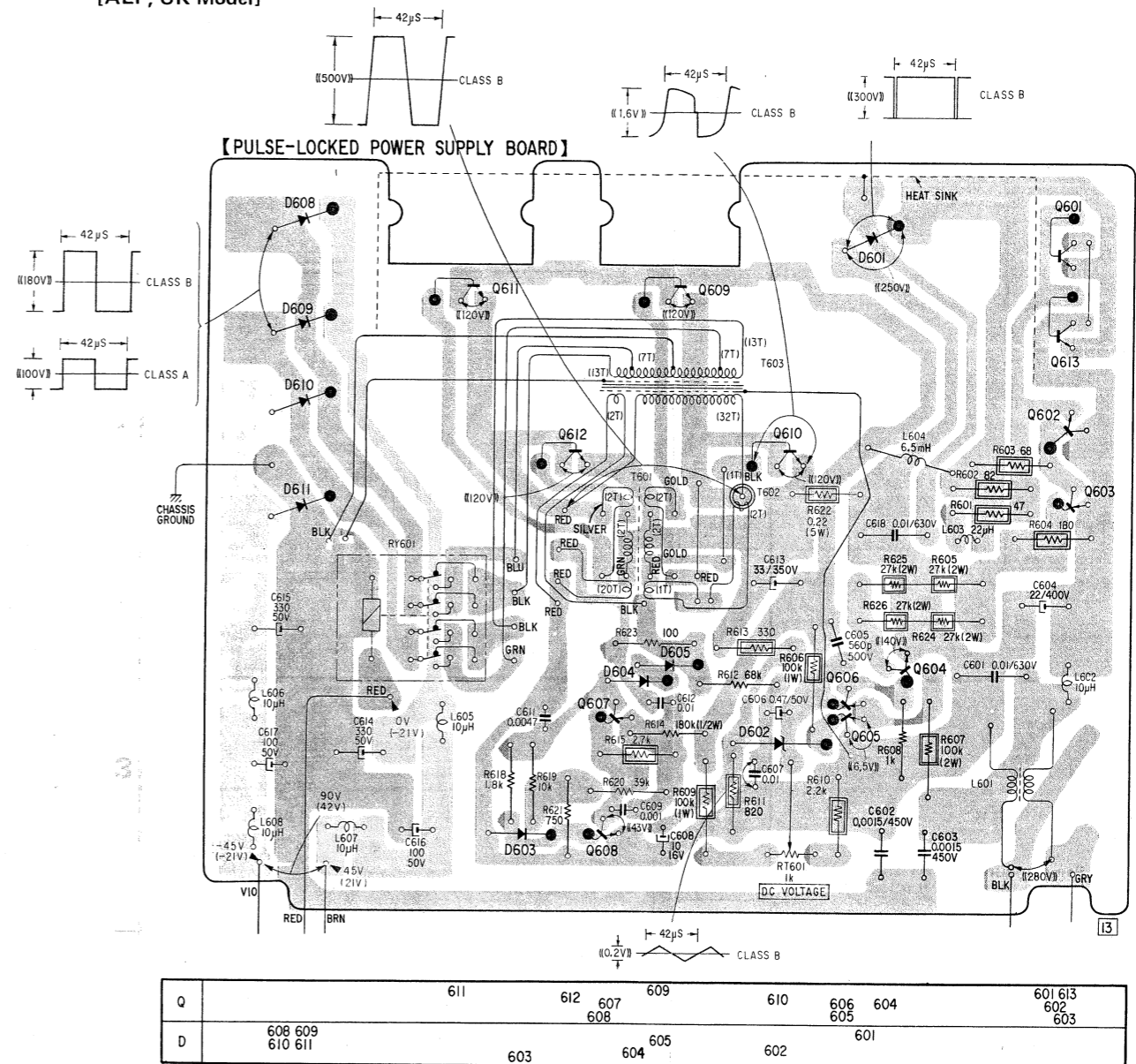
1. Adjust the attenuator for specified reading as shown below.
19 V US, Canadian model
15.5 V AEP, UK model
2. Adjust RT104 (L-CH) and RT204 (R-CH) for 0.007% or less on the distortion meter or for waveform with no clip on the oscilloscope.

Adjustment Location

- Power Amp Board -



4-1. MOUNTING DIAGRAM - Pulse-locked Power Supply Board -
[AEP, UK Model]

