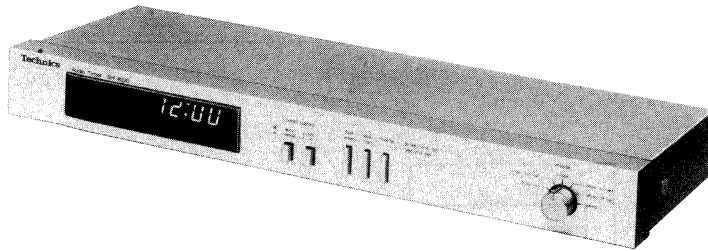


Service Manual

Audio Timer

SH-4020

[EG],[EF],[EK],[EH],
[EB],[DX],[EW],[DM],[Ei]

Areas

- | | |
|--|-------------------------------------|
| * [EG] is available in F.R. Germany. | * [DX] is available in Scandinavia. |
| * [EF] is available in France. | * [EW] is available in Switzerland |
| * [EK] is available in United Kingdom. | * [DM] is available in Denmark. |
| * [EH] is available in Holland. | * [Ei] is available in Italy. |
| * [EB] is available in Belgium. | |

English

Specifications

(Specifications are subject to change without notice for further improvement.)

Switch construction	Single pole-single throw
Clock accuracy	Synchronizes with frequency of power source
Timer accuracy	0 ~ +0.02 second against preset time
Clock	24-hour indication
Sleep timer	1 min. ~ 1 hour, 59 min.
Setting intervals	1 min. ~ 23 hours, 59 min.
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Power consumption	7W for operation of timer

Power capacity

for Denmark and Switzerland

Total 600W Max or each 275W Max (110V, 120V)

Total 1200W Max or each 550W Max (220V, 240V)

for other areas

600W Max (110V, 120V), 1200W Max (220V, 240V)

Dimensions (W×H×D)

for Denmark and Switzerland

430 × 53 × 167 mm

(16-15/16" × 2-3/32" × 6-9/16")

for other areas

430 × 53 × 156 mm

(16-15/16" × 2-3/32" × 6-5/32")

Weight

for Denmark and Switzerland

1.8 kg (4.0 lb.)

for other areas

1.9 kg (4.2 lb.)

Deutsch

TECHNISCHE DATEN

(Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

Schaltung	Doppelpol-Einrichtschaltung
Uhrenpräzision	Mit der Stromfrequenz synchronisiert
Timerpräzision	0 ~ +0,02 Sekunden zur eingestellten Zeit
Uhr	24-Stunden-Anzeige
Sleep timer	1 Min. bis 1 Std. 59 Min.
Einschaltdauer	1 Min. bis 23 Stdn. 59 Min.
Netzspannung	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Stromverbrauch	7W für den Gebrauch des Timers

Stromstärke

Dänemark und Schweiz

Total 600W max. oder je 275W max. (110V, 120V)

Total 1200W max. oder je 550W max. (220V, 240V)

andere Länder

600W max. (110V, 120V)

1200W max. (220V, 240V)

Abmessungen (B×H×T)

Dänemark und Schweiz

430 × 53 × 167 mm

andere Länder

430 × 53 × 156 mm

Gewicht

Dänemark und Schweiz

1,8 kg

andere Länder

1,9 kg

Français

CARACTERISTIQUES

(Sujet à changement sans préavis.)

Agencement des commutateurs	type bipolaire à une direction
Précision de l'horloge	Synchronisée avec la fréquence de la source de courant
Précision de du chronorupteur	0 ~ +0,02 seconde
Horloge	Affichage basé sur le système des 24 heures
Sleep timer	1 min. ~ 1 hour, 59 min.
Intervalles de réglage	De 1 minute à 23 heures, 59 minutes
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Consommation	7W pour le fonctionnement du chronorupteur

Pouvoir de consommation

pour le Danemark et la Suisse

Total 600W Max or each 275W Max (110V, 120V)

Total 1200W Max or each 550W Max (220V, 240V)

pour d'autres régions

600W Max (110V, 120V), 1200W Max (220V, 240V)

Dimensions (L×H×Pr)

pour le Danemark et la Suisse

430 × 53 × 167 mm

pour d'autres régions

430 × 53 × 156 mm

Poids

pour le Danemark et la Suisse

1,8 kg

pour d'autres régions

1,9 kg

Nota:

La Société NATIONAL-PANASONIC-FRANCE, importateur du matériel MATSUSHITA-ELECTRIC déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. (arrêté 14 Janvier 1980).

