573

CX-121SM

CASSETTE MECHANISM UNIT

SERVICE MANUAL

Subject
This service manual is about the Auto-Reverse Cassette Mechanism Unit for car stereo. For parts other than the Cassette Mechanism Unit, please refer to the service manual for the designated model.

APPLICABLE MODELS	
KE-4000/E	
KE-4300/E	
KE-4000SDK/WG	

PIONEER®

572

MECHANISM DESCRIPTION

• Cassette loading

1. When the Cassette is inserted, Arm (A) moves in the arrowed direction. Pin (A) is for the cassette holder support arm. (Fig. 1).

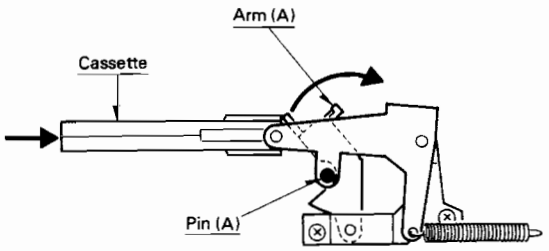


Fig. 1

2. When the cassette is pushed in all the way, the pin (A), supported by arm (A), will come loose. The Power Switch will come on at the same time (Fig. 2).

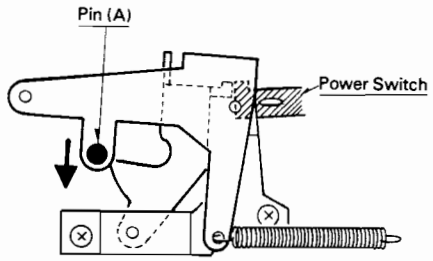


Fig. 2

3. As a result of the action in 1 and 2 above, Pin (A), through the tension of Spring (C), moves downward, causing the Cassette Holder to move in the same direction and complete loading (Fig. 3 and 4).

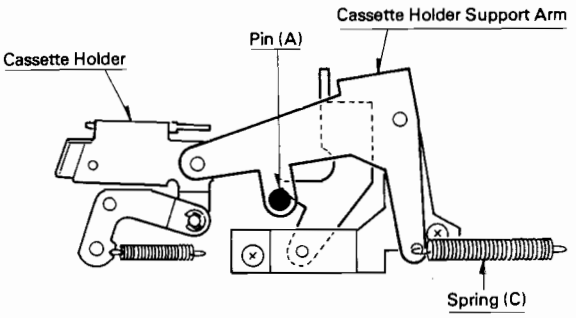


Fig. 3

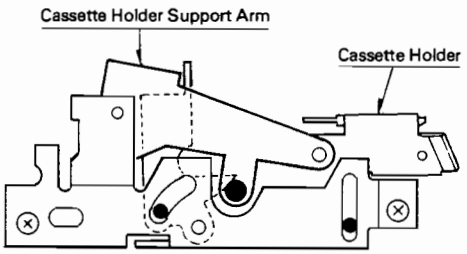


Fig. 4

• Eject mechanism

When crank is pushed in the direction of the arrow, the head base is released (this will be explained later), and the arm (C) is rotated so that it faces up. Steps 1 through 3 operate in reverse, and the cassette is ejected (Fig. 5).

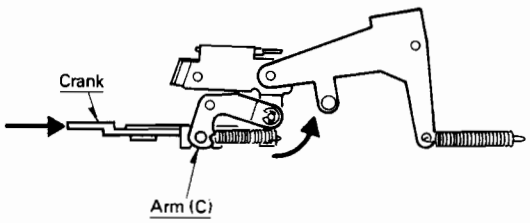


Fig. 5

• Tape tightening mechanism (Fig. 6)

1. The Flywheel and Pulley (A) are Belt driven by the Motor. The Reel Units are each driven by the gear connected to the Flywheel through the Idler. As seen in Fig. 6, the Capstan always rotates in the arrowed direction.
2. At the time the cassette is loaded, each Reel Unit rotates in the direction indicated by dotted line, inasmuch as the head base has yet to advance.
   Since the pinch roller is separated from the Capstan, the tape is wound at high speed on both reels, tape slack is taken up, and, sequentially, the sensing mechanism is activated.

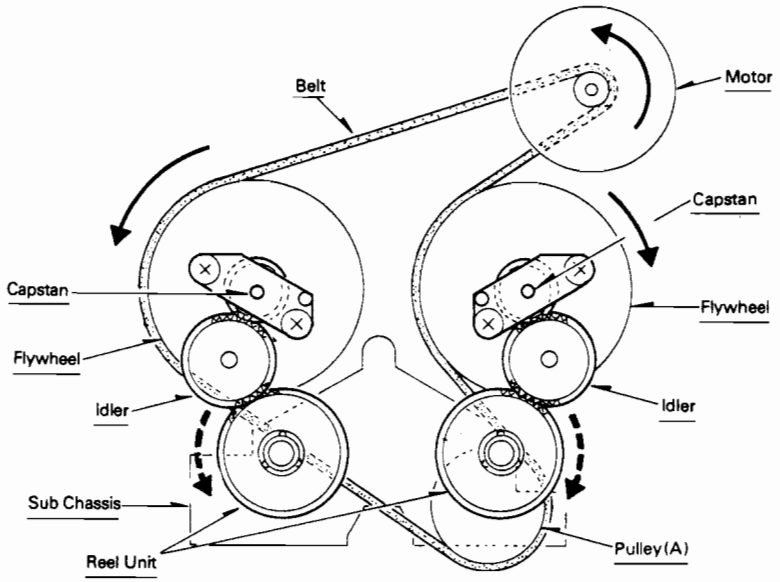


Fig. 6

• Anti-reel reversal mechanism (Fig. 7)

