

ALP K2®

Service Manual

for Digital Blood Pressure Monitor

Model No.WS-720

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1. DESCRIPTION

1. The Model WS-720 is an Auto Inflation Wrist Digital Blood Pressure Monitor.
Every process of the measurement is automatically done as "O/|" button is pressed.
2. The readings in each function are digital displayed on Dot-Matrix LCD panel.
3. LCD is constructed with 64 x 102 dots.
LCD shows pressure value during a measurement and shows measurement results, memory data and also symbol characters and short messages which describe inflation, deflation, palpatory wave, weak battery and etc.
4. Reliable measurement is constantly possible with WS-720 since this device shows measurement error symbol character and message if any extraordinary event happens during a measurement.
5. The Model WS-720 is an Auto Inflation Wrist Digital Blood Pressure Monitor. Every process of the measurement is automatically done as "O/|" button is pressed.
6. Microprocessor supervises the battery power and when it is judged to be running down, the weak battery symbol character and message are shown on the display.
7. The language for messages shown on the display can be selected from English, French, German, Italian or Spanish.
8. The unit can be set to display time when the power is turned off.
9. There are 4 buttons to operate this unit: "O/|" button, MENU button, MEMORY(+) button and MEMORY (-) button.
10. The unit holds such memory function that recalls 30 measurement results and their average stored in two accounts.
11. The stored data can be displayed in three ways: Single data display, list display and trend graph display.
12. The unit's functions such as inflation value can be set up in MENU section.
 - (1) Selection of the memory account
 - (2) Preset pressure set-up
 - (3) Memory clear
 - (4) Language selection
 - (5) Clock adjustment
 - (6) Contrast adjustment for the LCD
13. The inflation and deflation of the cuff are automatically done with air pump and electric control valve.
14. The electric control valve is supervised by the microcomputer.
The reliability of the measurement is high since the deflation rate is constantly kept at the appropriate speed.
15. The unit will automatically turn off if it is not operated for about 180 seconds or more.

2.SPECIFICATIONS

2-1. Model	WS-720-12	
2-2. Classification	CLASS II a	
2-3. Function	① Blood Pressure Measuring	
	② Pulse Rate Measuring	
	③ Automatic Power Shut Off (3 min.)	
	④ 2 Error Indication	
2-4. B.P.M. Specifications		
(1) Measuring Method	Cuff Oscillo-Metric	
(2) Measuring Position	Wrist	
(3) Coverage wrist circumference	125mm ~ 205mm	
(4) Pressure detection	Pressure to Frequency Converter	
(5) Pressure indicating (Cuff Pressure)	① Units	mmHg EN1060-1 6
	② Range	0 - 300 mmHg EN1060-3 7.7.1
	③ Resolution	1mmHg EN1060-3 7.7.2
	④ Zero setting	Automatic zero setting EN1060-3 7.4.4
(6) Measuring range	① Systolic	50- 250 mmHg Cuff Pressure
	② Diastolic	40- 180 mmHg Cuff Pressure SYS-DIA >10mmHg
	③ Pulse Rate	40 - 160 Beat/Min.
(7) Accuracy	① Pressure	± 3 mmHg EN1060-1 7.1.1
	② Pulse rate	± 5 % of Reading
(8) Cuff inflation	Automatic Inflation System (Air Pump)	
(9) Preset pressure	150 to 300 mmHg (10mmHg step)	
(10) Cuff deflation	Electromagnetic deflation Control Valve (ECV)	
(10) Deflation rate	5.5 ~ 7.5 mmHg/sec.	
(11) Rapid Exhaust	Automatic Exhaust (ECV) EN1060-3 7.4.3	
(12) Cuff system	① Cuff of Wrist	
	② Locking Mech.-Velcro with spring	
	③ Bladder Size	52mm(W) × 128mm(D)
	④ Cuff Size	66mm(W) × 280mm(D)

