ALP K2®

Service Manual

for Digital Blood Pressure Monitor

Model No.WS-630

I N D E X

1. DESCRIPTION

The Model WS-630 is an Auto Inflation Wrist Digital Blood Pressure Monitor.
The readings in each function are digital displayed on 7 digits LCD panel.

STATUS INDICATION shows Deflation, Inflation, Palpatory Wave and Battery Weak.

ERROR MESSAGE CODE includes Battery Weak, it is impossible to measure the blood pressure accurately.

BATTERY POWER is monitored when the unit is turned on and a warning will be displayed if it is too weak.

MEASURING SEQUENCE is displayed to invite necessary operation by the user.
They are;

Deflation: Wait until inflation or dump the cuff pressure.
Inflation: Pressurize the cuff.

AUTOMATIC AIR INFLATION inflates the cuff pressure by an internal air pump.

AUTOMATIC AIR DUMP VALVE dumps the pressure in the cuff automatically when the measurement is over or error has been occurred.

AUTOMATIC POWER SHUT OFF;

The unit will automatically turn off if it is not operated for about 180 seconds or more.

2. SPECIFICATIONS

1) MODEL : WS-630-04

2) FUNCTION
: Blood Pressure Measuring
: Pulse Rate Measuring
: Automatic Power Shut Off
: 3 Error Indication

3) INDICATOR
: 7 Digits LCD.
(SYSTOLIC/DIASTOLIC/PULSE RATE/MEMORY NO.)

: 3 State Indicators
(INFLATION, DEFLATION, PALPATORY WAVE)

4) B.P.M. SPECIFICATION

SYSTEM	: Oscillo-Metric Method
PRESSURE INDICATING RANGE	: 0 - 300 mmHg Cuff Pressure
MEASURING RANGE	SYS. : 50 - 250 mmHg Cuff Pressure DIA. : 40- 180 mmHg Cuff Pressure SYS-DIA >10 mmHg 40 - 160 Pulse Rate
MEMORY	: Systolic and Diastolic 7 Times Maximum Memory Data Average (SYS. DIA.)
PRESSURE ACCURACY	: Pressure Indication ± 3 mmHg Pulse Rate ± 5 % of Reading
PRESSURE BUILD-UP	: Automatic Inflation System (Air Pump)
PRESET PRESSURE	: 180 mmHg
DEFLATION METHOD	: Electro-magnetic deflation Control Valve (ECV-02)
DEFLATION RATE	: 4 mmHg/sec.
EXHAUST	: ECV-02
CUFF	: Locking Mech.-Velcro with spring
MAIN UNIT SIZE	: 77 mm (W) X 71 mm (D) X 36 mm (H)
Cuff Size	: 77 mm X 280 mm
MAIN UNIT WEIGHT	: APPROX. 128 gm Not Including Batteries

5) POWER SOURCE : R-6P or LR-6 Type 2 pcs.

6) POWER CONSUMPTION : 2W (Max.)

3. PRINCIPLES OF OPERATION

3-1. Operation of Each Unit

These units operate as follows:

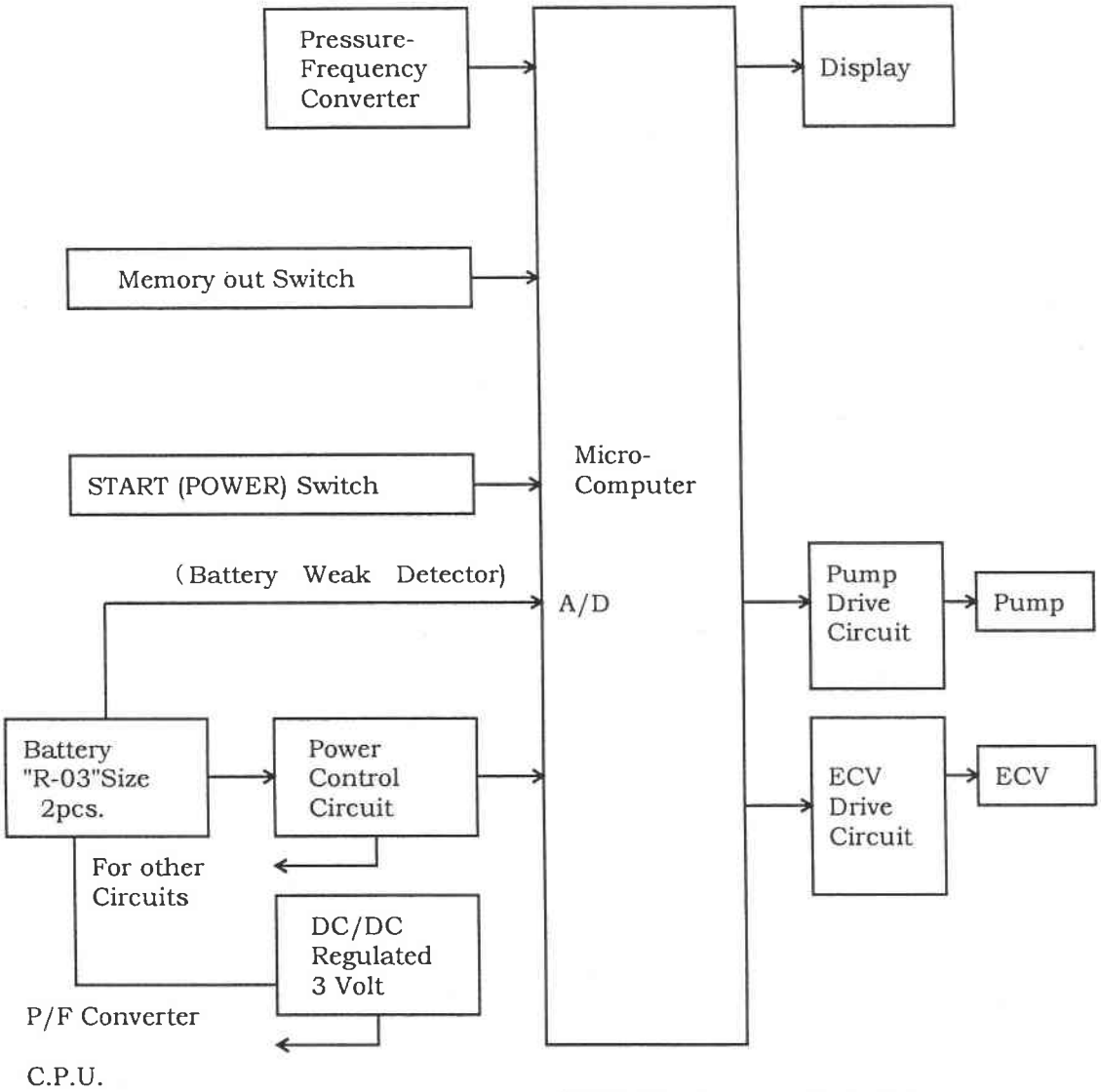


FIG. 3-1 Block Diagram

a) Pressure Sensor
Elastic capsule. Capsule is inflated by pressure.

Parallel Plate variable capacitor
Gap of parallel plate are changed by inflation.

CR oscillator
Oscillation frequency are changed by capacitance change.

Frequency Counter
Frequency are counted by counter and digital output is took in to the computer.
(The counter is included in to the computer IC chip)

b) Others
Power supply control circuit;
Receives the control signal from the microcomputer to turn the power on and off to units other than the microcomputer.

Display Unit;
Displays cuff pressure, maximum blood pressure, minimum blood pressure, pulse rate and information messages.

Electromagnetic deflation control valve (ECV) drive circuit;
ECV drive circuit controls the air exhaust speed regularly during blood pressure measuring by the controlling signal from the microcomputer.
It exhausts the air rapidly after the measuring or when "Err" indicating.

Pump drive circuit;
Controls starting and stopping of the pump.

c) Microcomputer

According to the information received, the microcomputer controls the P/F converter, blood pressure measuring sequence and LCD display drive.

3-2 Air Circuit;

The air circuit is composed of the following;

Pump : Used during an increase of pressure.

Electromagnetic deflation control valve
: Used for constant air exhaustion at the time of measurement.
: Used after the measurement.

Cuff : To tighten the left wrist.