1. Claws (A) and (B) serve to prevent the Reel Units from reversing owing to difference in torque between them before the tape is wound up, and the sensing mechanism is activated.
2. Claw (A), while rotating in the arrowed direction together with the Reel Unit, flips Claw (B) protruding from Lever (B) to continue rotation. However, Claw (A), in reversing its rotation, is caught by Claw (B), with the result Lever (B) is turned toward the Chassis side around Fulcrum (P). Pin (E) engages the Chassis to prevent Lever (B) from turning, causing reverse rotations, if any, to be brought to a stop within 180°.
3. In PLAY mode, the Head Base advances to rotate Lever (B) outside the Chassis so that it will not be caught by Claws (A) and (B). In F.F./REWIND, Pin (F) is made to rotate outside the Chassis by Arm (E), so that Lever (B) will not be caught by Claws (A) and (B).

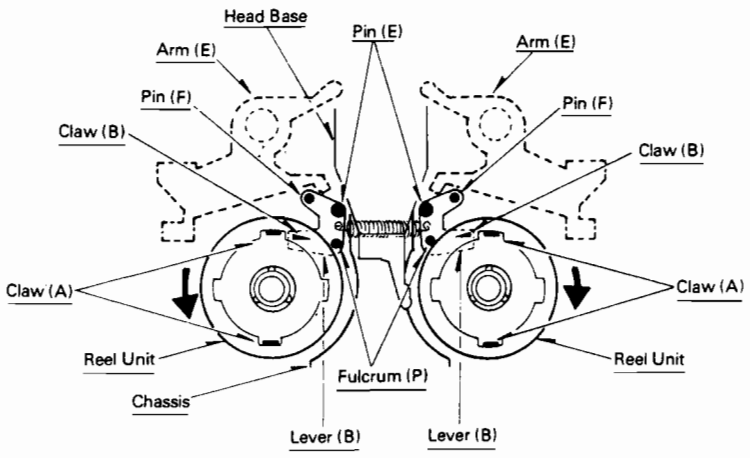


Fig. 7

• Sensing mechanism

1. Gear (A) always rotates in the arrowed direction via Pulley (A) and another gear. Cam (A) and the Guide are secured to Gear (A) (Fig. 8).

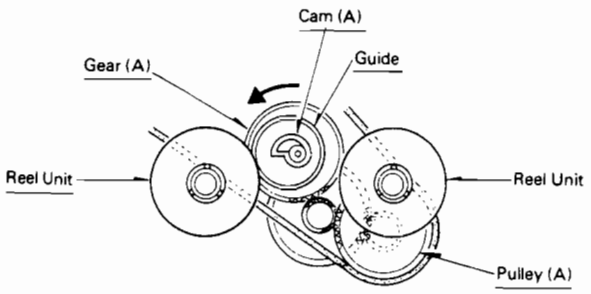


Fig. 8

2. Fulcrum (Q) is secured to the sub-chassis, and Arm (F) rotates together with the Reel Unit around the Reel Unit shaft via felt. Pin (G) is secured to Arm (F), Pin (H) to Lever (F), and Pin (I) to Arm (G), with each pin moving along the oval hole in its mate. With either of the Reel Units rotating, Arm (F) turns through friction. Since Arm (F) rotates either in the same direction or in the outward direction, Pin (H), which is connected to Arm (D) never fails to move upward (Fig. 9). And Lever (F), which is connected to Arm (D) via Pin (H), is thus applied through external force.

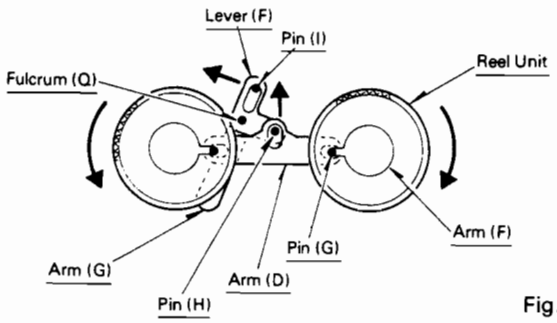


Fig. 9

3. As a result of the action of the Guide, Arm (G), at each rotation, moves toward the center of Gear (A). However, Lever (F) pushes Arm (G) in the circumferential direction of Gear (A), so there is no possibility of Cam (A) pushing Arm (G) downward (Fig. 10).

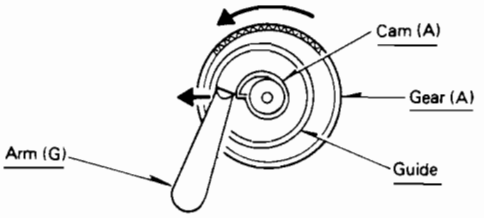


Fig. 10

4. When the reel units stop, Arm (G) is led by the Guide toward the center of Gear (A). However, Arm (G) to which a circumferential direction force is not applied is depressed by Cam (A), so that Lever (G) moves in the arrowed direction and presses the Main Solenoid Switch (Fig. 11).