(13) Indicator	102 × 64 dots LCD. (Dot-matrix LCD) EN1060-1 5		
	① Cuff Pressure		
	② Measurement results · SYSTOLIC · DIASTOLIC · PULSE RATE · MEMORY		
	③ Indicate the characters during measurement		
	④ Indicate of the Operation		
(14) Memory	⑤ Error Indication · ERROR MEASURE AGAIN · REPLACE THE BATTERIES(Weak battery)		
	① Systolic Diastolic and Pulse rate		
	② 2 way of 30 Times		
	③ Memory data Average (SYS. DIA. PUL.)		
	④ Memory display · One Data indication · Data List indication, · Data trend indication		
(15) Microcomputer	8Bit Microcomputer	TMP86CM29AU- 3EF7 A205120-01	
(16) Power Source	LR03 Type (AAA Size) 2 pcs. EN1060-3 7.3.1		
(17) Power consumption	200 mW (Max.2W)		
	Operating status	Typ.	Max.
	① Inflation	550mA	670mA
	② Measurement (at150mmHg)	30mA	50 mA
	③ Displayed measurement result	8 mA	15 mA
	④ Poweroff (clock display ON)	450μA	600 μA
	⑤ Poweroff (clock display OFF)	50μA	100 μA
(18) Battery life	① With clock display	approximately 2 months with one measurement a day	
	② Without clock display	approximately 10 months with one measurement a day	
(19) Operating TEMP./Humidity	+10 °C to +40 °C /85% RH or below EN1060-1 7.1.2.2		
(20) Storage TEMP./Humidity	-5 °C to +50 °C /85% RH or below EN1060-3 7.5.1		
(21) Main unit size	84.6 mm (W) × 75.6 mm (D) × 31.5 mm (H)		
(22) Main unit weight	APPROX. 117 gm (Not Including Batteries)		

2-5. Safety system	Cuff Pressure > 330mmHg → Rapid Exhaust
2-6. Electrical safety	EN1060-1 7.2.1
2-7. Resistans to vibration & shock	EN1060-1 7.2.2
2-8. Air Leakage	EN1060-3 7.4.1
2-9. Electromagnetic compatibility	EN1060-3 7.5.3
2-10. Stability of the cuff pressure indication	EN1060-3 7.6
2-11. Overall system accuracy	EN1060-3 7.9
2-12. Lay a pipe system	See "10.Exploded Views 10-1.MAIN UNIT" P25
2-13. Operating manual	English / French / German / Italian / Spanish
2-14. Accessories	Non
2-15. Life	5 Year

3. PRINCIPLES OF OPERATION

3-1. Operation of Each Unit

These units operate as follows:

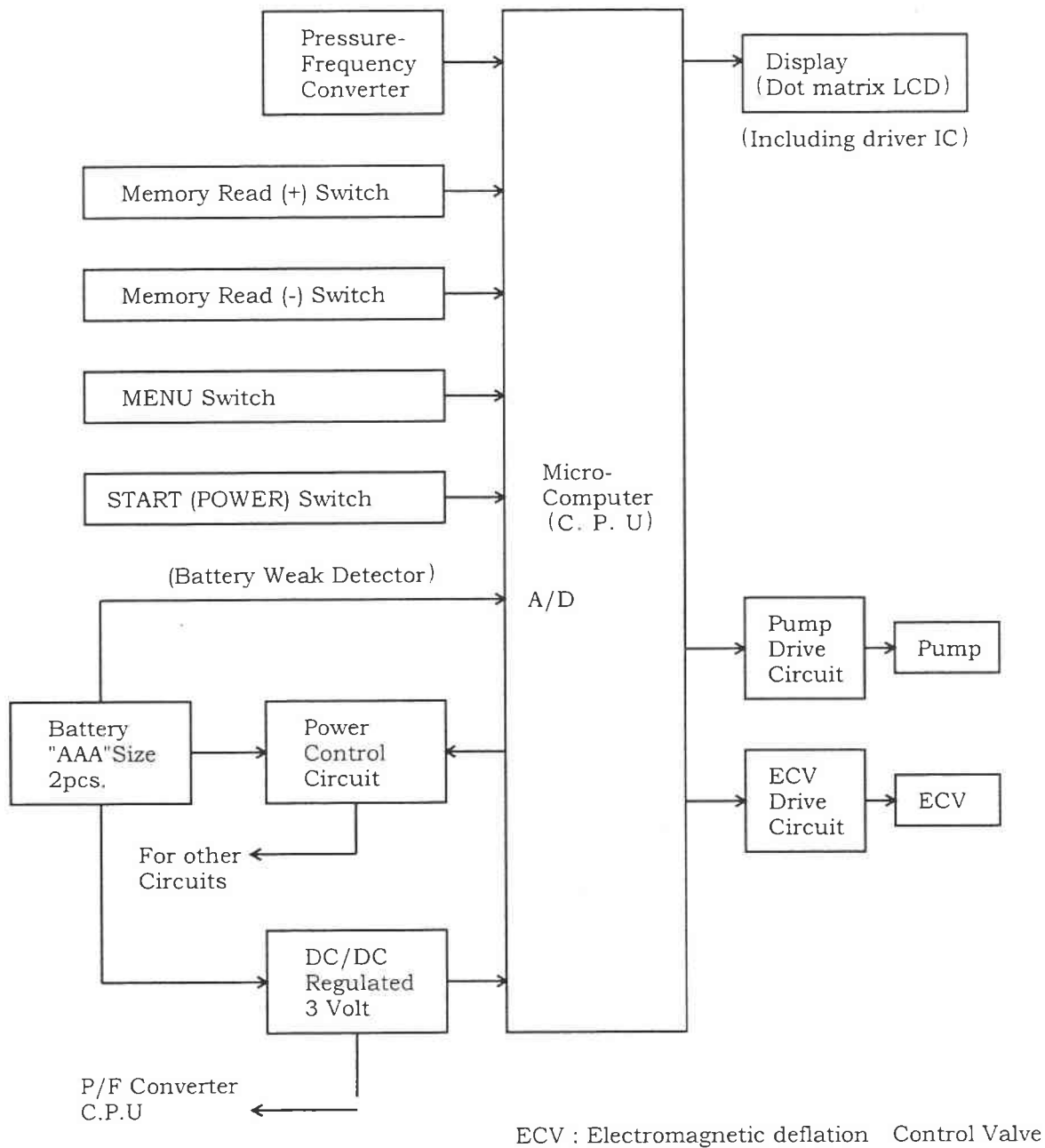


FIG. 3-1 Block Diagram

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.

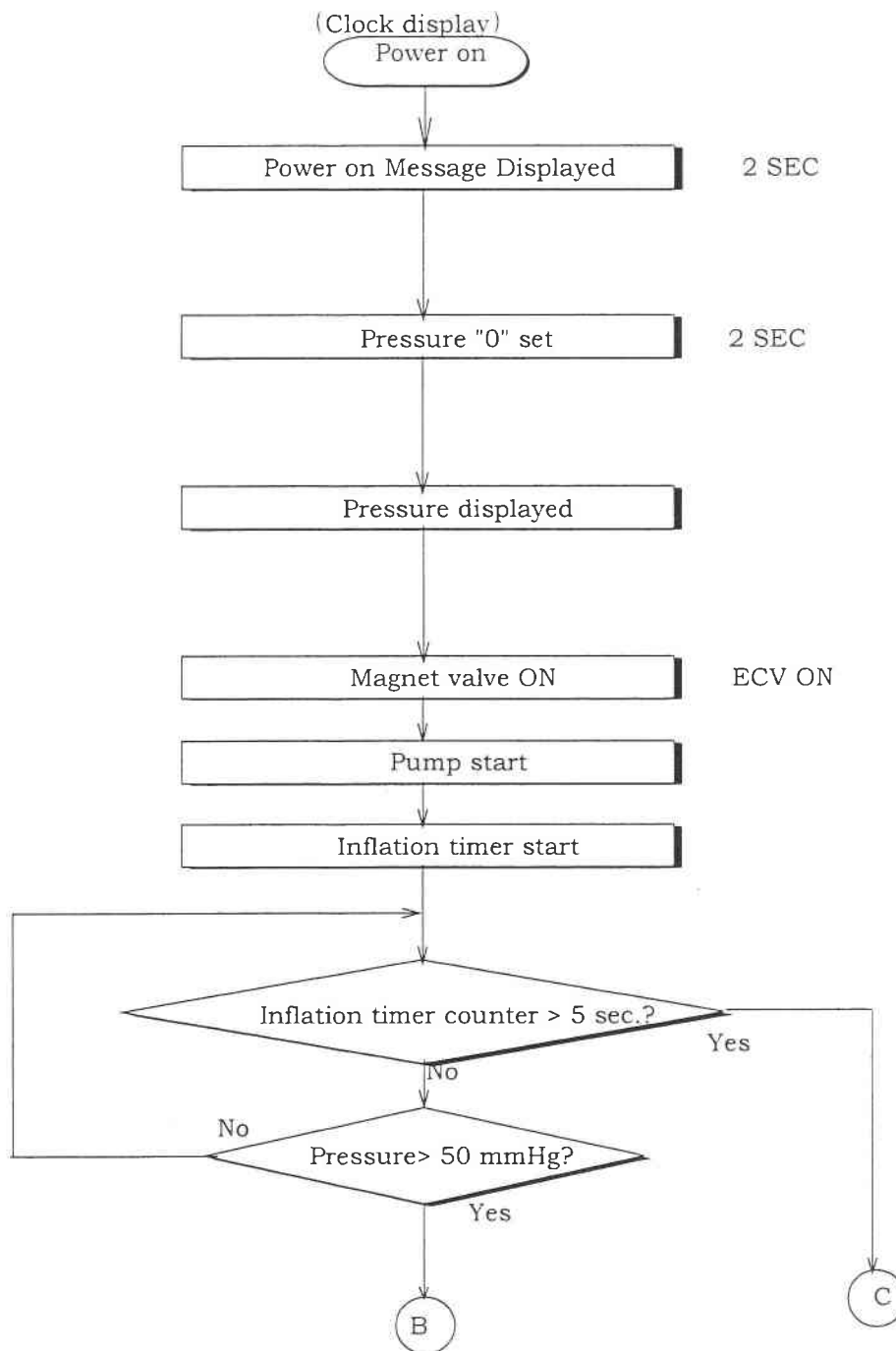
Pump drive circuit;