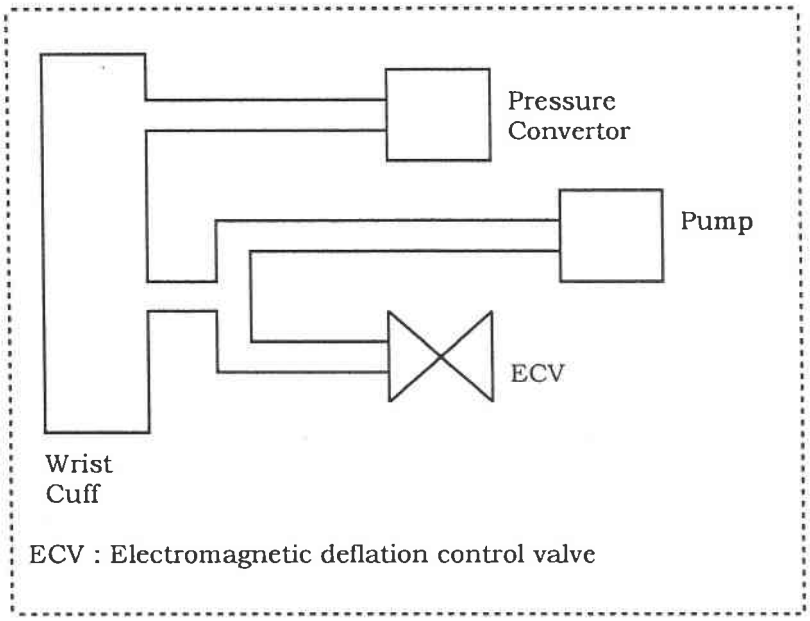


FIG. 3-2 Air Circuit

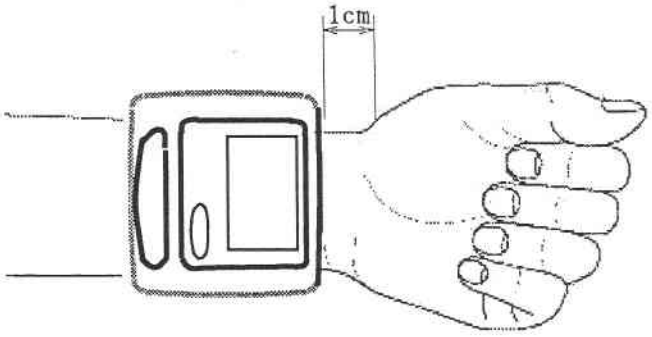
4. OPERATIONS INSTRUCTION

4-1 Power Supply

1) In case using battery
Take off battery cover rear side of main body and insert 2 pieces of R-03 or LR-03 type batteries to fit polarity indication.

4-2 Measurement Procedures

1) Wrap the Cuff around the upper left wrist.
Face upwards the palm of the hand, make the body position in the center of the palm, and wrap the cuff tightly to the wrist, leaving no space between the cuff cloth.



In case you wear a wrist watch on your left wrist, please wrap cuff after you put off it.

The position of the individual when being measured may be either lying down or sitting. In the sitting position however make sure that the location on the left wrist to be measured is about at the same height as the heart and that the forearm is extended naturally on the table and does not move.

2) Push the "START" switch to automatically inflate cuff to the Optimum pressure.

3) "Inflation" indication will disappear when pressure start to descend. Please do not move your body as possible as you can later.

4) Further descending cuff pressure, indication mark for "Heart mark" flashing to notice pulse wave when the pulse wave begin to generate.

5) Further descending cuff pressure and when come to minimum blood pressure, display for "Heart mark" flashing also disappear.

6) Minimum and maximum blood pressure is displayed for 3 second and pulse rate is displayed for 2 second and the different displays are shown intermittently.

7) Measurement is completed above all steps. Then the "Deflation" mark will appear and the unit will automatically exhaust the air from the cuff.

8) If you forget to turn the power switch to off after completion of measurement, it will be automatically turned off after the 180 seconds.

9) In case you take measure again, you should repeat from item 2) to 7).

4.4 Memory information

1) The unit can store the results of seven measurements in the memory.