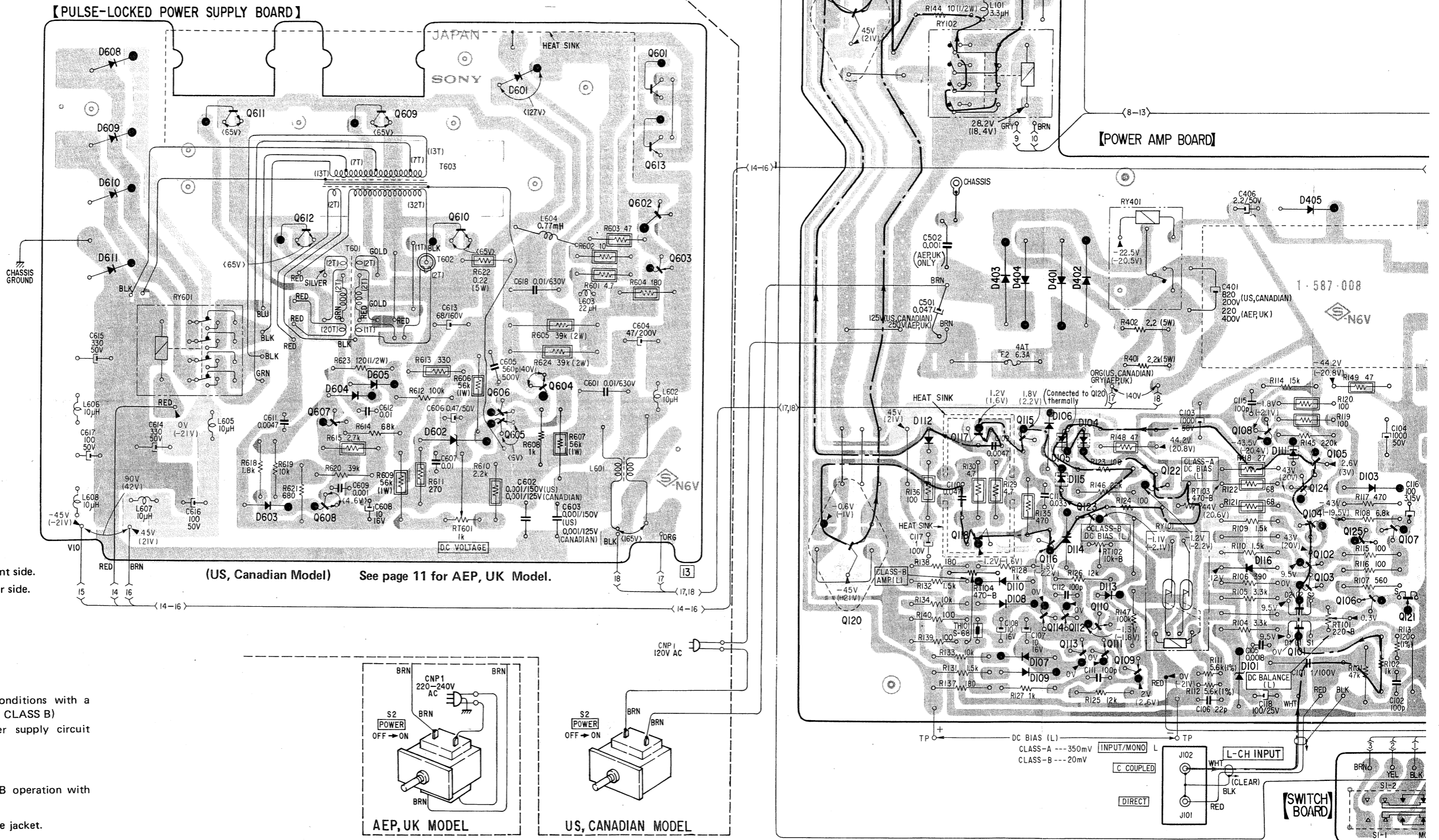


Replacement Semiconductors
see page 18.

Note:

- : parts extracted from the component side.
- : B + pattern
- Readings are taken under no-signal conditions with a VOM (20 kΩ/V)
- Voltage values for pulse-locked power supply circuit () class A (()) with 220 V ac < > with 120 V ac
- The waveforms are taken under class-B operation with 220 V ac unless otherwise noted.

4.2. MOUNTING DIAGRAM

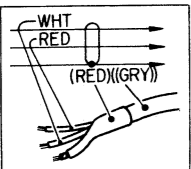
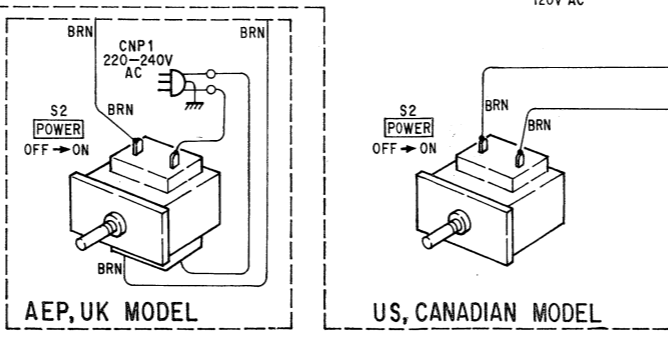


Replacement Semiconductors see page 18.

- Note:
- : parts extracted from the component side.
 - : parts extracted from the conductor side.
 - ▨ : B + pattern

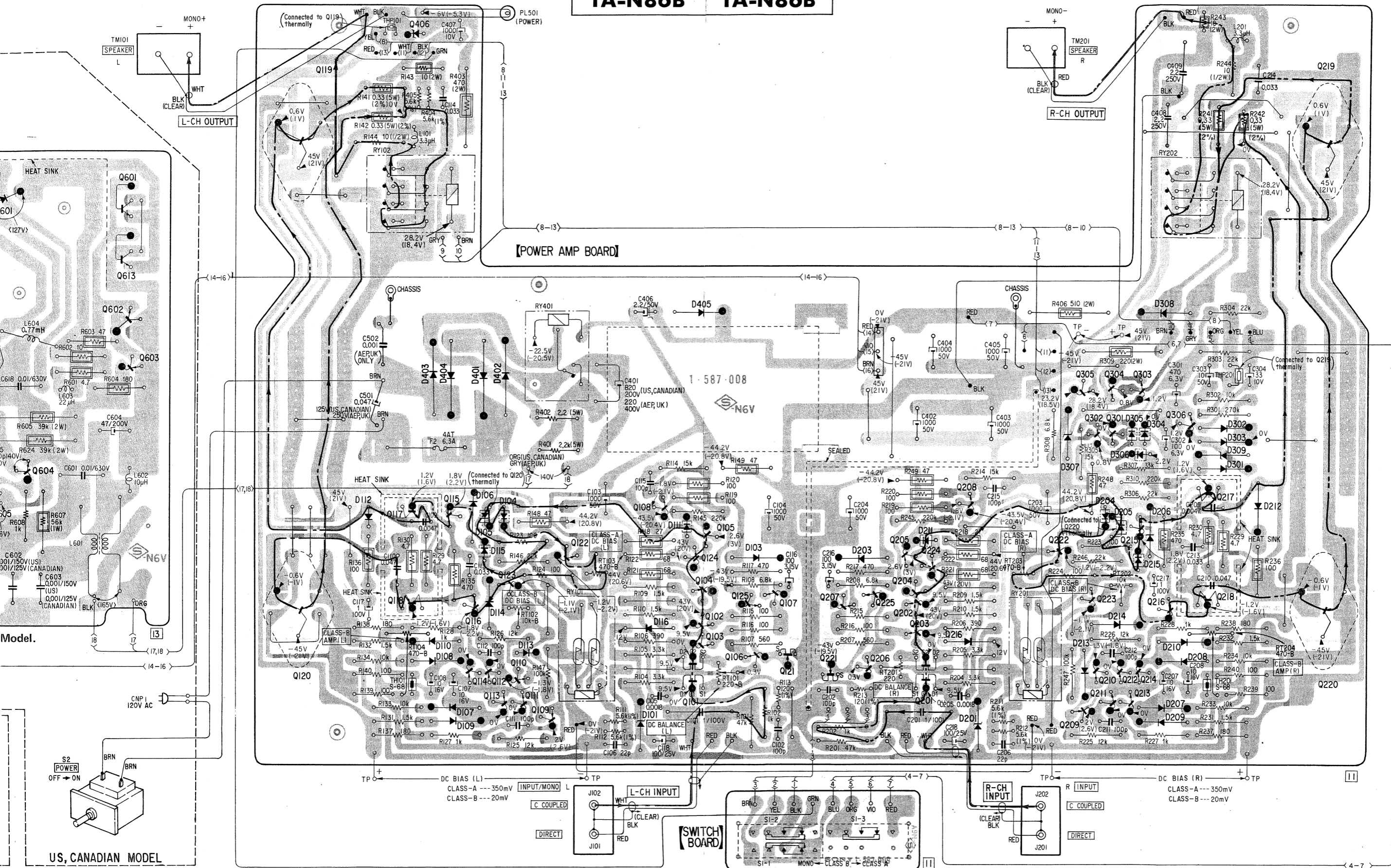
- Signal Path
- : L-CH
 - : R-CH

- Readings are taken under no-signal conditions with a VOM (20 kΩ/V) (OPERATION switch: CLASS B)
- Voltage values for pulse-locked power supply circuit () class A (()) with 220 V ac < > with 120 V ac
- The waveforms are taken under class-B operation with 220 V ac unless otherwise noted.
- Color code of sleeving over the end of the jacket.