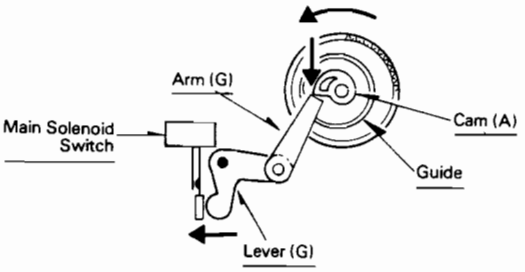


Fig. 11

5. With this, Auto Reverse, F.F./REWIND or cassette loading can be switched from the state of tape being tightened to PLAY mode.

• Head base advance mechanism

1. With activation of the sensing mechanism, the main solenoid switch is turned on, so that Arm (I) is rotated counterclockwise and pushes Pin (J), which is attached to the head base. Simultaneously, Arm (I) depresses the FF/REW Switch which is designed to vary the motor speed. When Arm (I) is disengaged, the motor speed is set for fast forward and rewind operations, and when depressed, the speed is set for tape play. Arm (K), attached to the Main Solenoid, is provided with an oval hole for purpose of rotating, and is returned to its normal position by Spring (E) (Fig. 12).

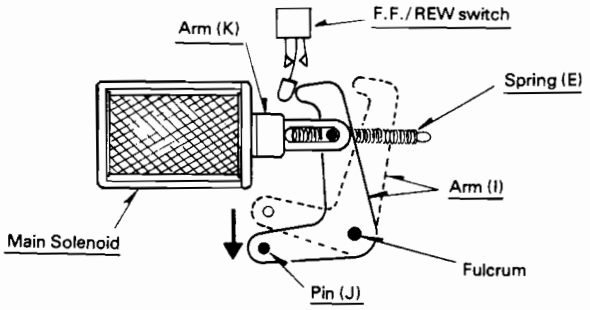


Fig. 12

2. The Head Base moves downward, as shown in Fig. 13, and is locked by Arm (J) and the Roller mounted on the Head Base. In F.F./REWIND and Ejection, Lever (C) moves left to disengage Arm (J) so that the Head Base is unlocked for return to its normal position by Spring (D).

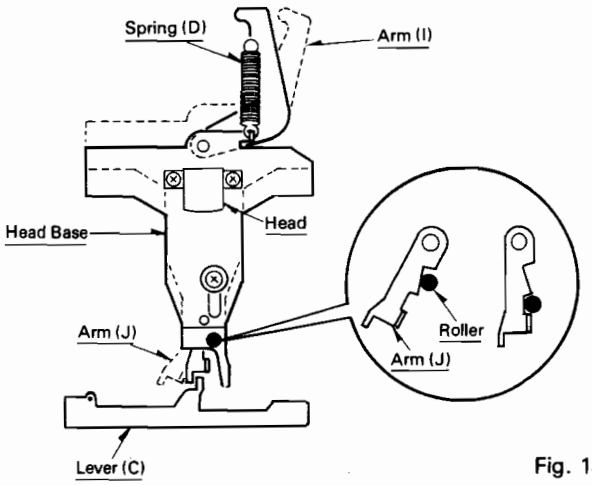


Fig. 13

• Auto Reverse mechanism (Fig. 14 and 15)

1. When the sensing mechanism is activated with the Head Base advanced, the pin at the end of the main solenoid causes Arm (O) to rotate so that Lever (H) is attracted.
2. Lever (H) engages either Pin (K) or (L), attached to Arm (L), to cause Arm (L) to rotate. Pin (L) engages the groove of Cam (F), so that Cam (F) moves right and left to rotate Arm (N) and cause the Arm (E) to move vertically, and stop the rotation on either side of the Reel Units.
3. Cam (F) contacts Pin (M), which is attached to the Pinch Roller Unit. Pin (M), through the pressure of Spring (G), with the claw protruding toward the Head Base as its stopper, is provided with constant downward force.
4. Pin (M), via Cam (F), moves vertically to control the contact of the Capstan on one side with the Pinch Roller.
5. Spring (F), mounted to the rotating shaft of Arm (L) via the protrusion (A) of Arm (L), rotates in the same direction as Arm (L) to store sufficient force to move Arm (M).
6. Said force, when Lever (H) rotates Arm (L) and is returned to its normal position (when the Lever (H) engages neither Pin (L) or (K), affects the oval hole on Lever (H) to incline the Lever (H) toward the opposite side.