Technics

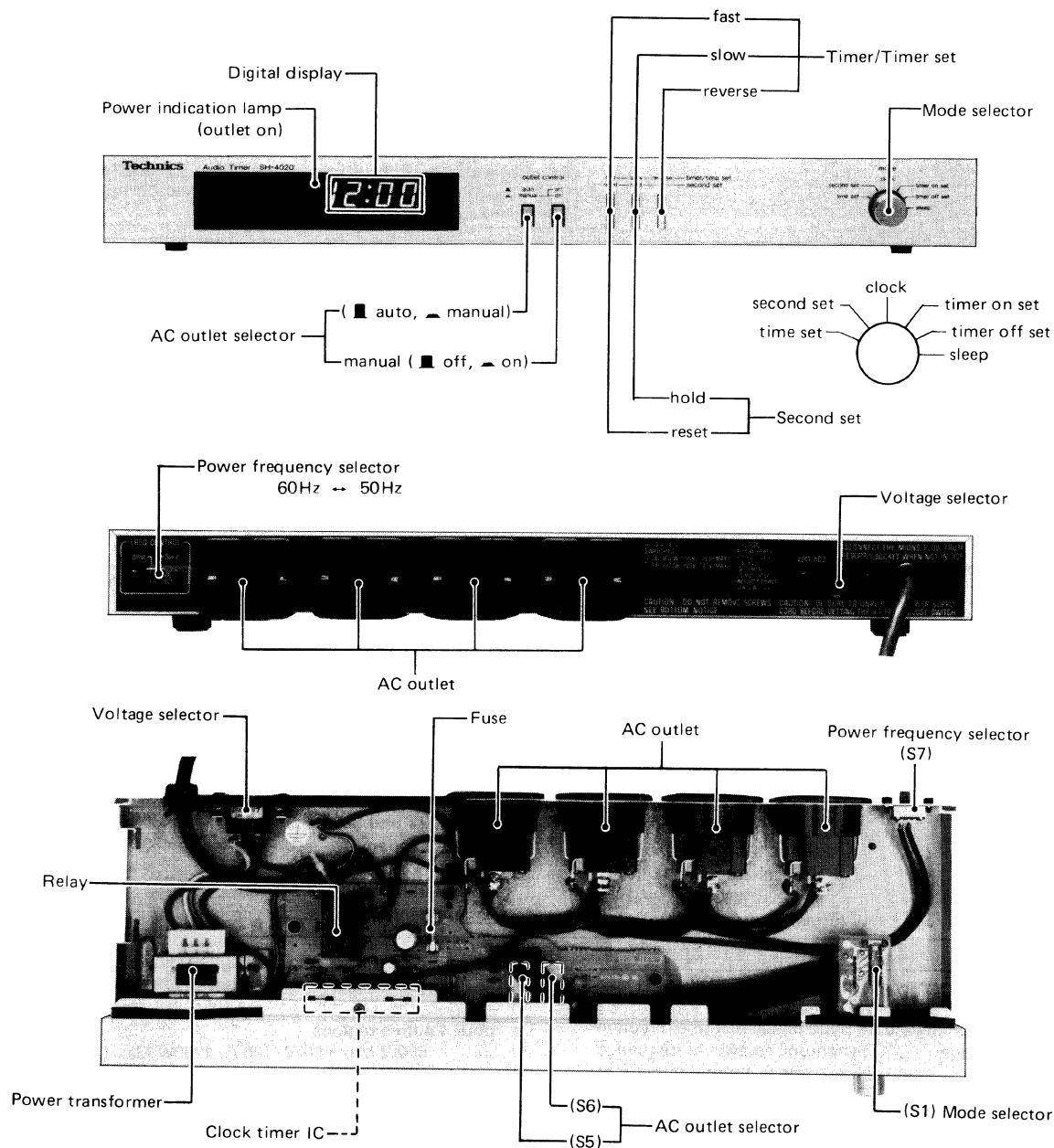
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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DIAGRAM	5
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LOCATION OF CONTROLS



* This photo shows the [EG] area.
The shape of AC outlet of this unit differs with area.

FEATURES

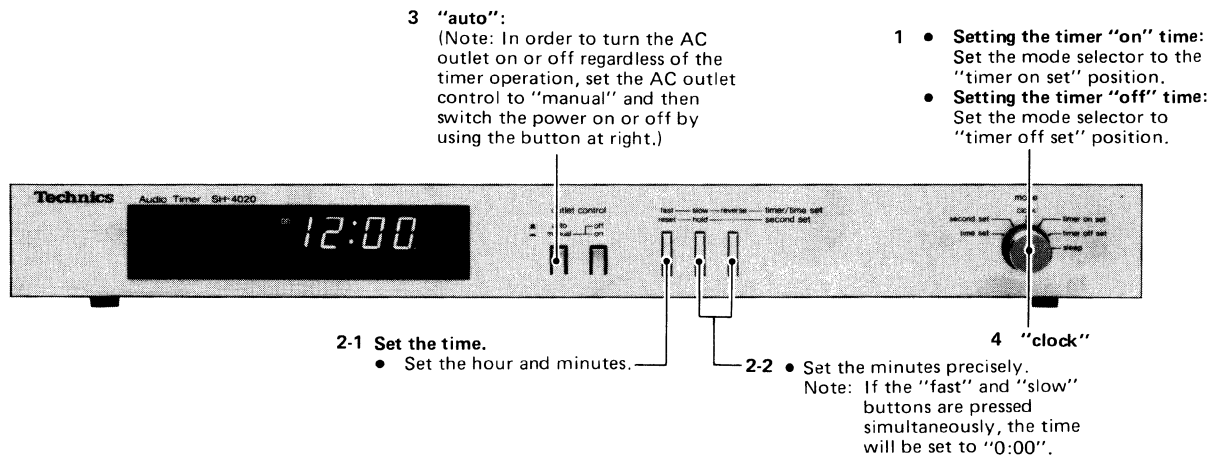
- Once-a-day on-off function.
- Sleep timer can be steplessly set in a range from 1 minute to 1 hour 59 minutes (display in minute only).
- AC power socket (interlocked with switch) of 680W max.
- 24-hour indication (easy-to-read FL display).
- Commercial power supply frequency synchronizing system.