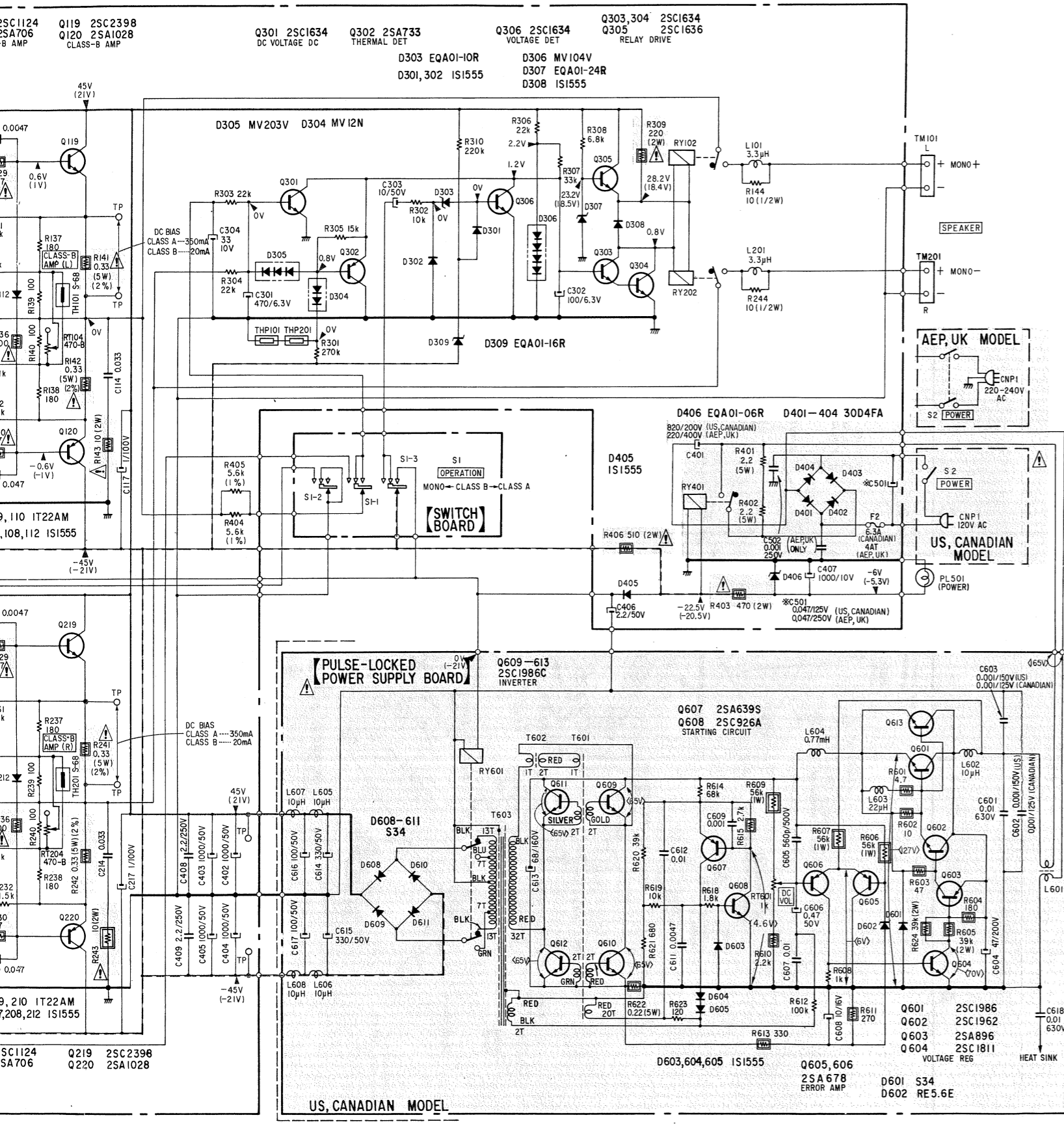


Q		611	612	607	609	610	606	604	601	613	602	603	119	117	115	116	123	110	122	108	124,105	104	125	107
D		608 609	610 611	603	604	605	602	601		112	406	403,404,401	106,105	104	113	116	405	103	101	111	101,102,103	106</		

TA-N86B TA-N86B



604	601,613	119	117	115	116	123	122	108	124,105	125	107	207	225	205,204	208	305,302	304	303	217	219	
	602,603	120	118	114	112	110	109		104	106	121	221	206	202,224		222	223,301,212,215	216	306	218	
			112	406	106,105	104	113		101,102,103	103				203,201		209,210,211,213,214	206,308	210	302,303	212	
				110,108	403,404,401	115	402		116	101		203	211	216		307	204,205	206,308	210	309,301	
					110,108	107,109	114		101					201		213	214	305,304	207	208	212