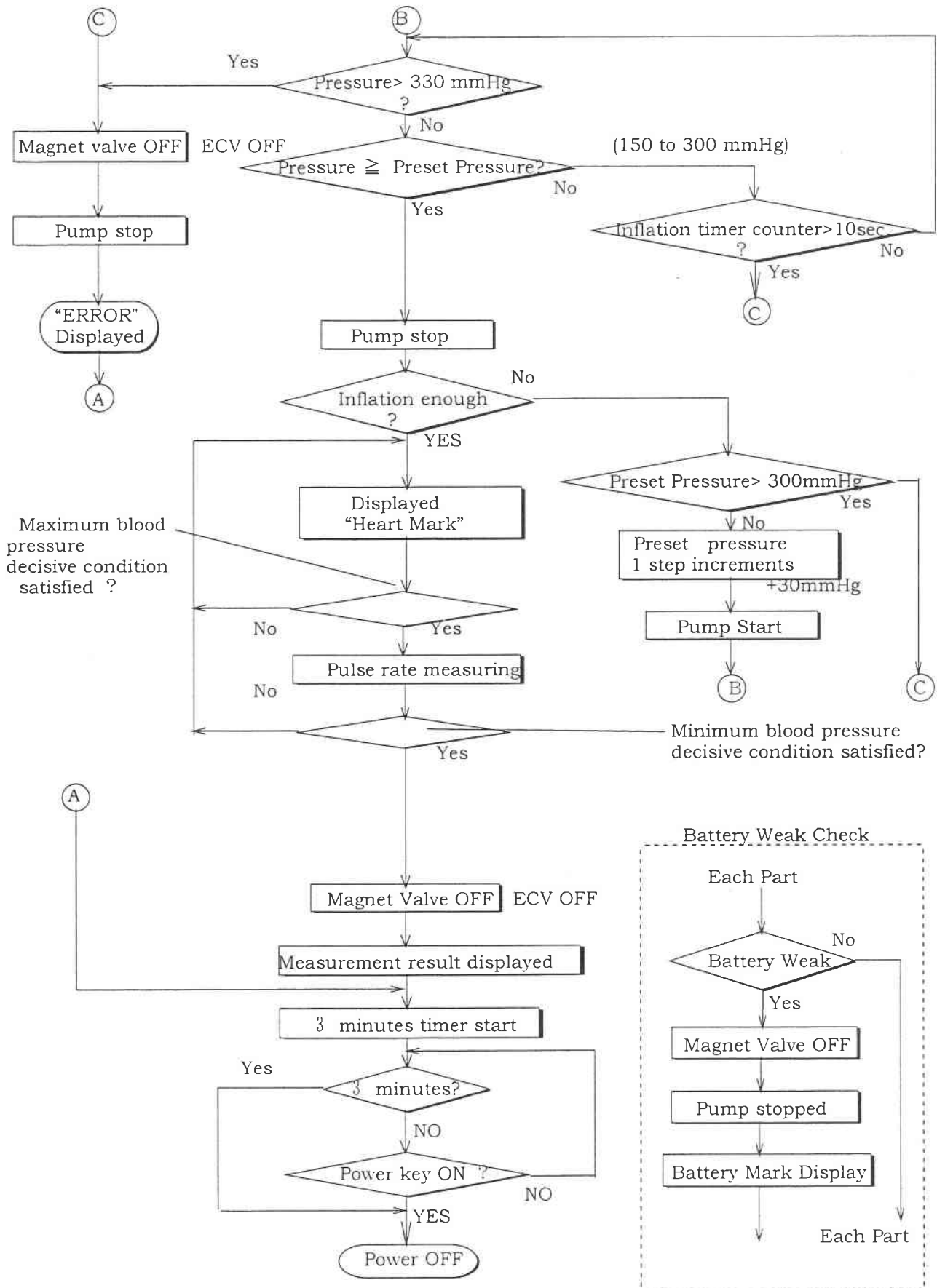
Controls starting and stopping of the pump.