HOW TO OPERATE

• Setting the timer (on/off time)

About the timer

The timer is used to turn the power on or off at preset times. If the AC outlet control is set to the "auto" () position, the power will be turned on at the preset "on" time, and off at the preset "off" time.



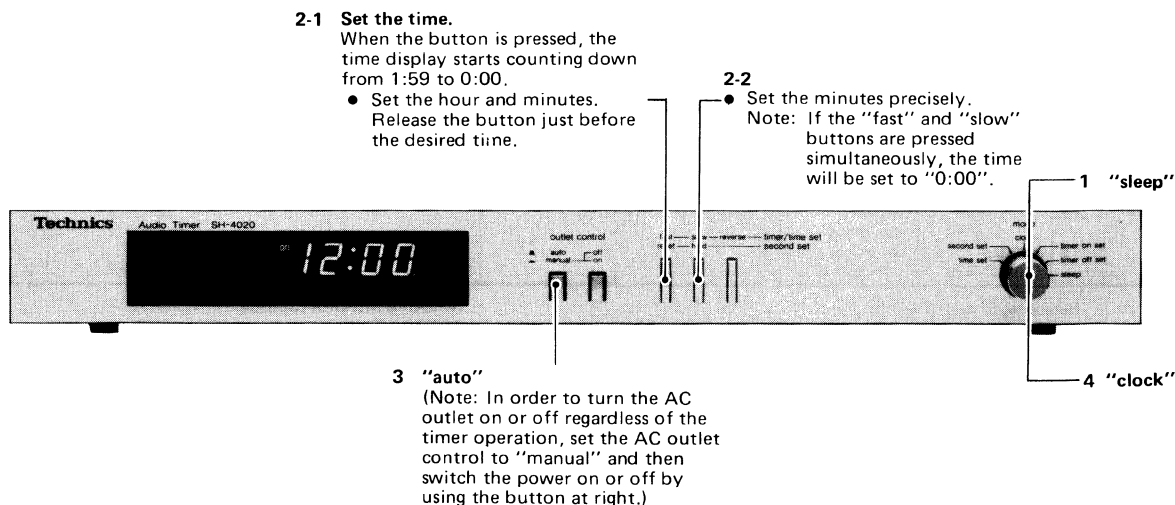
Notes:

1. If an amplifier, etc., is turned "on" by the timer and after one minute, the mode selector is set to the "timer on set" position, the power and the timer-controlled operation will be turned off.
2. The timer will not operate if the mode selector is set to the "timer on set" position.
3. The timer will not operate if the "on" and "off" times are set to the same time.

• Setting the sleep timer

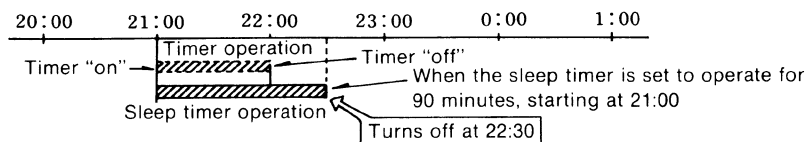
About the sleep timer

The sleep timer is used to turn the power off automatically at a preset time. The sleep timer makes it possible to go to sleep while listening to music. The timer will then turn the power of the audio unit off at the preset time.



Notes:

1. The sleep timer operates only once. It must be reset each time it is to be used.
2. If the timer operation (on/off) and the sleep timer operation overlap, the sleep timer operation will take priority.



DISASSEMBLY INSTRUCTIONS

- How to remove the printed circuit board.
- 1. Remove the 2 setscrews (Fig. 1 : ①, ②) of the cabinet.
- 2. Remove the 1 setscrew (Fig. 1 : ③) of the FL bracket and move the FL bracket in the direction of the arrow A in Fig. 1.
- 3. Remove the 3 setscrews (Fig. 1 : ④ ~ ⑥) of the front panel, and move the front panel in the direction of the arrow B in Fig. 1.
- 4. Remove the 3 setscrews (Fig. 2 : ⑦ ~ ⑨) of the printed circuit board.
(Raise the printed circuit board when repairing.)