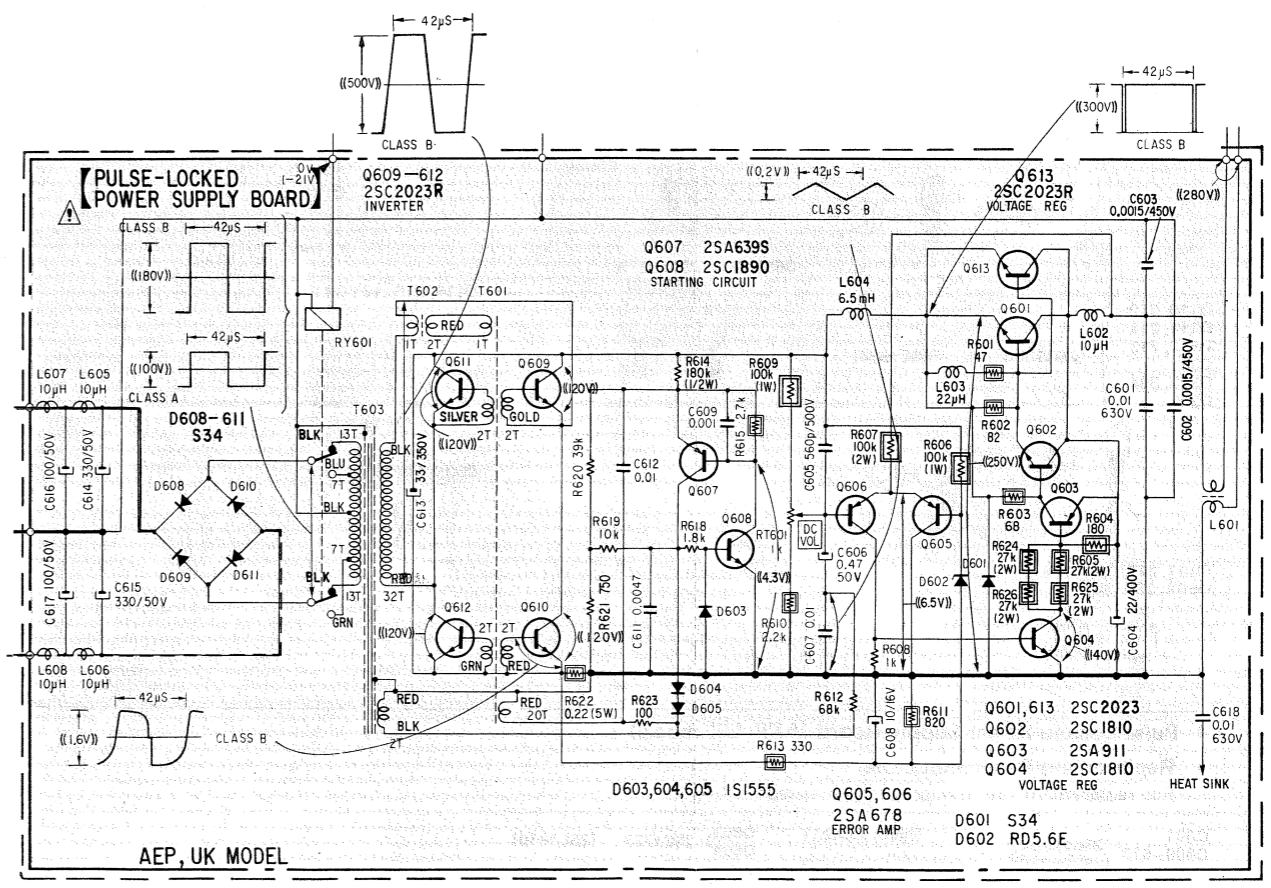
Note:

- All capacitors are in μF unless otherwise noted $\text{pF} = \mu\mu\text{F}$ 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, $\frac{1}{2} W$ unless otherwise noted. $\text{k}\Omega : 1000 \Omega$; $\text{M}\Omega = 1000 \text{k}\Omega$
- Voltages are dc with respect to ground unless otherwise noted.
- All adjustable resistors have characteristic curve B, unless otherwise noted.
- \square : nonflammable resistor.
- 1% indicates component tolerance.
- \square : panel designation.
- \square : adjustment for repair.
- Readings are taken under no-signal conditions with a VOM (20 $\text{k}\Omega/\text{V}$) (OPERATION switch: CLASS B)
- Voltage values for pulse-locked power supply circuit () class A () with 220 V ac < > with 120 V ac
- The waveforms are taken under class-B operation with 220 V ac unless otherwise noted.
- — : B+ bus.
- - - - : B- bus.
- Switch

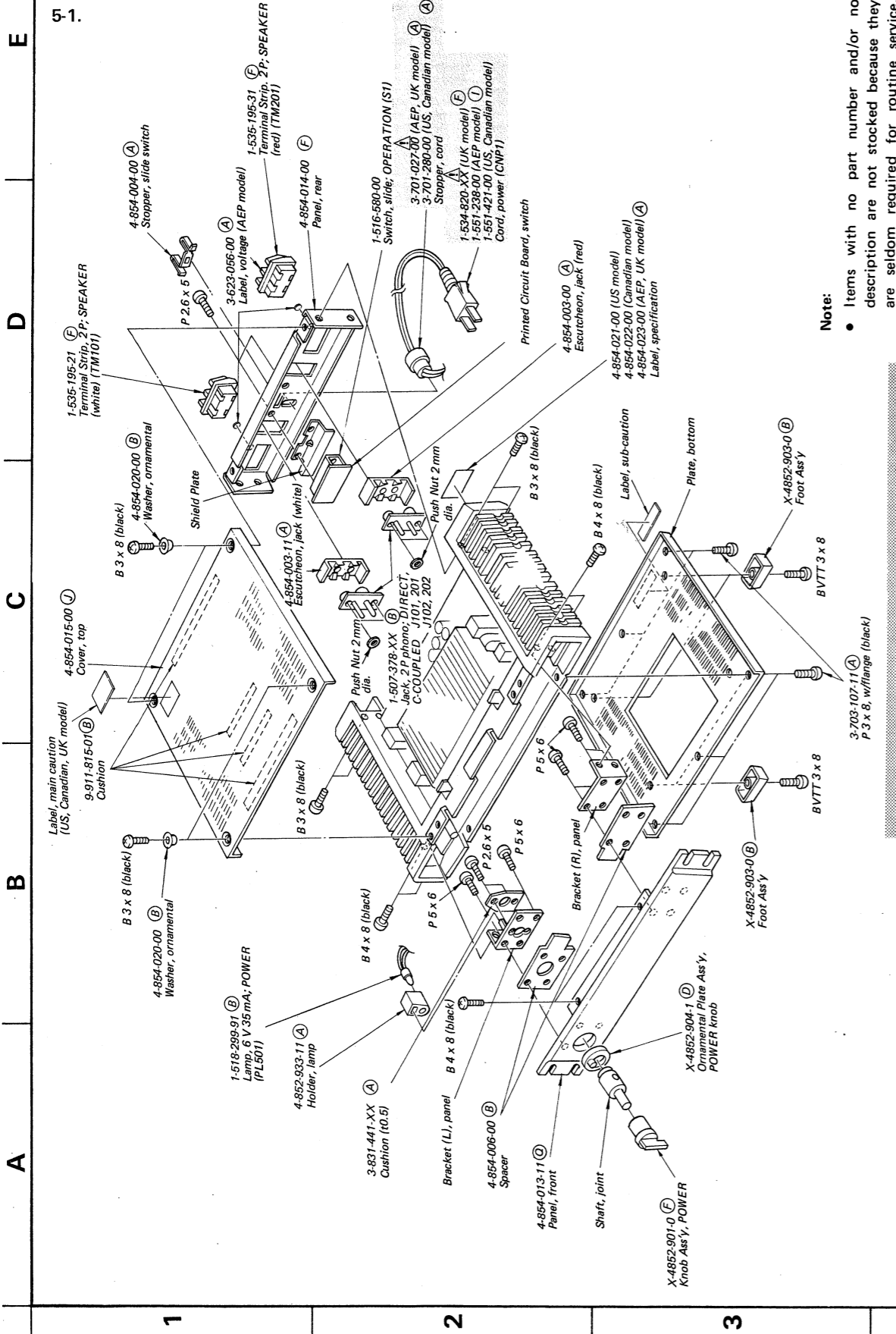
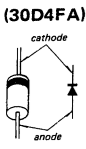
Ref. No.	Switch	Position
S1	OPERATION	CLASS B
S2	POWER	OFF