Measurement result is automatically stored in the memory when the first measurement is completed and the power switch is turned off.

(Memory No. 1 indicates the measurement result obtained in the right previous measurement).

2) To recall the memory, press Memory Button, a single push will recall the results stored in Memory 1. Second, third ,4 ,5 ,6 and 7th pushes on the button will recall the results in Memories 2,3,4,5,6 and 7. The memory number recalled will be shown in the Memory number Display Area in the left corner of the display panel.

3) If you press the memory recall button in succession by the number of times of memory, and press it again after all the memory data are recalled, you can see in the LCD display the average value of all stored data of Systolic blood pressure and the average value of all stored data of diastolic blood pressure. At the same time, in the area of memory NO. a letter [A] as a marking is indicated.

5. ERROR DISPLAY

This blood pressure monitor displays as error message for mistake measurement method and weak battery.
In case displaying error message during measurement,
please exhaust and please re-measure after confirming how to use.

1) Improper pressure

Err 330 *Inflation above 330 mmHg.

Err *Noise is detected by moving body during measurement.
*The exhaust speed is irregular.
The exhaust speed is higher than 6 mmHg/sec. or lesser than 2 mmHg/sec.

2) Weak battery

Weak battery provide inadequate voltage for operation of the unit.
Batteries need to be replaced.

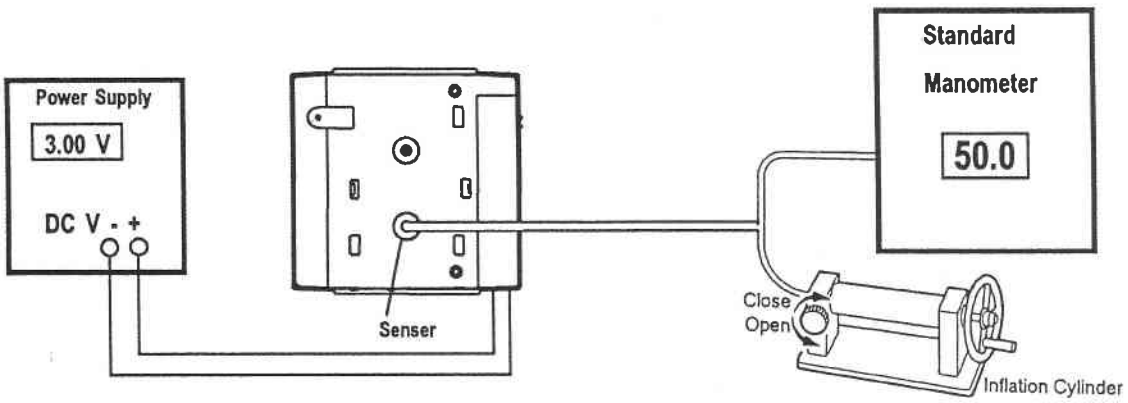
Weak battery

6 . PRESSURE ACCURACY TEST

Connection with Test Device

1. Connect a 3V DC power supply in off mode.

2. Connect the standard manometer and the inflation cylinder, then make it diverge to join the connector used for the pressure accuracy test on the unit.