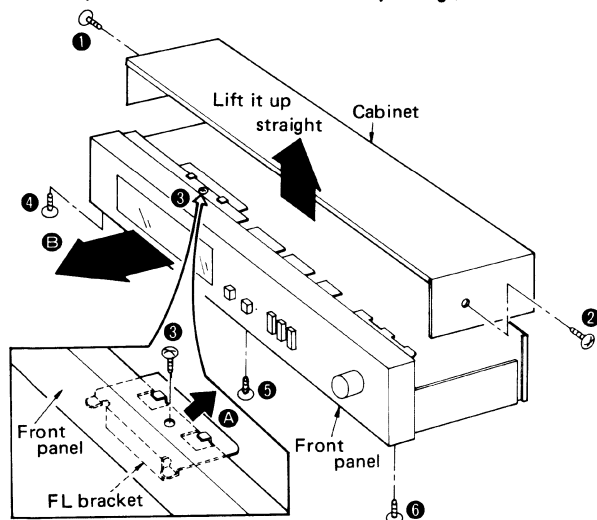


Fig. 1

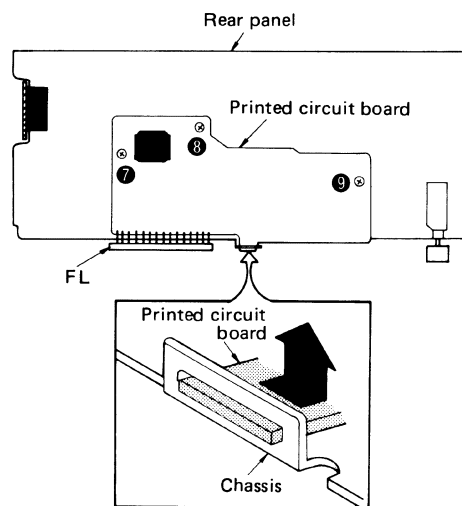


Fig. 2

REPLACEMENT PARTS LIST Electrical Parts

- Notes:**
- Parts numbers are indicated on most mechanical parts. Please this part number for parts orders.
 - Important safety notice:
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components use only manufacturer's specified parts.
 - The "S" mark is service standard parts and may differ from production parts.
 - Unless otherwise specified,
All resistors are in OHMS(Ω), K=1000 Ω , M=1000k Ω .
All capacitors are in MICROFARADS(μ F), P= μ F.

Ref. No.	Part No.	Description
INTEGRATED CIRCUIT		
IC1	MN6076	Clock Timer
TRANSISTORS		
Q1, 2	2SA733-P1	Switching
DIODES		
D1	Δ S SVDSR1K2	Rectifier
D2, 11	SVDMZ406B	6V, Zener
D3~9	MA162A	Switching
D10	S SVDMZ409B	9V, Zener

Ref. No.	Part No.	Description
TRANSFORMER		
T1	Δ SLT5J181-W	Power Source
FLUORESCENT DISPLAY TUBE		
FL	SAD4LT40ZA	Timer
RELAY		
RLY1	Δ SSY81	AC Outlet

Ref. No.	Part No.	Description
FUSE		
F1	Δ XBAS2C025T1A	250V, T250mA
F11 ~ 14	Δ XBA2C63TRO	250V, T630mA
[EG] only		
SWITCHES		
S1	SSR175	Mode
S2, 3, 4	SSG9	Timer Set
S5, 6	SSH2007	AC Outlet
S7	ESD14116	Allocation
S8	Δ ESE3787	(50/60Hz) Voltage Adjust

Numbering System of Resistor

Example

ERD	25	T	J	104
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : $\pm$ 5%

Numbering System of Capacitor

Example

ECKD	1H	103	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	1E	S	101	
Type	Voltage	Peculiarity use	Value	

Capacitor Type	Voltage	
ECEA : Electrolytic	1E : 25V	P : $\pm$ 100%, -0%
ECKD : Ceramic	1V : 35V	Z : $\pm$ 80%, -20%
	1H : 50V	
	KC : 400V	