NORMAL DIRECTION

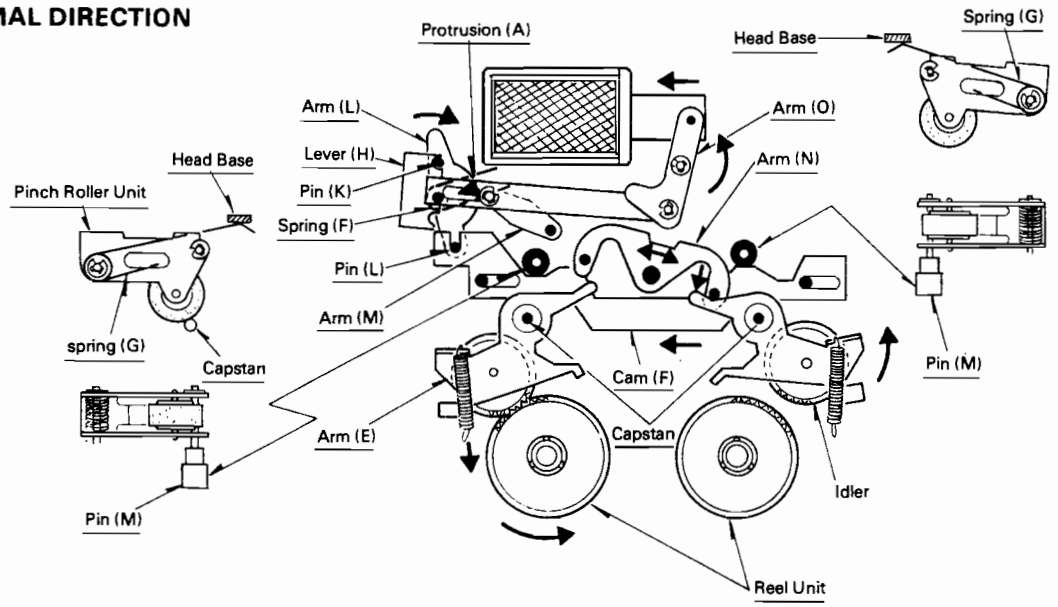


Fig. 14

REVERSE DIRECTION

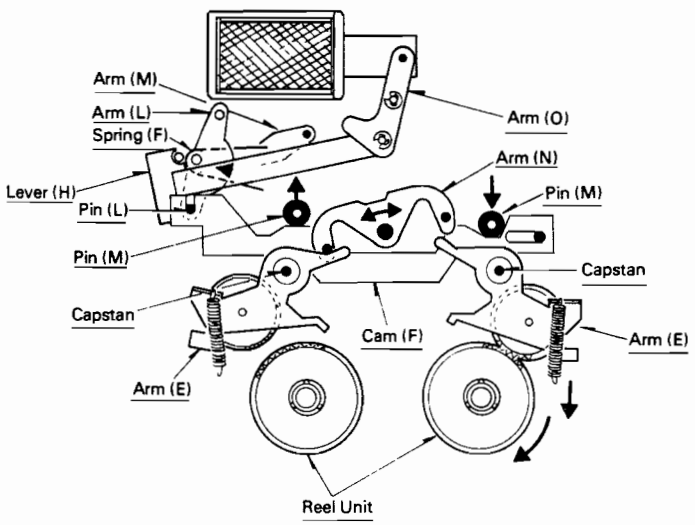


Fig. 15

7. Pin (K) of Arm (L), which engages Arm (P), acts to operate the head selector switch, thus activating the Auto Reverse mechanism in the manner described above (Fig. 16).

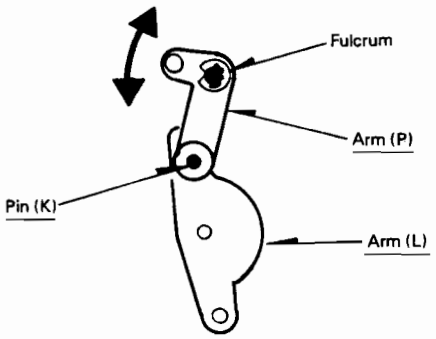


Fig. 16

• F.F./REWIND mechanism

1. The left-right movement of Crank causes right-left movements of Cam (G). Lever (A) is pushed by the tapered sections at both ends of the upper side of Cam (G) (Fig. 17).

2. Lever (A) causes Arm (E) to rotate and separate the idle gear on one side from the Reel Units, simultaneously making Lever (B) rotate and disengage Claws (A) and (B), which are designed to prevent the Reel Units from reversing (Fig. 17).

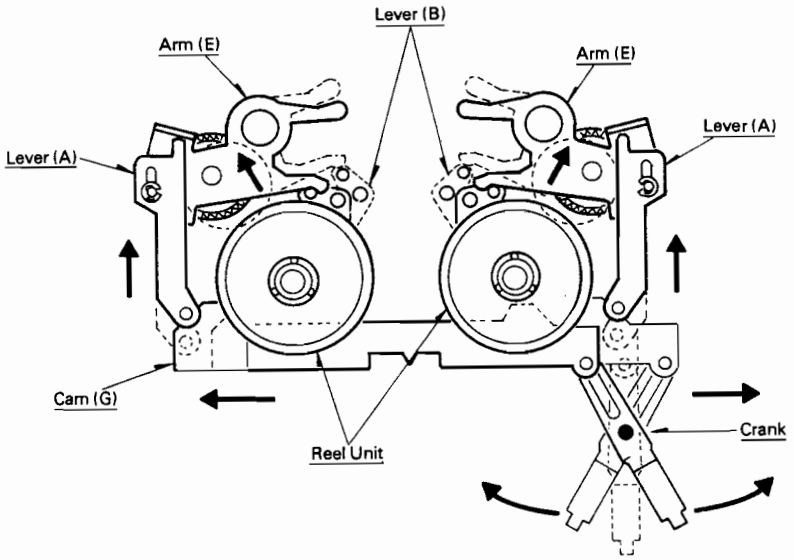


Fig. 17

3. With Cam (G) moving right or left, Arm (Q), through the pressure of Spring (H), is pushed toward the upper side in the figure to strike the bottom of the tapered section of Cam (G) and is locked.
4. With Crank returned to center position, the Roller of Arm (Q) rolls over the tapered section to unlock Arm (Q) (Fig. 18).
5. Shifting of Crank during PLAY causes the protrusion of Lever (C) to push Arm (J), so that the Head Base is unlocked.
6. At the end of F.F./REWIND, the sensing mechanism is activated and advances the Head Base, with the result Arm (Q) is pushed toward the lower side in the figure by the end of the Head Base to bring F.F./REWIND to a stop (Fig. 18).