c) Microcomputer

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

3-2 Flow Chart of Operation





3-3 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 or right wrist.

Pressure Sensor : Frequency are changed by pressure

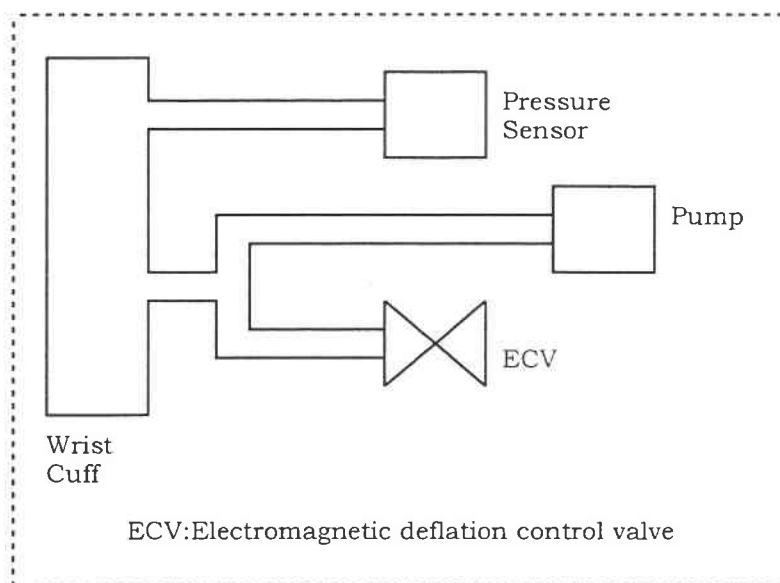
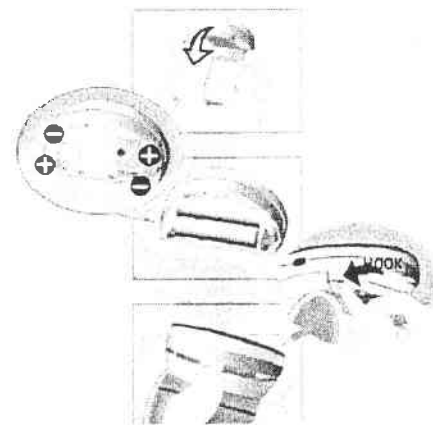


FIG. 3-2 Air Circuit

4. OPERATIONS INSTRUCTION

4-1 Battery Installation

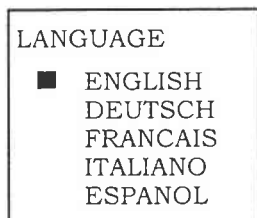
- 1) Remove the battery cover in the arrow direction.
- 2) Install two LR-03 type alkaline dry cells in the battery compartment, giving attention to their polarity. The calls can be easily installed by pushing their (-) side against the spring.
- 3) Replace the battery cover on the unit.



4-2 Language and clock set-up after battery replacement

Set the language and the clock after replacing batteries or when installing batteries for the first time.

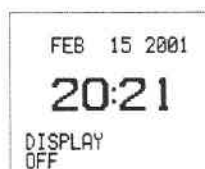
- 1) The first display when batteries are installed is the language set-up menu.
 - Language set-up menu is to chose the language for messages shown on the display while operating this unit. (Chose one of the following languages: English, German, French, Italian and Spanish.)
 - The language initially selected is English.
 - Select language with either MEMORY (+) or (-) button.
 - Complete the set-up with MENU button or POWER/START button.



NOTE Whenever you want to change the selected language, refer to "4-7MENU/3)-d)LANGUAGE". The language can be reset up anytime and any number of times.

- 2) Adjust the clock
The display after the language set-up menu is the clock set-up menu.

- The adjustment of the clock is necessary to store the measured result along with the date and time correctly so that the memory can show when and what time a measurement was made.