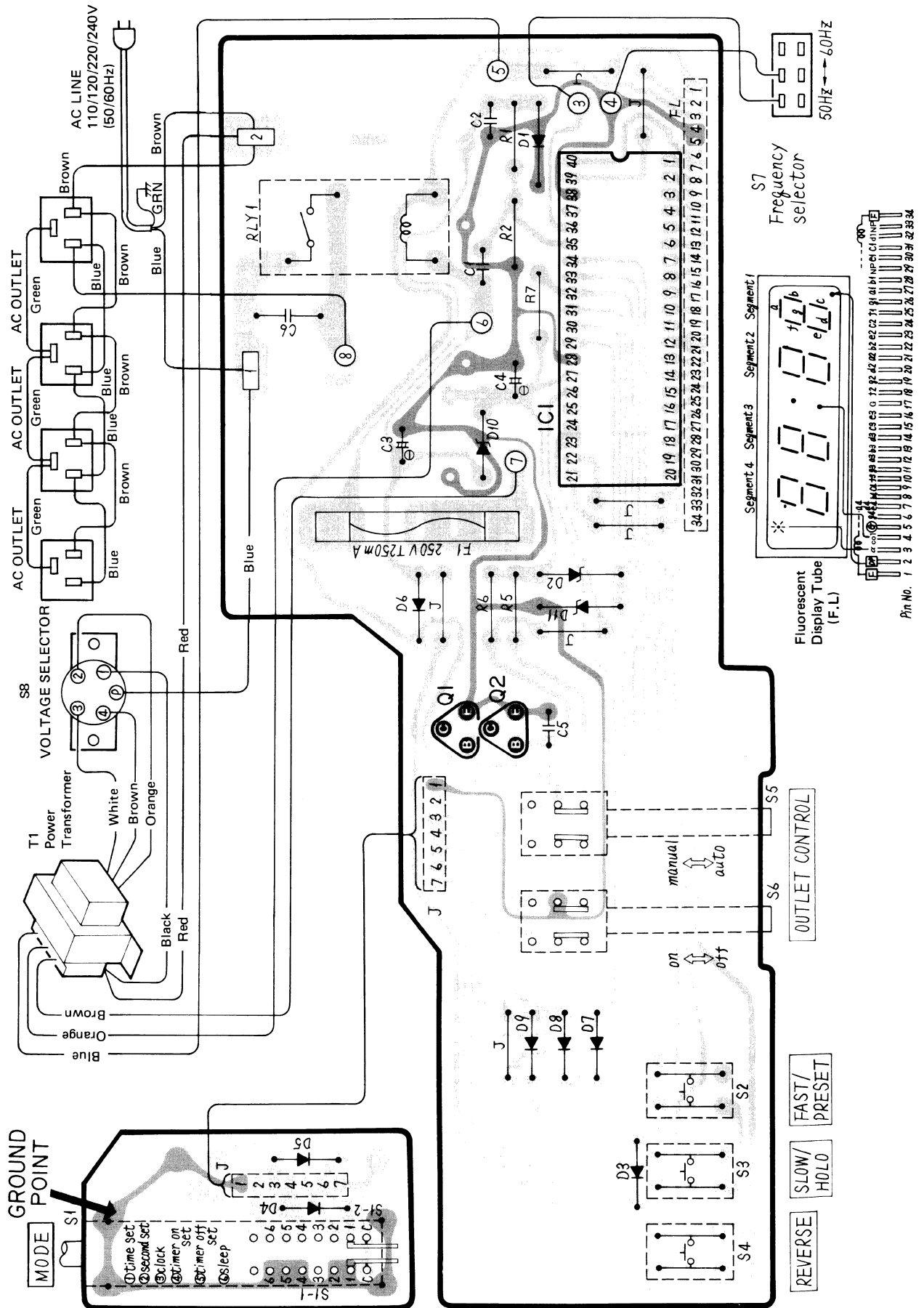
Ref. No.	Part No.	Value
RESISTORS		
R1	S ERD25TJ104	100K
R2	S ERD25TJ333	33K
R5	S ERD25FJ103	10K
R6, 7	S ERD25TJ563	56K

Ref. No.	Part No.	Value
CAPACITORS		
C1, 2	S ECKD1H103ZF	0.01
C3	S ECEA1VS471	470
C4	S ECEA1ES101	100
C5	S ECKD1H103ZF	0.01
C6	Δ ECKDKC103PF	0.01

CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM



Ground (Earth) lines



The diagram illustrates a digital clock circuit using the MN6076 IC. The circuit is powered by an AC line input, which is transformed and rectified to provide a 5V supply. A 5V/60Hz clock source (S7) is connected to the IC's frequency division and wave-form shaping blocks. The IC's internal blocks include a stop watch, basic timer, segment decoder, sleep counter, and sleep output. The output is a digital display showing '88:88.' with a 'FL' indicator. The circuit also features a mode selector (S1) with settings for time set, second set, clock, timer on set, timer off set, and sleep. Other components include a relay drive (Q1,2), a relay, and an AC outlet selector (S6).

IC 1
MN6076
Clock timer

Power frequency selector
S7

5V/5msec/cm (60Hz)

AC LINE

Power transformer

Rectifier

Relay

Relay drive
Q1,2

AC outlet selector
S6

AC outlet

Mode selector
S1

1 time set
2 second set
3 clock
4 timer on set
5 timer off set
6 sleep

FL

88:88.

SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

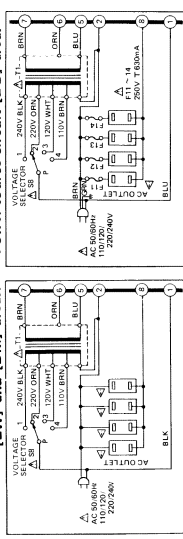
* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. without O mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.

Notes:

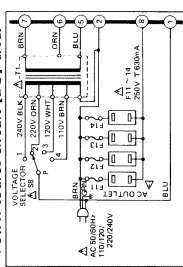
1. S1 : Mode selector switch in "time set" position (① time set, ② second set, ③ clock, ④ timer on set, ⑤ timer off set, ⑥ sleep).
2. S2 ~ S4 : Timer/time set switch
[When the set (S2 : fast, S3 : slow, S4 : reverse)]
① second set (S2 : reset, S3 : hold)
3. S5 : AC outlet selector switch in "auto" position, (auto ↔ manual)
4. S6 : AC outlet selector switch in "off" position, (on ↔ off)
5. S7 : Power frequency selector switch in "50Hz" position, (50Hz ↔ 60Hz)
6. S8 : Voltage selector switch in "220V" position, (110V ↔ 120V ↔ 220V ↔ 240V)
(110V ↔ 120V ↔ 220V ↔ 240V)
7. RLY 1 : Relay in "off (normal open)" position.