Test method

1. Open the inflation cylinder, then turn on the power supply.

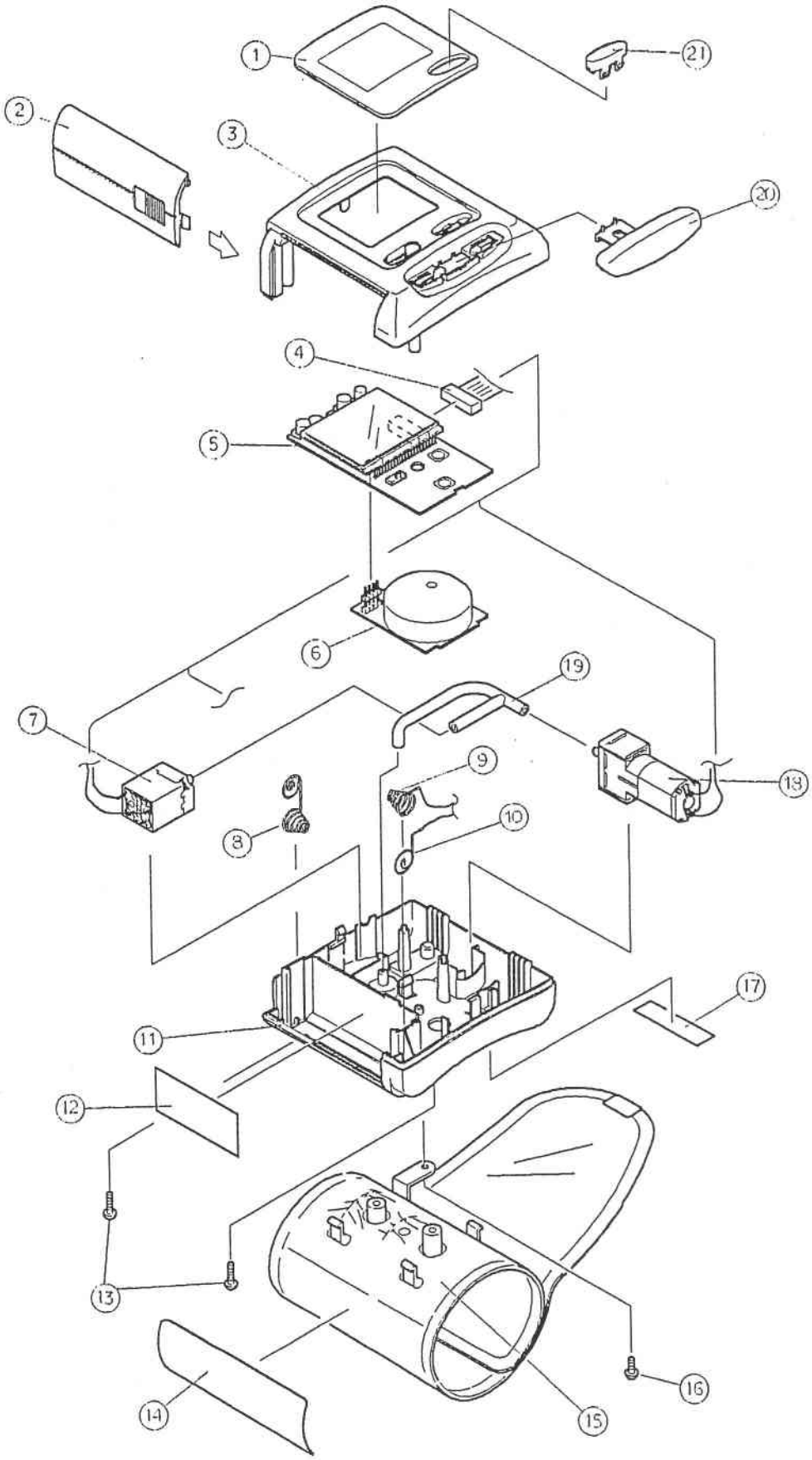
2. Keep pressing the start switch of the unit till all-indication disappear. Both upper and under 3 columns show "0" indication, Now the unit is in pressure test mode.

3. Close the inflation cylinder, then turn the cylinder handle to inflate air until a reading of 50 mmHg on the standard manometer is obtained. At that time, the display of the unit should show "50 50" instead of the " 0 0" mentioned Step 2 above. Both numbers "50 50" should not deviate too much 50 ±3 at the most.