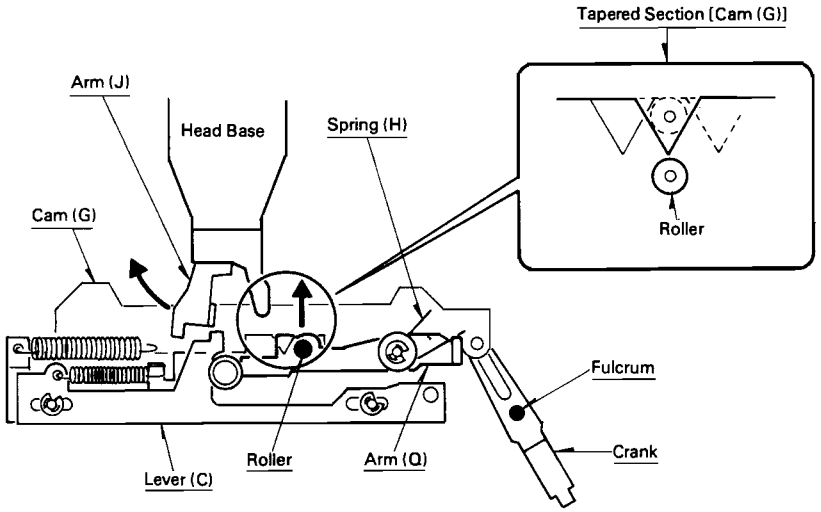


Fig. 18

• Sensing mechanism deactivator

With Crank pushed, Arm (T), through the pressure of Spring (K), moves in the direction shown by arrow in the figure and pushes Arm (G) so that the sensing mechanism is deactivated. With Crank returned to its normal position, Arm (T), through Arm (S), is separated from Arm (G) (Fig. 19).

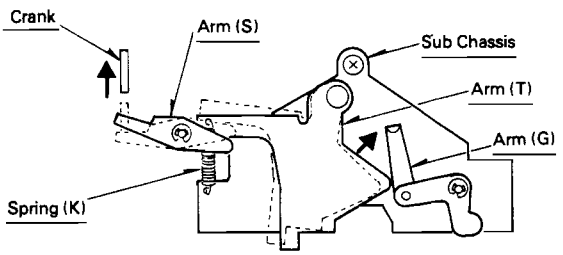


Fig. 19

TAPE SPEED ADJUSTMENT

Tape speed can be adjusted by replacing the motor pulley. Three types of pulleys differing in diameter available as shown in the table below. The pulley surface has either one groove, two grooves or no groove to help distinguish the diameter (Fig. 20).

Diameter	Parts No.	No. of Grooves
11.59 mm	CXB-996	None
11.72 mm	CXB-997	One
11.85 mm	CXB-998	Two

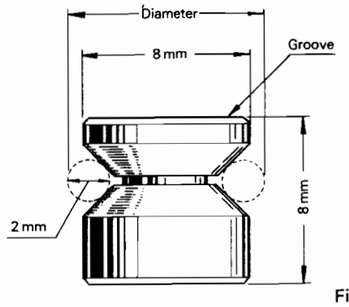


Fig. 20

AZIMUTH ADJUSTMENT

1. Connect VTVM and the speaker (4Ω) to the green and gray leads, respectively. Connect the red lead to a DC regulated power supply and apply 13.8V.
2. Insert a 333 Hz (STD-341) test tape. With balance set at medium and tone at maximum, turn volume for an output reading of 0 dB.
3. Insert a 10 kHz (STD-341) test tape.
4. Turn the azimuth adjusting screw so the outputs of Lch and Rch are maximized symmetrically both in normal and reverse directions (Fig. 21).

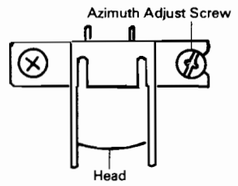
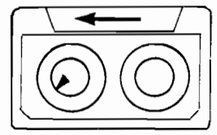


Fig. 21

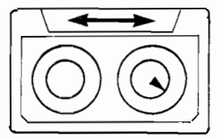
CHECK POINTS OF CASSETTE MECHANISM

When replaced or repaired cassette mechanism parts, refer to values in the following table.

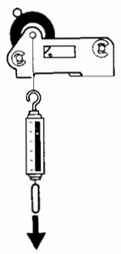
(1) Wind torque
Take measurement for 5~6 seconds using a cassette torque meter (120g/cm) to make sure torque is 50~70g/cm.