* This is the basic circuit diagram (for DX, EK, EF, EB, EH, EI) of this unit.
Note that part of the circuit is subject to change depending on the areas.

• Power source circuit [EW] and [DM] areas.



• Power source circuit [EG] area.



Product for Scandinavia and Denmark.

• Terminal voltage of IC1 (MNE6076) when the fluorescent display is :

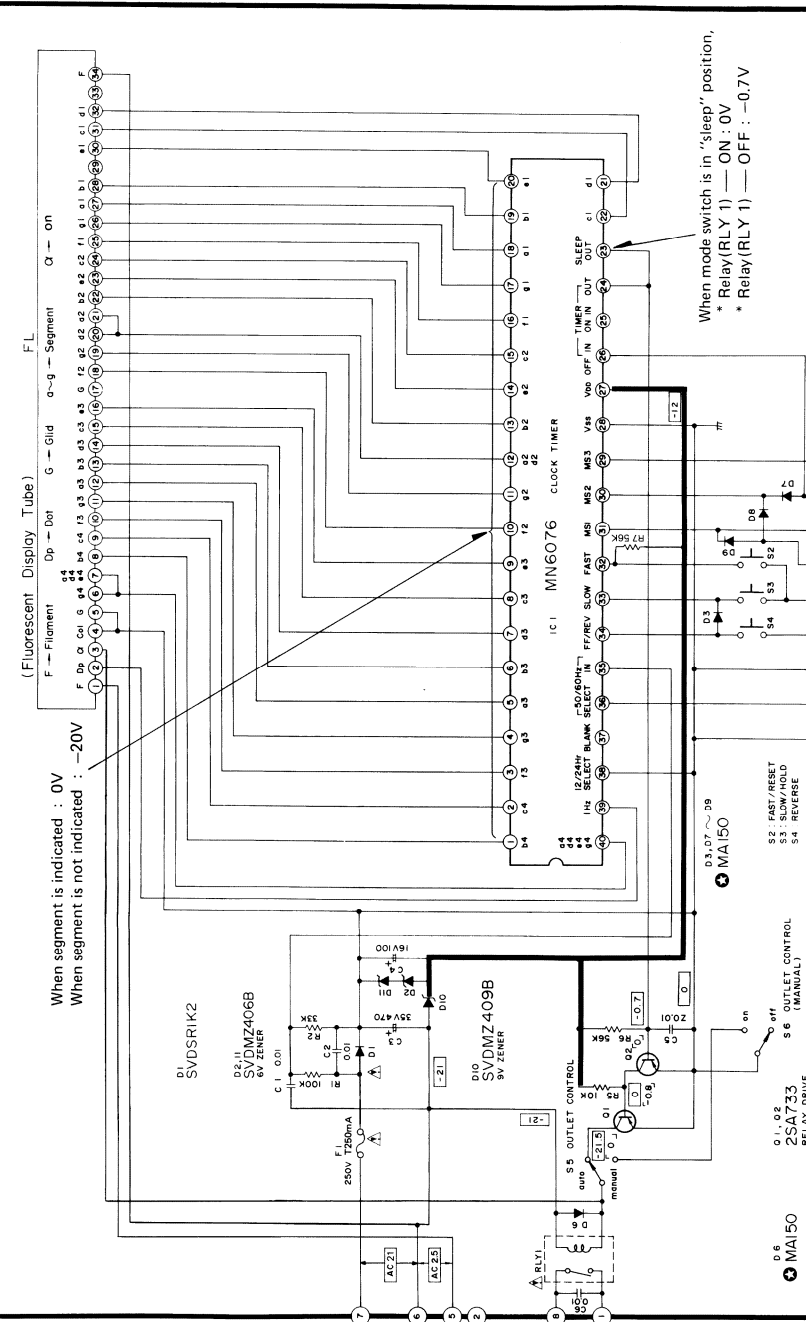
Pin	MODE: time set	MODE: time set	MODE: time set	MODE: time set	MODE: time set
No.	control	control	control	control	control
①	-21	-19.5	0	0	0
②	-21	-19.5	0	0	0
③	0	-13	-10	-10	-10
④	0	-14	-11.5	-11.5	-11.5
⑤	0	0	0	0	0
⑥	-21	-20	-20	-20	-20
⑦	-21	-20	-20	-20	-20
⑧	-21	-20	-20	-20	-20
⑨	-21	-20	-20	-20	-20
⑩	-21	-20	-20	-20	-20
⑪	-21	-20	-20	-20	-20
⑫	0	0	0	0	0
⑬	-21	-20	-20	-20	-20
⑭	-21	-20	-20	-20	-20
⑮	-21	-20	-20	-20	-20
⑯	-21	-20	-20	-20	-20
⑰	-21	-20	-20	-20	-20
⑱	-21	-20	-20	-20	-20
⑲	-21	-20	-20	-20	-20
⑳	-21	-20	-20	-20	-20
㉑	-21	-20	-20	-20	-20

Terminal ② with S2 depressed is 0V.
Terminal ③ with S3 depressed is 0V.
Terminal ④ with S4 depressed is 0V.