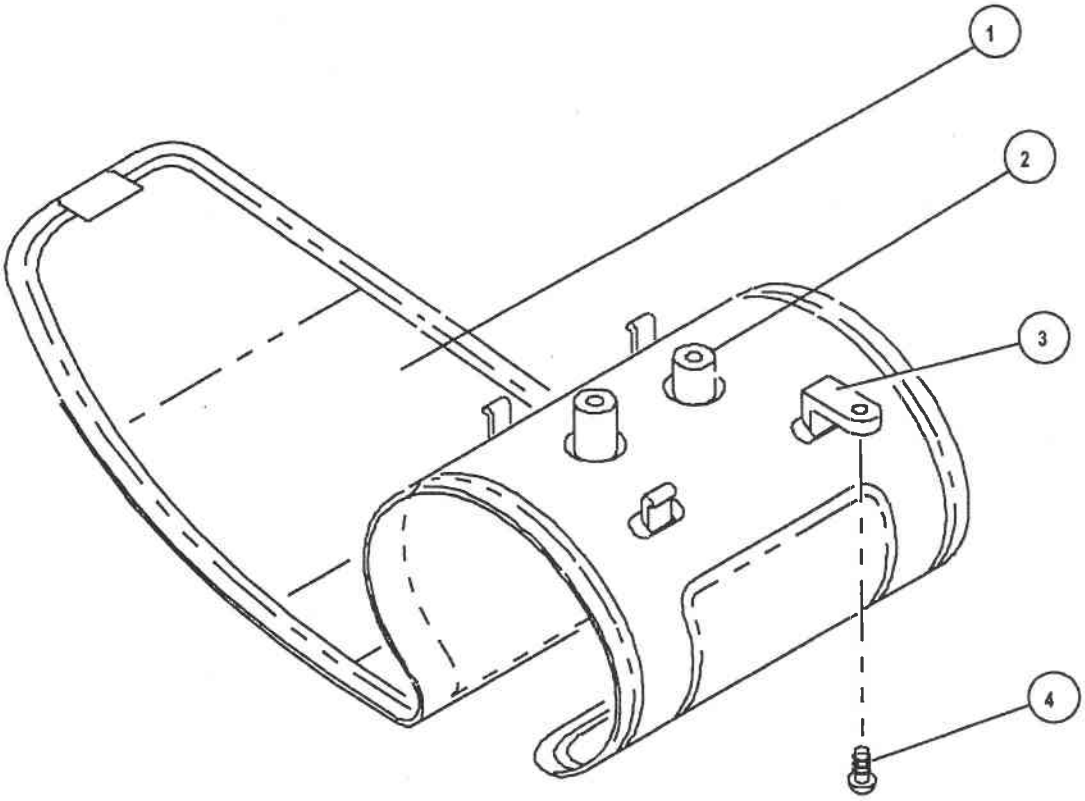
4. Do the check described in Step 3 above at 100,150,200,250, and 300 mmHg as well(±3 mmHg).