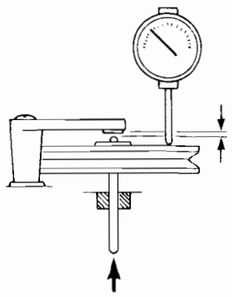
(2) F.F. and rewind torque
Take measurement for 5~6 seconds using a cassette torque meter (120g/cm) to make sure torque is 50g/cm or more.



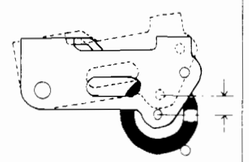
(3) Pinch roller press adhesion force
Measure using a tension gauge (500g) to make sure the load is 240~300g with the pinch roller starting to rotate in contact with the capstan shaft.



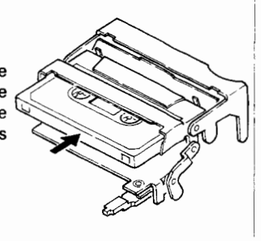
(4) Clearance between flywheel and flywheel bracket
Set a dial pick gauge as shown in the figure, and check to make sure the difference is between 0.05 mm and 0.2 mm, when the flywheel is applied with pressure in the arrowed direction.



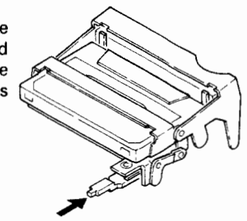
(5) Pinch roller travel
Use a slide calipers to ascertain that the distance between the position of the center shaft at the time the pinch roller contacts the capstan and that at the time the capstan has gone away from the pinch roller should be at least 0.8 mm when the tape is playing in the reverse direction and at least 4.3 mm when it is F.F./REWIND.



(6) Cassette loading force
Using tension gauge (1 kg) at the center of the cassette, check to make sure the indication is less than 600 g.



(7) Eject force
Using tension gauge (3 kg) in the arrowed direction, check to make sure the indication is less than 3 kg.



EXPLODED VIEW (TOP)

CX-121SM

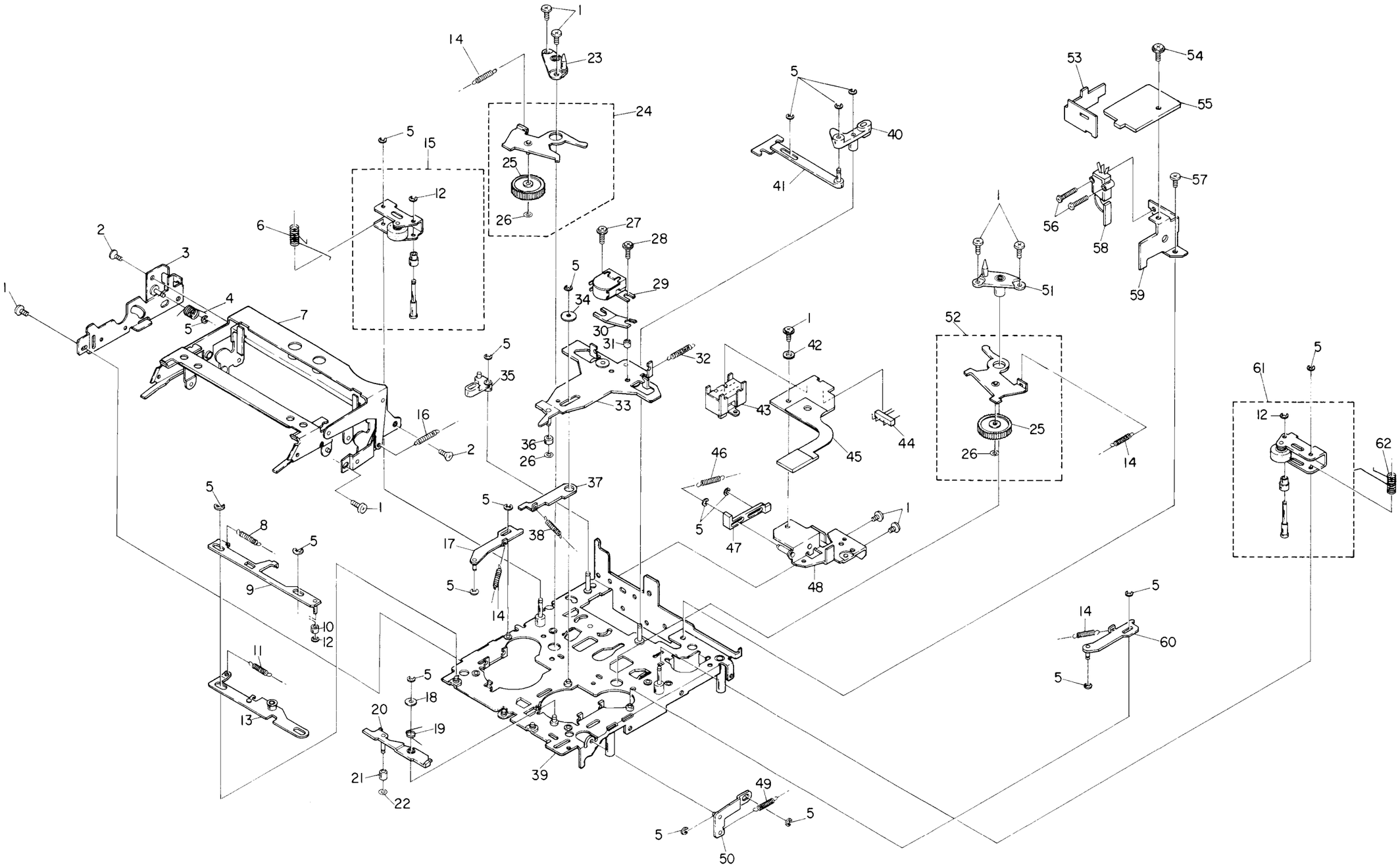


Fig. 22

EXPLODED VIEW (BOTTOM)