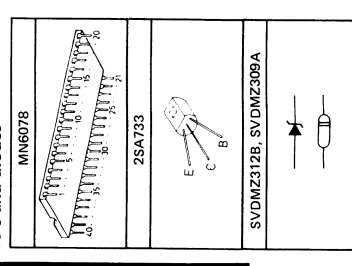
• Terminal voltage of IC1 (MNE6076) when the fluorescent display is :

Pin	MODE: time set	MODE: time set	MODE: time set	MODE: time set	MODE: time set
No.	control	control	control	control	control
①	-21	-19	-15	-15	-15
②	-21	-19	-15	-15	-15
③	-21	-19	-15	-15	-15
④	-21	-19	-15	-15	-15
⑤	-21	-19	-15	-15	-15
⑥	-21	-19	-15	-15	-15
⑦	-21	-19	-15	-15	-15
⑧	-21	-19	-15	-15	-15
⑨	-21	-19	-15	-15	-15
⑩	-21	-19	-15	-15	-15
⑪	-21	-19	-15	-15	-15
⑫	-21	-19	-15	-15	-15
⑬	-21	-19	-15	-15	-15
⑭	-21	-19	-15	-15	-15
⑮	-21	-19	-15	-15	-15
⑯	-21	-19	-15	-15	-15
⑰	-21	-19	-15	-15	-15
⑱	-21	-19	-15	-15	-15
⑲	-21	-19	-15	-15	-15
㉑	-21	-19	-15	-15	-15

Terminal ② with S2 depressed is 0V.
Terminal ③ with S3 depressed is 0V.
Terminal ④ with S4 depressed is 0V.



• Terminal guide of transistors, IC's and diodes



8. [] indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some error in the voltage values, depending on the internal impedance of the DC circuit tester.
[] indicated voltage values are relay on.

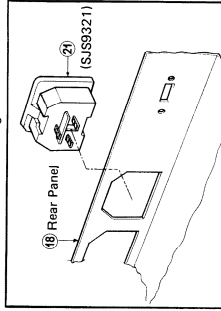
9. Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

EXPLODED VIEWS

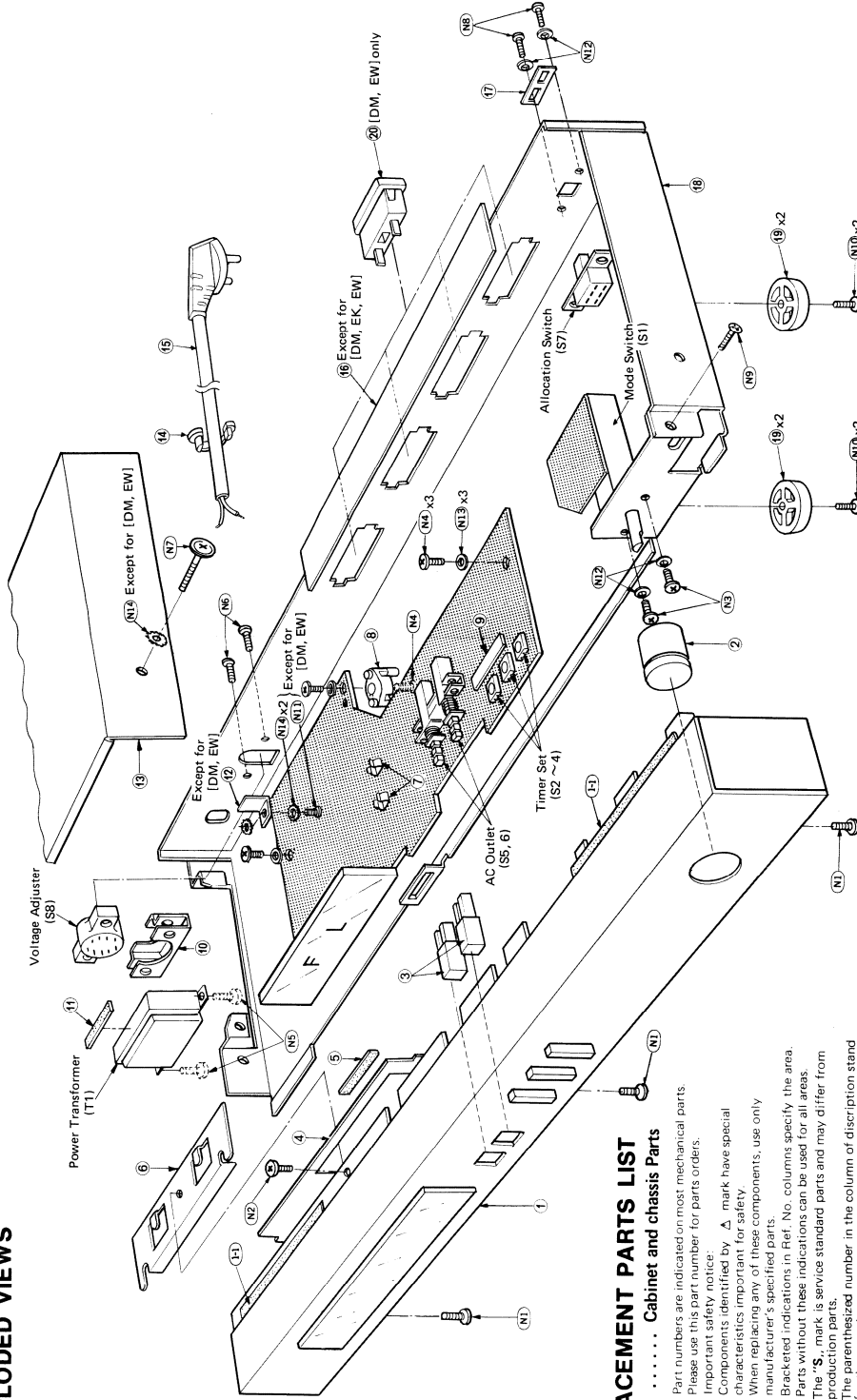
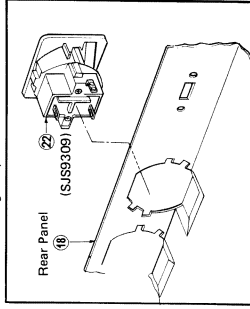
SH-4020 SH-4020