Note: The components identified by shading and mark \triangle are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque \triangle sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



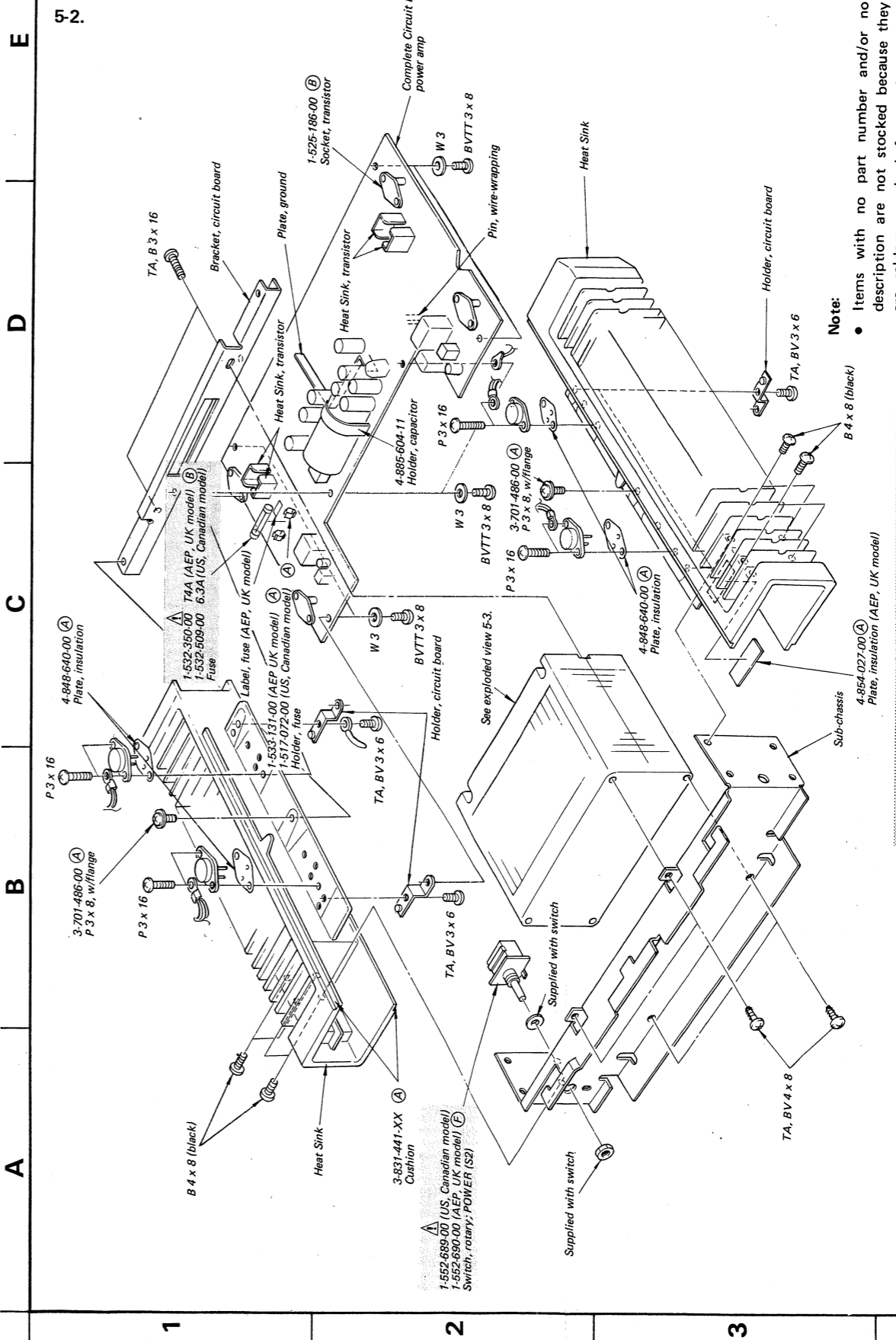
SECTION 5
EXPLODED VIEWS



Note: The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

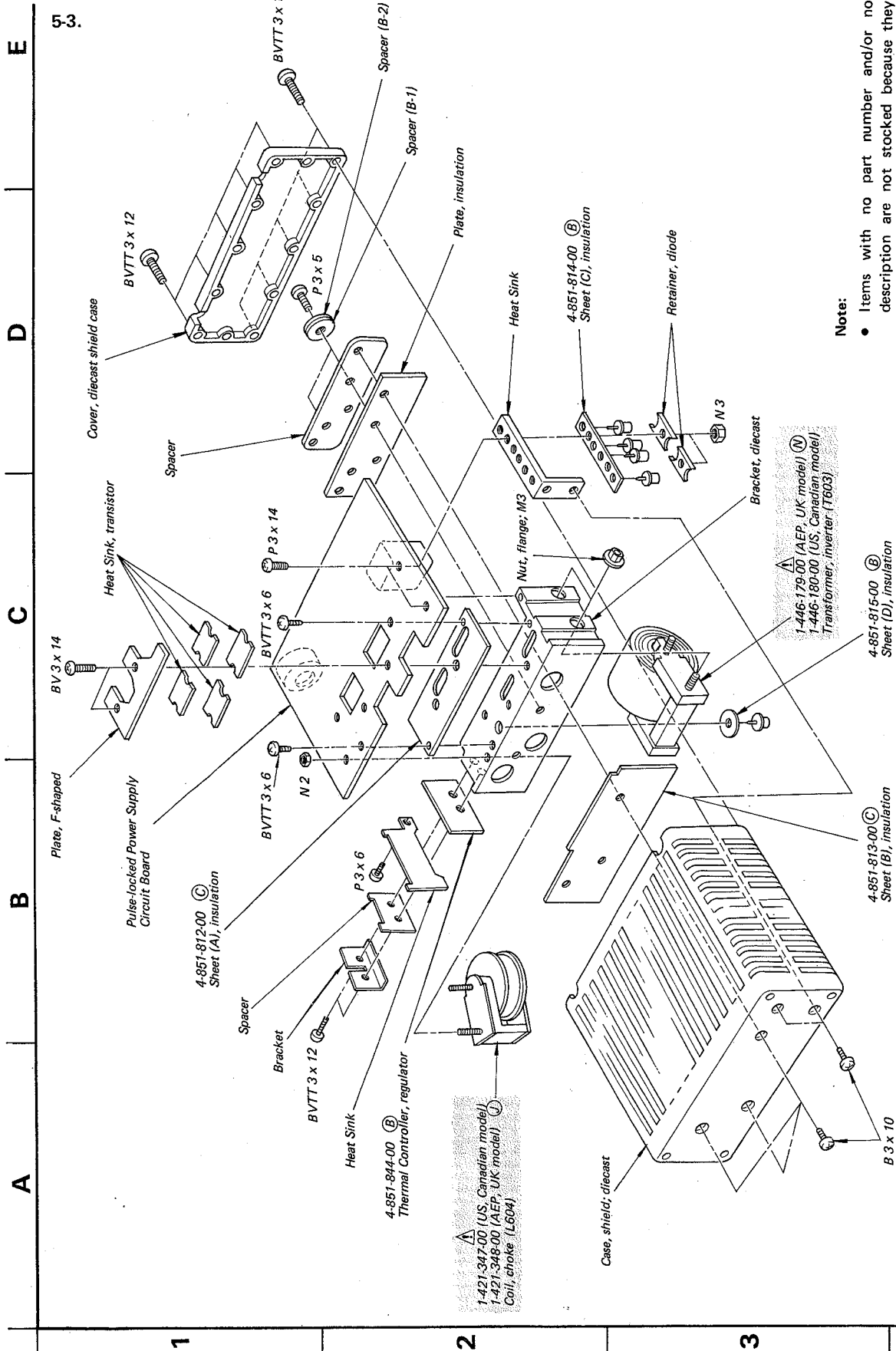
- Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted. (—) = slotted head
 - Circled letters (A to Z) are applicable to European models only.