7.ILLLUSTRATION

7 - 1 . MAIN UNIT ASSEMBLY

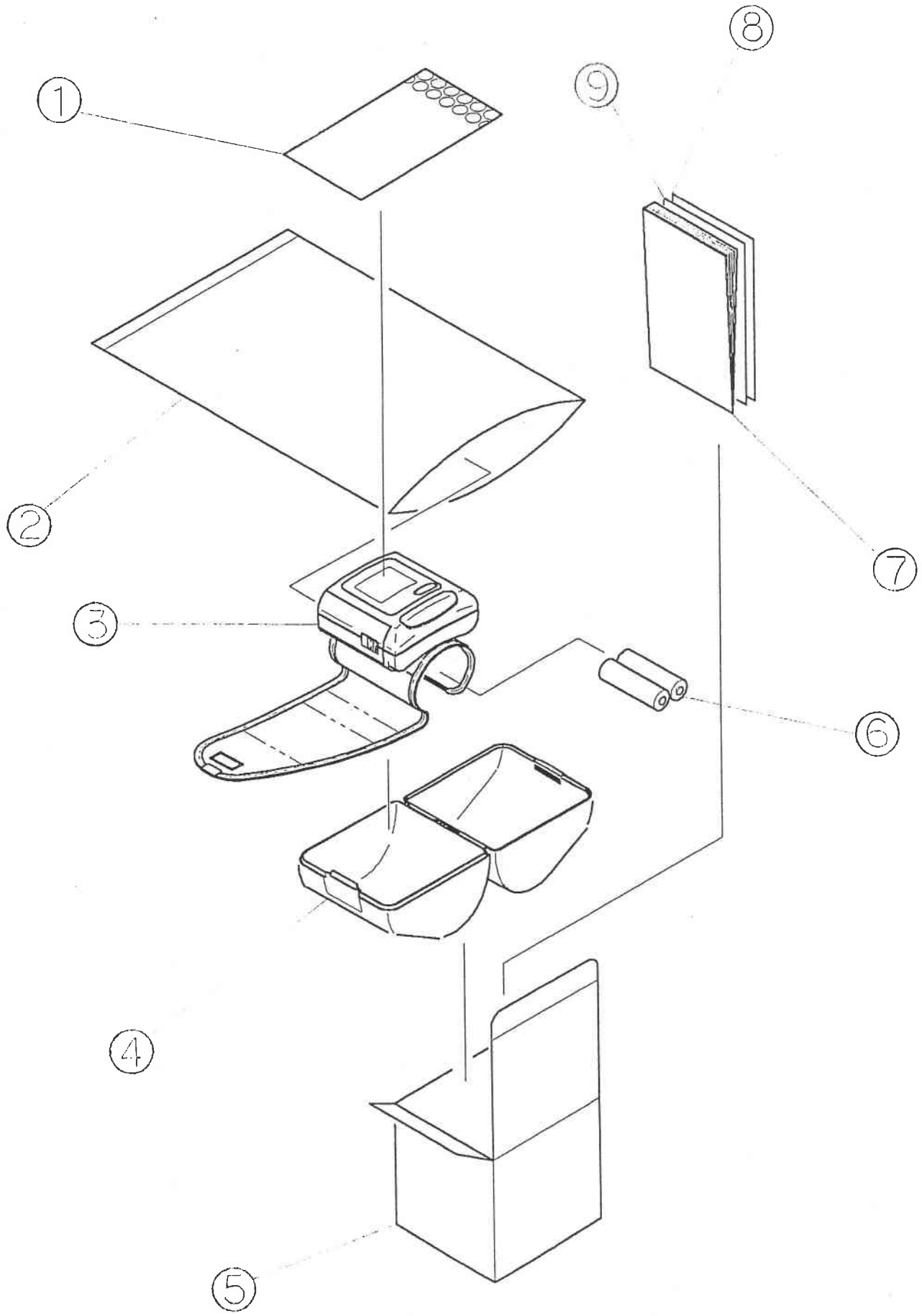


7-2. CUFF ASSEMBLY



No.	Name
1	Cuff
2	Bladder
3	Cuff spring
4	Screw

7-3. GENERAL ASSEMBLY



8 . PARTS LIST

8-1. MAIN UNIT ASSEMBLY

No.	Parts name	Parts No.	Quantity/unit
1	Display panel (PRINT)	A103481-01 (A102996-1)	1
2	Battery cover	C103478-01	1
3	Upper case	D103477-01	1
4	Connector assembly (8P)	A208050-1	1
5	PC board assembly A	A250349-1	1
6	PC board assembly B	A250350-1	1
7	ECV (ECV-02-01)	61736AM	1
8	Battery terminal (+, -)	A102889-1	1
9	Battery terminal (-)	A102888-1	1
10	Battery terminal (+)	A102887-1	1
11	Bottom case	D102714-01	1
12	Battery label	A103741-1	1
13	Case holding screw	A100034-2008	2
14	Cuff label	A103696-1	1
15	Cuff assembly	A103489-01	1
16	Cuff holding screw	A100034-2006	1
17	Sr. NO. label	A103446-1	1
18	Air pump assembly DP-65-01	A103725-1	1
19	Air tube	A103676-1	1
20	Power/Start switch knob (PRINT)	B103479-01 (A102997-1)	1
21	Memory switch knob	A103480-01	1

8-2. CUFF ASSEMBLY

No.	Parts name	Parts No.	Quantity/unit
1	Cuff	A103691-1	1
2	Bladder	A100008-1	1
3	Cuff spring	B102331-1	1
4	Screw	A100034-2006	1

8-3. GENERAL ASSEBLY

No.	Parts name	Parts No.	Quantity/unit
1	Air pack	A101155-0713	1
2	PE bag No. 10	A100663-10	1
3	Main unit	A103490-1	1
4	Carrying box	B100004-02	1
5	Package box	A103719-1A	1
6	Battery LR6	A210047-1	2
7	Instruction manual	A103720-1A	1
8	Guarantee	A103758-1A	1
9	Record chart	A102311-1A	1