AC Outlet and Rear Panel

[EK] For United Kingdom.



[DX, EB, EF, EH, EI, EG] Except for United Kingdom, Denmark and Switzerland.



REPLACEMENT PARTS LIST

..... Cabinet and chassis Parts

- Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "S" mark is service standard parts and may differ from production parts.
5. The parenthesized number in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description & Pos.
CABINET and CHASSIS PARTS		
1	SYW541	From Panel Asy V
2	ISHS3259	Spacer
3	SBNS93	Knob, Mode Switch
4	SDU101	Filter, AC Outlet
5	SHG149	Rubber, FL
6	SUW187	Bracket
7	SJT347	Holder, Fuse
8	SHR513	Spacer, P.C.B.
9	SWN166	Bracket, Switch
10	SHG647	Rubber, Power
11	SJT721	Transformer
12	Except for [DM, EW]	Terminal
13	SKCS105	Cabinet
14	SHR131	Bushing, AC Cord
15	SHR127	Bushing, AC Cord

Ref. No.	Part No.	Description & Pos.
15	other Δ SJA103-1	AC Cord
15	[DM] Δ SJA97	AC Cord
15	[EK] Δ QEC1208M	AC Cord
15	[EW] Δ SJA111	AC Cord
16	[Except for DM, E.K., EW]	Shield Cover
16	SMX619	Stopper, Allocation
17	SHR5073-1	Rear Panel
18	other	Rear Panel
18	SGPH40200X	Rear Panel
18	SGPH40200E	Rear Panel
18	[DM] Δ SGPH40200G	Rear Panel
18	[EW] Δ SGPH40200G	Rear Panel
19	SKL227-4	Foot
20	SI9225	Socket, AC Outlet
21	Except for [DM, EW]	Socket, AC Outlet
21	[EK] Δ SI9321	Socket, AC Outlet
22	SGS369	Socket, AC Outlet

Ref. No.	Part No.	Description & Pos.
SCREWS		
N1	XTBS388F21	Tapping, with Direct
N2	Δ XTBS388F21	Tapping, $\oplus$ 3x8
N3	Δ XSN3-65	Tapping, $\oplus$ 3x6
N4	Δ XTN348BFZ	Tapping, $\oplus$ 3x8
N5	Δ XTBS388FZ	Tapping, $\oplus$ 3x10
N6	Δ XTBS388FZ	Tapping, $\oplus$ 3x14
N7	Δ SNE2045	Tapping, $\oplus$ 3x6
N8	Δ XSN3-65	Tapping, $\oplus$ 3x8
N9	Δ XTBS388	Tapping, $\oplus$ 3x8
N10	Δ XTBS388FZ	Tapping, $\oplus$ 3x10
N11	Δ XTBS388FZ	Tapping, $\oplus$ 3x14
N12	Except for [DM, EW]	Tapping, $\oplus$ 3x8
N13	Δ XWA38	Spring, #3
N14	Δ XWC3B	Plain, #3
N15	Δ XWC3B	External Tapped Lock, #3

Ref. No.	Part No.	Description & Pos.
ACCESSORIES		
A1	Δ SP5309	Plug Adapter, AC
A2	[EK] only SQF11155	Instructions Book
A2	[EK] only SQF11157	Instructions Book
PACKING PARTS		
P1	SP7211	Rejuvenation Bag
P2	SP53461	Pad, Left Side
P3	SP53463	Pad, Right Side
P4	SP53465	Pad, Upper
P5	SP53465	Pad, Bottom
P6	SPG3663	Carton Box
P6	SPG3663	Carton Box

- Areas
- * [EG] is available in F. R. Germany.
 - * [EF] is available in France.
 - * [EK] is available in United Kingdom.
 - * [EH] is available in Holland.
 - * [EB] is available in Belgium.
 - * [DX] is available in Scandinavia.
 - * [EW] is available in Switzerland.
 - * [EI] is available in Denmark.
 - * [E] is available in Italy.