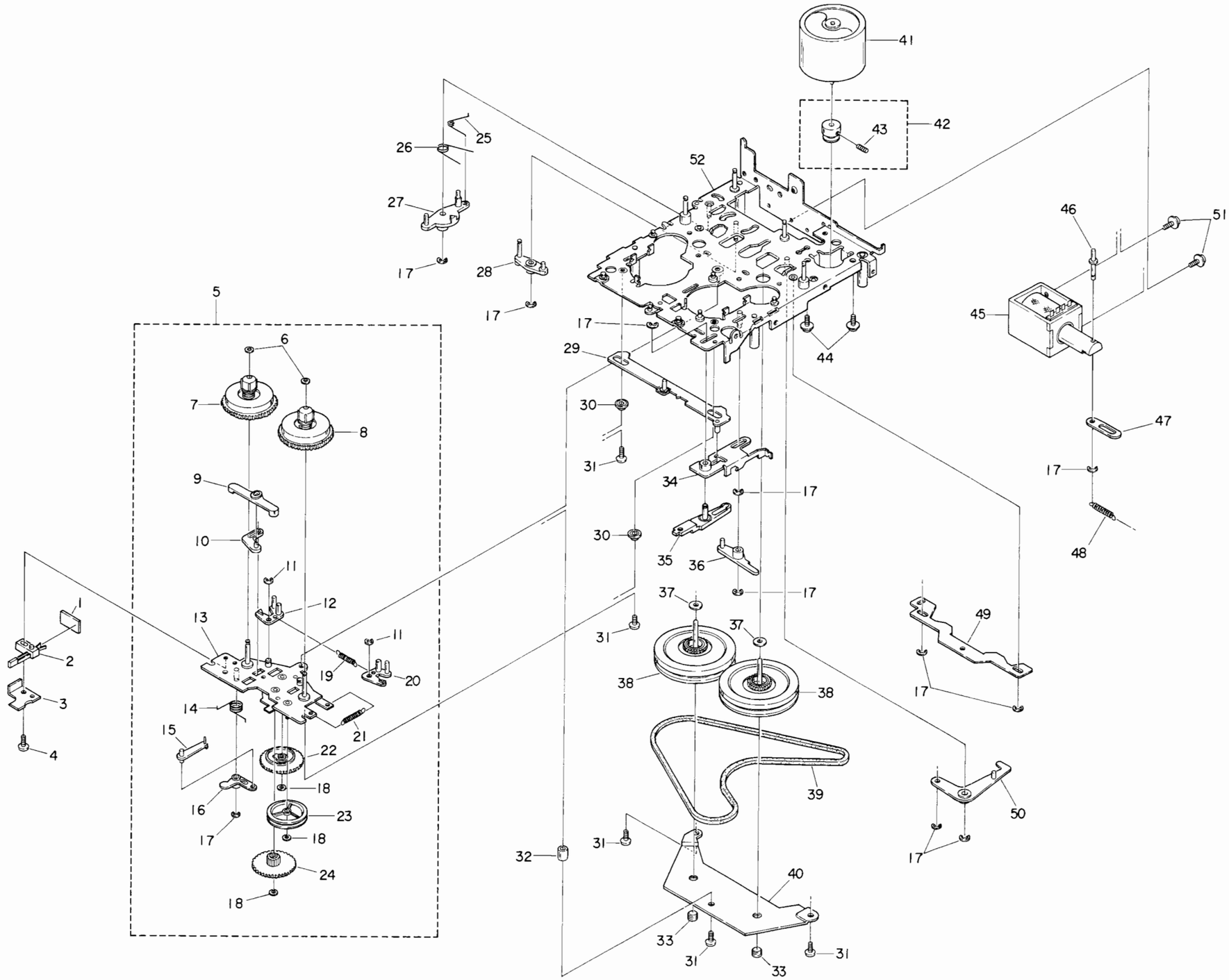


Fig. 23

SWITCH UNIT

CX-121SM

• **Parts Connection**

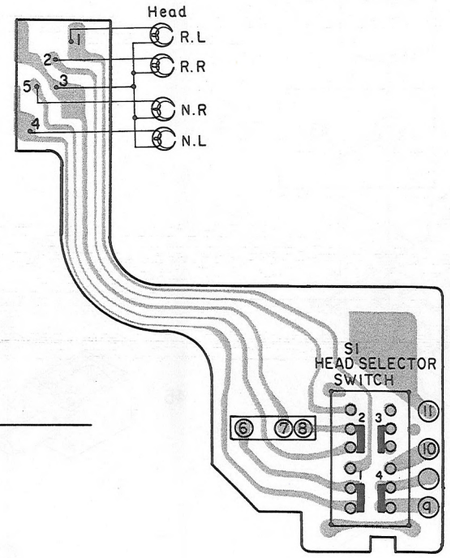


Fig. 24

• **Part List**

Part No.	Symbol & Description	
CSH-062	S1	Switch

MOTOR P.W. BOARD

• **Parts Connection**

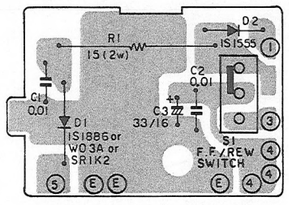


Fig. 25

• **Parts List**

Part No.	Symbol & Description	
W03A or	D1	
1S1886 or		
SR1K2		
1S1555	D2	
CSL-025	S1	Switch