Note: The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted. (—) = slotted head
 - Circled letters (A to Z) are applicable to European models only.



5.3.

- Note:**
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted.
 - Circled letters (A) to (Z) are applicable to European models only.

Note: Les composants identifiés par un triangle et une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

SECTION 6

ELECTRICAL PARTS LIST

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
SEMICONDUCTORS		
Transistors		
Q101, 201	8-765-342-10	(F) 2SK97
⇒ Q102, 202	8-720-950-03	(C) 2SC926A
⇒ Q103, 203		
Q104, 204	8-729-304-62	(B) 2SB646A
Q105, 205		
⇒ Q106, 206	8-720-950-03	(C) 2SC926A
⇒ Q107, 207		
⇒ Q108, 208	8-765-012-20	(C) 2SC1811
⇒ Q109, 209	8-729-612-77	(B) 2SA1027R
⇒ Q110, 210	8-729-663-47	(C) 2SC1364
⇒ Q111, 211		
⇒ Q112, 212	8-729-612-77	(B) 2SA1027R
⇒ Q113, 213	8-729-663-47	(C) 2SC1364
⇒ Q114, 214	8-729-612-77	(B) 2SA1027R
Q115, 215	8-729-306-72	(B) 2SD667A
Q116, 216	8-729-300-72	(B) 2SB647A
Q117, 217	8-725-412-00	(C) 2SC1124
Q118, 218	8-727-632-00	(C) 2SA706
Q119, 219	8-765-471-20	(I) 2SC2398
Q120, 220	8-765-481-20	(K) 2SA1028
Q121, 221	8-729-203-04	(B) 2SK30A
Q122, 222	8-761-622-00	(B) 2SC1636
Q123, 223		
⇒ Q124, 224	8-729-612-77	(B) 2SA1027R
⇒ Q125, 225	8-720-950-03	(C) 2SC926A
⇒ Q301	8-729-663-47	(C) 2SC1364
⇒ Q302	8-729-612-77	(B) 2SA1027R
⇒ Q303, 304	8-729-663-47	(C) 2SC1364
Q305	8-761-622-00	(B) 2SC1636
⇒ Q306	8-729-663-47	(C) 2SC1364
⇒ Q601	△8-729-302-31	(D) 2SC2023-R (AEP, UK model)
⇒ Q601	△8-729-302-32	(D) 2SC2023-O (AEP, UK model)
⇒ Q601	△8-729-308-72	2SC1986D (US, Canadian model)
⇒ Q602	△8-729-372-30	(C) 2SC1723 (AEP, UK model)
Q602	△8-765-170-01	2SC1962 (US, Canadian model)
Q603	△8-765-082-20	2SA896 (US, Canadian model)

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description
Q603	△8-765-141-00	(J) 2SA911 (AEP, UK model)
⇒ Q604	△8-729-372-30	(C) 2SC1723 (AEP, UK model)
Q604	△8-765-012-20	2SC1811 (US, Canadian model)
⇒ Q605, 606	△8-729-612-77	(B) 2SA1027R
Q607	△8-729-163-04	(C) 2SA639S
Q608	△8-720-950-03	(C) 2SC926A
⇒ Q609-613	△8-729-302-31	(D) 2SC2023-R (AEP, UK model)
⇒ Q609-613	△8-729-302-32	(D) 2SC2023-O (AEP, UK model)
⇒ Q609-613	△8-729-308-72	2SC1986D-O (US, Canadian model)
Diodes		
⇒ D101, 201	8-719-930-12	(B) EQB01-12Z
D103, 203	8-719-815-55	(B) 1S1555
D104, 204	8-719-910-40	(B) MV104V
D105, 205	8-719-300-11	(B) SV04S
D106, 206	8-719-923-76	(B) 1S2076A
D107, 207	8-719-815-55	(B) 1S1555
D108, 208		
D109, 209	8-719-422-21	(B) 1T22AM
D110, 210	8-719-912-00	(B) MV12N
D111, 211		
D112-114	8-719-815-55	(B) 1S1555
D212-214		
D115, 215	8-719-912-00	(B) MV12N
D116, 216	8-719-210-45	(C) 10YG4.5
D301, 302	8-719-815-55	(B) 1S1555
⇒ D303	8-719-931-10	(B) EQB01-10
D304	8-719-912-00	(B) MV12N
D305	8-719-920-30	(B) MV203V
D306	8-719-910-40	(B) MV104V
⇒ D307	8-719-931-24	(B) EQB01-24
D308	8-719-815-55	(B) 1S1555
⇒ D309	8-719-931-16	(B) EQB01-16
⇒ D401-404	△8-719-911-55	(B) U05G
D405	8-719-815-55	(B) 1S1555
⇒ D406	8-719-931-16	(B) EQB01-16
D601	△8-719-303-41	(C) S34
D602	△8-719-156-08	(B) RD5.6E
D603-605	△8-719-815-55	(B) 1S1555
D608-611	△8-719-303-41	(C) S34