NOTE:
When the clock display is set to ON, the battery life will be short. It is suggested to use set the clock display to OFF.

Procedures

- 2)-1 Set the clock in the order of year, month, day, hour and minute.
- 2)-2 The article to be adjusted flashes.
- 2)-3 Adjust with MEMORY (+) or (-) button.
- 2)-4 Make confirmation by pressing MENU button and the next article to be set up flashes.
- 2)-5 Repeat 2)-3 and 2)-4 steps.
- 2)-6 Press POWER/START button when every article is adjusted.
- 2)-7 The time is displayed when the clock set-up is completed.

NOTE The clock on this unit is only a supplement and therefore the clock may go ahead or behind the time. In such cases, refer to "4-7MENU/3)-e)CLOCK SET".

4-3 Measurement Procedures

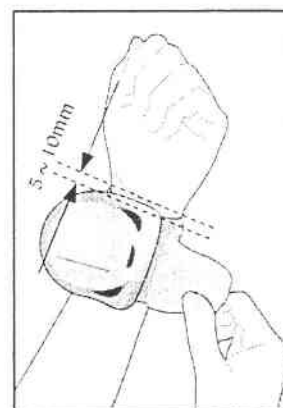
1) Wrapping the Cuff around your wrist.

1-1) With the palm of your left hand up, put the cuff on your wrist so that the main body is on the same side as your palm.

1-2) Adjust the cuff, with your palm up, until its edge is positioned about 5 ~ 10 mm from the lowest part of your palm.

1-3) Fasten the cuff around your wrist so that there is no space between the cuff and your wrist. The cuff should fit snugly. Press the surface of the cuff to make sure that it is attached securely.

- Attach the cuff next to the skin.
- Take care that your clothes are not caught by the cuff.
- Do not push the POWER button before the cuff is completely wound.



<When the cuff cannot be put on your left wrist >

If it is impossible to put the cuff on your left wrist, use your right wrist for measurement.

2) Correct posture during Measurement

2-1) Sit on a chair.

2-2) Lightly open your left hand, with your palm up, and put your elbow on a table or stand.

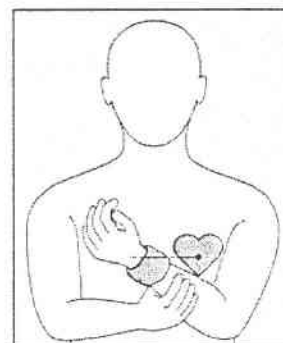
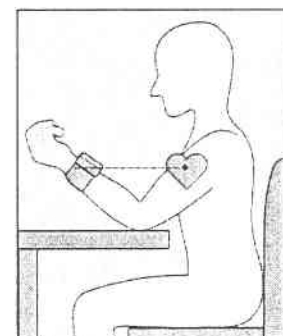
2-3) Adjust the cuff to the same height as your heart.

- When there is no table available

1) Sit on chair.

2) Adjust the cuff to the same height as your heart by lightly applying your left arm to your breast.

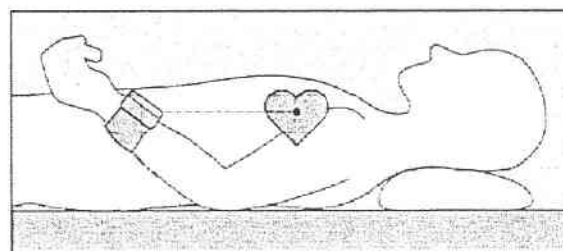
3) Lightly support your arm by your right hand during measurement.



- Making a measurement in bed

1) Lie on your back.

2) Adjust the cuff to the same height as your heart.



- Breathe deeply 5 or 6 times to relax before measurement.
- Measured data may vary slightly depending on the posture during measurement.
- Measurements should be made with the same wrist in the same position.
- If the cuff is lower (higher) in position than the heart, the measured reading tends to become larger (smaller).

4-4 Measuring Method

Starting Measurement. Let yourself relax !

- 1) Press the POWER/START Button.

If you hold the POWER/START button too long (more than approximately 2 sec.), the apparatus will be in the "checking mode" or the power will be turned off. In such cases, which do not indicate any problems, press the POWER/START button again to start the measurement.

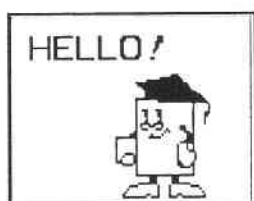
Set the inflation value

The priory set pressure is 180 mmHg. Set the inflation value approximately 40 to 50 mmHg higher than your systolic blood pressure if you already know the value. You can leave the preset pressure at 180 mmHg if you do not know your systolic pressure.