Part No.	Symbol & Description
RS2P150J	R1
CKDYF103Z25	C1, C2
CEA330P16	C3

PARTS LIST

• *Parts whose parts numbers are omitted are subject to being not supplied.*

Exploded View (Top)

Key No.	Part No.	Description
1.	BMZ26P040FMC	Screw
2.	CMZ26P040FMC	Screw
3.	CXC-064	Bracket Unit
4.	CBH-583	Spring
5.	YE20FUC	Washer
6.	CBH-561	Spring
7.	CXC-061	Holder Unit
8.		Spring
9.	CXC-057	Lever Unit
10.		Roller
11.		Spring
12.	YE15FUC	Washer
13.	CXC-065	Lever Unit
14.	CBH-524	Spring
15.	CXB-994	Pinch Roller Unit
16.	CBH-532	Spring
17.	CXB-855	Lever Unit
18.		Washer
19.		Spring
20.	CXB-921	Arm Unit
21.		Roller
22.		Washer
23.	CNR-129	Bearing
24.	CXB-844	Gear Unit
25.	CNV-950	Gear
26.	CBF-045	Washer
27.	PMS20P040FMC	Screw
28.	CBA-082	Screw, M2×8
29.	CPB-049	Head
30.	CBL-178	Spring
31.	CNW-064	Rubber
32.	CBH-528	Spring
33.		Head Base
34.		Washer
35.	CNV-987	Arm
36.	CLA-831	Roller
37.		Cam
38.	CBH-586	Spring
39.		Chassis Unit
40.	CNV-947	Arm
41.	CXC-055	Lever Unit
42.	WH26FUC	Washer
43.	CSH-062	Switch
44.	CKS-052	Plug
45.	CNP-697	P.W. Board
46.	CBH-582	Spring
47.	CNW-123	Lever
48.	CXC-058	Bracket Unit
49.	CBH-536	Spring
50.	CXC-063	Arm Unit
51.	CNR-128	Bearing
52.	CXB-843	Gear Unit
53.		Shield
54.		Screw
55.		P.W. Board
56.	BMZ20P080FMC	Screw
57.	BMZ26P030FMC	Screw
58.	CSL-025	Switch
59.		Bracket
60.	CXB-854	Lever Unit
61.	CXB-993	Pinch Roller Unit
62.	CBH-560	Spring

Exploded View (Bottom)

Key No.	Part No.	Description
1.		P.W. Board
2.	CSN-058	Switch
3.		Cover
4.	BMZ20P080FMC	Screw
5.	CXB-860	Sub Chassis Assy
6.	CBF-045	Washer
7.	CXB-833	Reel Unit
8.	CXB-832	Reel Unit
9.	CNV-957	Arm
10.	CNV-958	Lever
11.		Washer
12.	CNV-961	Lever
13.	CXB-829	Sub Chassis Unit
14.	CBH-521	Spring
15.	CNV-959	Arm
16.	CNV-962	Lever
17.	YE20FUC	Washer
18.	CBF-046	Washer
19.	CBH-520	Spring
20.	CNV-960	Lever
21.	CBH-548	Spring
22.	CNV-956	Gear
23.	CNV-954	Pulley
24.	CNV-955	Gear
25.	CBH-525	Spring
26.	CBH-526	Spring
27.		Arm
28.		Arm Unit
29.		Cam Unit
30.	CLA-851	Collar

Key No.	Part No.	Description
31.	BMZ26P040FMC	Screw
32.	CLA-817	Collar
33.	CNV-984	Screw
34.	CXC-062	Lever Unit
35.	CXC-059	Crank Unit
36.	CNW-125	Arm
37.	CBF-111	Washer
38.	CNR-130	Flywheel
39.	CNT-072	Belt
40.		Holder
41.	CXM-059	Motor
42.	CXB-996	Pulley Unit
	CXB-997	
	CXB-998	
43.	ZMK26M040FMC	Screw
44.	PMS26P025FUC	Screw
45.	CXP-028	Solenoid
46.	CLA-825	Shaft
47.		Arm
48.	CBH-527	Spring
49.		Cam
50.	CXB-849	Arm Unit
51.	PMS26P040FUC	Screw
52.		Chassis Unit

PIONEER ELECTRONIC CORPORATION
4-1, Meguro 1 chome, Meguro-ku, TOKYO, 153, JAPAN
PIONEER ELECTRONICS OF AMERICA
1925 E, Dominguez St. Long Beach, Calif. 90810
PIONEER ELECTRONIC (EUROPE) N.V.
Luithagen-Haven 9, 2030 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD.
178-184 Boundary Road, Braeside, Victoria 3195, Australia

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