Note: Les composants identifiés par un tramé et une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
Thermistors		
TH101, 201	1-800-193-00	(A) Thermistor, S-68
THP101, 201	1-800-427-00	(B) Thermistor, positive
COILS		
L601	(A) 1-421-259-00	Line filter (US, Canadian model)
L601	(A) 1-421-349-00	(F) Line filter (AEP, UK model)
L602	(A) 1-421-329-00	(B) 10 μ H, choke
L603	(A) 1-407-161-XX	(A) 22 μ H, microinductor
L604	(A) 1-421-347-00	0.77 mH, choke (US, Canadian model)
L604	(A) 1-421-348-00	(J) 6.5 mH, choke (AEP, UK model)
L605-608	(A) 1-421-329-00	(B) 10 μ H, choke

TRANSFORMERS

T601	(A) 1-543-098-00	Core (US, Canadian model)
T601	(A) 1-543-100-00	(B) Core (AEP, UK model)
T602	(A) 1-543-121-00	(B) Core
T603	(A) 1-446-179-00	(M) Inverter (AEP, UK model)
T603	(A) 1-446-180-00	Inverter (US, Canadian model)

CAPACITORS

All capacitors are in μ F and electrolytic unless otherwise noted. 50 WV or less are not indicated except for electrolytics. p : μ μ F, elect : electrolytic

C101, 201	1-130-083-00	(C) 1	100 V	polyethylene ceramic
C102, 202	1-102-975-00	(A) 100 p		
C103, 203 C104, 204	1-123-061-00	(C) 1000	50 V	
C105, 205	1-108-561-00	(A) 0.0018		mylar
C106, 206	1-107-069-00	(A) 22 p		mica
C107, 207 C108, 208	1-121-651-00	(A) 10	16 V	
C109, 209	1-108-234-00	(A) 0.0047		mylar
C110, 210	1-108-246-00	(A) 0.047		mylar
C111, 211 C112, 212	1-102-975-00	(A) 100 p		ceramic
C113, 213 C114, 214	1-108-244-00	(A) 0.033		mylar

Ref. No.	Part No.	Description
C115, 215	1-107-085-00	(A) 100 p mica
C116, 216	1-131-177-00	(C) 100 3.15 V tantalum
C117, 217	1-123-249-00	(A) 1 100 V
C118, 218	1-121-417-00	(B) 100 25 V
C301	1-121-424-00	(B) 470 6.3 V
C302	1-121-414-00	(A) 100 6.3 V
C303	1-121-738-00	(A) 10 50 V
C304	1-121-402-00	(A) 33 10 V
C401	(A) 1-123-407-00	(I) 220 400 V (AEP, UK model)
C401	(A) 1-123-408-00	820 200 V (US, Canadian model)
C402-405	1-123-061-00	(C) 1000 50 V
C406	1-121-450-00	(A) 2.2 50 V
C407	1-121-736-00	(B) 1000 10 V
C408, 409	1-108-972-00	(G) 2.2 250 V mylar
C501	(A) 1-108-749-00	0.047 125 V mylar (US model)
C501	(A) 1-130-159-00	(C) 0.047 250 V film (AEP, UK model)
C501	(A) 1-130-197-00	0.047 125 V polyethylene (Canadian model)
C502	(A) 1-102-222-00	(B) 0.001 250 V ceramic (AEP, UK model)
C601	(A) 1-130-141-00	(A) 0.01 630 V polyethylene
C602, 603	(A) 1-115-149-00	(C) 0.0015 450 V paper (AEP, UK model)
C602, 603	(A) 1-161-502-00	0.001 150 V ceramic (US model)
C602, 603	(A) 1-161-516-00	0.001 125 V ceramic (Canadian model)
C604	(A) 1-123-401-00	47 200 V (US, Canadian model)
C604	(A) 1-123-402-00	(C) 22 400 V (AEP, UK model)
C605	(A) 1-161-438-00	(A) 560 p 500 V ceramic
C606	(A) 1-121-726-00	(A) 0.47 50 V
C607	(A) 1-108-239-00	(A) 0.01 mylar
C608	(A) 1-121-651-00	(A) 10 16 V
C609	(A) 1-108-227-00	(A) 0.001 mylar
C611	(A) 1-108-234-00	(A) 0.0047 mylar
C612	(A) 1-108-239-51	(A) 0.01 mylar
C613	(A) 1-123-277-00	68 160 V (US, Canadian model)

Note: The components identified by shading and mark (A) are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque (A) sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
C613	△1-123-280-00 (C) 33	350 V (AEP, UK model)
C614, 615	△1-121-656-00 (B) 330	50 V
C616, 617	△1-121-417-00 (B) 100	50 V
C618	△1-130-141-00 (A) 0.01	630 V polyethylene

RESISTORS

All resistors are in ohms. Common ¼ W carbon resistors are omitted. Refer to the list on page 27 for their part numbers. All adjustable resistors have characteristic curve B, unless otherwise noted. kΩ : 1000 Ω

R111, 211 R112, 212	1-214-150-11 (A) 5.6 k	¼ W(1%) metal oxide
R113, 213	1-214-110-00 (A) 120	¼ W(1%) metal oxide
R118, 218	△1-211-508-00 (A) 27	¼ W carbon (nonflammable)
R119, 219 R120, 220	△1-211-522-00 (A) 100	¼ W carbon (nonflammable)
R121, 221 R122, 222	△1-211-518-00 (A) 68	¼ W carbon (nonflammable)
R129, 229 R130, 230	△1-211-490-00 (A) 4.7	¼ W carbon (nonflammable)
R135, 235	△1-211-538-00 (A) 470	¼ W carbon (nonflammable)
R136, 236	△1-211-522-00 (A) 100	¼ W carbon (nonflammable)
R141, 241 R142, 242	△1-217-573-00 0.33	5 W(2%) wirewound (nonflammable)
R143, 243	△1-206-463-00 (A) 10	2 W metal oxide (nonflammable)
R144, 244	△1-244-825-00 10	½ W carbon
R148, 248 R149, 249	△1-211-514-00 (A) 47	¼ W carbon (nonflammable)
R309	△1-206-648-00 (A) 220	2 W metal oxide (nonflammable)
R401, 402 R403	△1-217-570-00 2.2 △1-206-656-00 (A) 470	5 W metal plate 2 W metal oxide (nonflammable)
R404, 405 R406	1-214-150-00 5.6 k △1-206-657-00 (A) 510	¼ W(1%) metal oxide 2 W metal oxide (nonflammable)