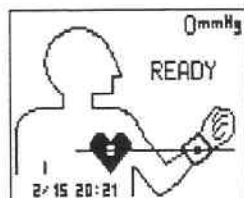
Refer to "4-7 MENU/ 3)-b) PRESET PRESSURE" to set the inflation value.

- 2) Press the POWER/START Button.

"READY" message which suggests you that the measurement is about to start will appear on the display following the "HELLO" message when you press POWER/START button.



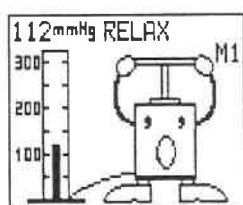
2 sec.



2 sec.

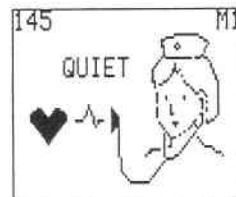
Then the unit automatically starts inflation.

Display during inflation



- 3) Pressure starts to descend. Please do not move your body.

- 4) While cuff pressure decreases, heart mark flashes as pulse wave is detected.



- 5) When pressure reaches minimum blood pressure, the heart mark disappears.

- 6) Measurement is completed above all steps. Then the unit will automatically exhaust the air from the cuff.
- 7) Minimum and maximum blood pressures and pulse rate are displayed.



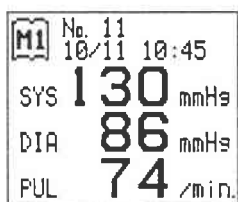
- 8) To turn off the power, press POWER/START button.
- 9) If you forget to turn off the unit after completion of a measurement, it will be automatically turned off after 180 seconds.

4-5 Measured data storage

When either M1 or M2 is selected before starting a measurement, the measured data will automatically be stored in the memory as the measurement is completed.

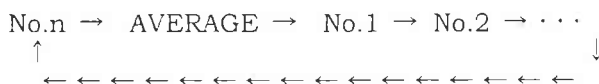
4-6 Memory information

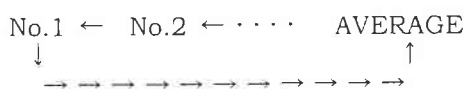
- 1) The measured data will be stored automatically in the set memory account. When the memory is set to OFF, measurement result will not be stored.
- 2) The memory number 1 is the oldest stored data. When the number of measurements exceeds the maximum storable number, the oldest data will be deleted to record new data.
- 3) Each of two memory accounts can hold 30 measurement results and their average.
- 4) The unit has three memory indication modes: Single data display mode, data list display mode and data trend graph display mode.
- 5) Single data display mode
 - a) When the unit is turned off (when either nothing or clock is displayed), press MEMORY (+) or (-) button and the latest data with memory number X will appear on the display. The memory data number 1 is the oldest data in the memory.



- * Change memory number with MEMORY (+) or (-) button.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.
- * Move to data list display mode by pressing MENU button.

- b) To see the average value, press MEMORY (+) or (-) button while the latest data is on the display. To see the old data, press MEMORY (+) button; as the button is pressed, the memory number changes incrementally, while it changes decrementally as the (-) button is pressed.





- c) To fast forward the data (4 data/sec.), hold down MEMORY (+) or (-) button for more than two seconds.
- d) Even when batteries are replaced, any stored memory data will not be deleted.
- e) If you need not to store measurement results and not to recall them, set the memory OFF.

6) Data list display mode

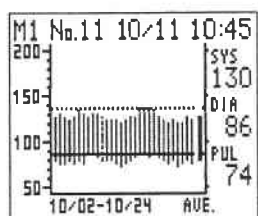
- a) To see the data list, press MENU during single data display mode.
- b) The data shown at the bottom of the list with a cursor mark is the last data shown in the single display mode.
- c) Only five data can be shown on the display at one time, scroll the screen with MEMORY (+) or (-) button, however, too see other data.

M1	10/11	10:45		
No.	SYS	DIA	PUL	
Ave.	135	82	72	
7	137	80	75	
8	132	88	76	
9	136	89	71	
10	132	82	76	
█ 11	130	86	74	

- * Move the cursor with MEMORY (+) or (-) button.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.
- * Move to trend graph display mode by pressing MENU button.