Ref. No.	Part No.	Description
R601	△1-211-490-00 4.7	¼ W carbon (nonflammable) (US, Canadian model)
R601	△1-211-514-00 (A) 47	¼ W carbon (nonflammable) (AEP, UK model)
R602	△1-211-498-00 10	¼ W carbon (nonflammable) (US, Canadian model)
R602	△1-211-520-00 (A) 82	¼ W carbon (nonflammable) (AEP, UK model)
R603	△1-211-514-00 47	¼ W carbon (nonflammable) (US, Canadian model)
R603	△1-211-518-00 (A) 68	¼ W carbon (nonflammable) (AEP, UK model)
R604	△1-211-528-00 (A) 180	¼ W carbon (nonflammable)
R605	△1-214-596-00 39 k	2 W metal oxide (nonflammable) (US, Canadian model)
R605	△1-206-698-00 (A) 27 k	2 W metal oxide (nonflammable) (AEP, UK model)
R606	△1-214-598-00 56 k	1 W metal oxide (nonflammable) (US, Canadian model)
R606	△1-214-595-00 (A) 100 k	1 W metal oxide (nonflammable) (AEP, UK model)
R607	△1-214-598-00 56 k	1 W metal oxide (nonflammable) (US, Canadian model)
R607	△1-214-597-00 (A) 100 k	2 W metal oxide (nonflammable) (AEP, UK model)
R608 R609	△1-246-470-00 (A) 1 k △1-214-598-00 56 k	¼ W carbon 1 W metal oxide (nonflammable) (US, Canadian model)
R609	△1-214-595-00 (A) 100 k	1 W metal oxide (nonflammable) (AEP, UK model)

Note: The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
R610	△1-211-945-00 (A) 2.2 k	¼ W carbon (nonflammable)
R611	△1-211-532-00	270 ¼ W carbon (nonflammable) (US, Canadian model)
R611	△1-211-544-00 (A) 820	¼ W carbon (nonflammable) (AEP, UK model)
R612	△1-246-517-00 (A) 68 k	¼ W carbon (AEP, UK model)
R612	△1-246-521-00	100 k ¼ W carbon (US, Canadian model)
R614	△1-244-927-00 (A) 180 k	¼ W carbon (AEP, UK model)
R614	△1-246-517-00	68 k ¼ W carbon (US, Canadian model)
R615	△1-211-553-00 (A) 2.7 k	¼ W carbon (nonflammable)
R618	△1-246-479-00 (A) 1.8 k	¼ W carbon
R619	△1-246-497-00 (A) 10 k	¼ W carbon
R620	△1-246-511-00 (A) 39 k	¼ W carbon
R621	△1-246-469-00	680 ¼ W carbon (US, Canadian model)
R621	△1-246-470-00 (A) 750	¼ W carbon (AEP, UK model)
R622	△1-217-156-00 (B) 0.22	5 W wirewound
R623	△1-246-449-00 (A) 100	¼ W carbon (AEP, UK model)
R623	△1-246-451-00	120 ¼ W carbon (US, Canadian model)
R624	△1-214-596-00	39 k 2 W (US, Canadian model)
R624-626	△1-206-698-00 (A) 27 k	2 W metal oxide (AEP, UK model)
RT101, 201	1-224-550-21 (B) 220,	adjustable; dc balance
RT102, 202	1-224-252-XX (B) 10 k,	adjustable; class-B dc bias
RT103, 203	1-224-248-XX (B) 470,	adjustable; class-A dc bias
RT104, 204	1-224-641-XX (B) 470,	adjustable; class-B amp.
RT601	△1-224-642-XX (B) 1 k,	adjustable; dc voltage

SWITCHES

S1	1-516-580-00 (C) Slide,	OPERATION
S2	△1-552-689-00	Rotary, POWER (US, Canadian model)
S2	△1-552-690-00 (F) Rotary,	POWER (AEP, UK model)

Note: The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description
MISCELLANEOUS		
CNP1	△1-551-238-00 (I)	Cord, power (AEP model)
CNP1	△1-551-421-00	Cord, power (US, Canadian model)
CNP1	△1-534-820-XX (F)	Cord, power (UK model)
F2	△1-532-350-00 (B)	Fuse, 4AT (AEP, UK model)
F2	△1-532-509-00	Fuse, 6.3A (US, Canadian model)
J101, 201 J102, 202	1-507-378-XX (B)	Jack, 2 p; DIRECT, C COUPLED
PL501	1-518-299-91 (B)	Lamp, 6 V 35 mA; POWER
RY101, 201	1-515-294-00 (F)	Relay
RY102, 202	1-515-302-00 (F)	Relay
RY401	△1-515-278-00	Relay (US, Canadian model)
RY401	△1-515-278-00 (F)	Relay (AEP, UK model)
RY601	△1-515-127-XX (I)	Relay
TM101	1-535-195-21 (F)	Terminal Strip, 2 p; SPEAKER (white)
TM201	1-535-195-31 (F)	Terminal Strip, 2 p; SPEAKER (red)
	1-517-072-00	Holder, lamp (US, Canadian model)
	1-525-186-00 (B)	Socket, transistor
	1-533-131-00 (A)	Holder, fuse

Note: Les composants identifiés par un tramé et une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

ACCESSORIES AND PACKING MATERIALS

<u>Part No.</u>	<u>Description</u>
3-701-202-00	(A) Bag, check sheet
3-770-353-11	(F) Manual, instruction (AEP, UK model)
3-770-353-21	Manual, instruction (US, Canadian model)
3-794-233-21	Sheet (US model)
3-794-301-31	Sheet, instruction (Canadian model)
4-809-251-00	(A) Bag, plastic
4-854-019-00	(C) Cushion
4-854-024-00	(F) Carton (AEP, UK model)
4-854-025-00	(B) Sub-cushion (AEP, UK model)
4-854-026-00	Carton (US, Canadian model)

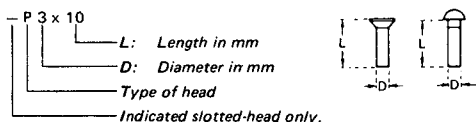
1/4 WATT CARBON RESISTORS [Ⓐ]

Note: Circled letter [Ⓐ] is applicable to European models only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-476-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-477-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-478-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-479-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-480-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-481-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-482-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-483-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-484-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-485-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-486-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-487-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

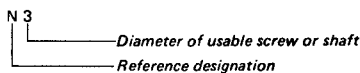
HARDWARE NOMENCLATURE

Screw:



Indicated slotted-head only.
Unless otherwise indicated, it means cross-recessed head (Phillips type).

Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	