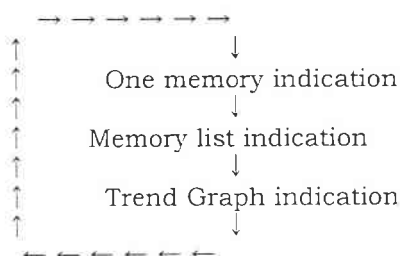
7) Trend graph display mode

- a) To see the trend graph, press MENU button during data list display mode.
- b) The data marked with the cursor in the list display flashes and its measurement date and time are displayed at the top and its measurement results at the right.
- c) To see the other stored data information, press MEMORY (+) or (-) button and move the flashing data.



- * The 2nd data from the right of the graph is the latest measured data.
- * To shift flashing point, use MEMORY (+) or (-) button.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.

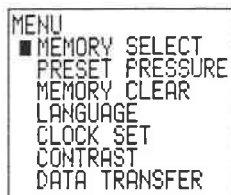
- d) The first data from the right of the graph is the average value.
- e) Hold down either MEMORY (+) or (-) button and memory data will be fast forwarded.
- f) Go back to single data display mode by pressing MENU button during graph display mode.(The data flashing in the trend graph will be shown.)



4-7 MENU

1) Press MENU button.

a) To see menu, press MENU button when unit is turned off (when whether nothing or the clock is displayed).



- * Select with MEMORY (+) or (-) button.
- * Make determination with MENU button.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.

2) Function

a) MEMORY SELECT; either set the memory OFF or chose between two memory accounts.

b) PRESET PRESSURE; set the inflation value.

c) MEMORY CLEAR; delete specific stored data.

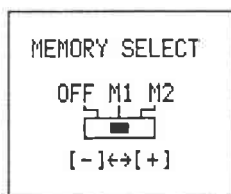
d) LANGUAGE; chose one of five languages, English, German, French, Italian and Spanish.

e) CLOCK SET; adjust the clock (month, day, hour and minute).

f) CONTRAST; adjust LCD contrast (brightness).

3) Menu items and setting up

a) MEMORY SELECT; switch memory accounts.



- * After battery replacement, account is set to M1.
- * Select among OFF, M1 and M2 with MEMORY (+) or (-) button.
- * Press MENU to determine and the unit will be turned off.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START to turn off the unit.

b) PRESET PRESSURE; set the inflation value.



- * The initial preset pressure value is 180 mmHg.
- * The pressure range is from 150 to 300 mmHg.
- * The value changes at 10 mmHg intervals as MEMORY (+) or (-) button is pressed.
- * Press MENU to determine and the unit will be turned off.
- * The unit will be automatically turned off after 30 seconds if it is not operated.
- * Press POWER/START button to turn off the unit.

c) MEMORY CLEAR; delete specific stored data.

Delete any unnecessary data in the memory.

<Procedures>

c-1) Press MENU button and go to MENU.

c-2) Move the cursor to MEMORY CLEAR with MEMORY (+) or (-) button.

c-3) Press MENU button and go to MEMORY CLEAR, where stored blood pressure value and pulse rate with date and time are listed.

c-4) Move the cursor to data to be deleted with MEMORY (+) or (-) button. Scroll the screen and find any unnecessary data.

M1 MEMORY CLEAR			
10/22 16:12			
No.	SYS	DIA	PUL
18	132	86	78
19	138	90	78
20	138	90	78
21	137	86	78
■ 22	135	88	78

- * Select the data with MEMORY (+) or (-) button.
- * Delete the data by pressing MENU button.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.

c-5) Press MENU button and the data selected will be deleted.

c-6) Press POWER/START button to cancel deleting the data; the power will be turned off.

d) LANGUAGE; chose one of five languages, English, German, French, Italian and Spanish.

Language can be changed anytime in the MENU.

Titles and messages during procedures will be in the selected language.

LANGUAGE	
■	ENGLISH
	DEUTSCHE
	FRANCAIS
	ITALIANO
	ESPAÑOL

- * Initially set language is English.
- * Move the cursor with MEMORY (+) or (-) button.
- * Press MENU button to set the language and turn off the unit.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn of the unit.

e) CLOCK SET; adjust the clock (month, day, hour , minute and display ON/OFF).

At same manner of battery replacement, clock can be adjusted anytime.

FEB 15 2001	
20:21	
DISPLAY	OFF

- * The clock indication is 24 hours mode.
- * After battery replacement, the date and time are always January 1st, 2000 00:00.
- * Adjust date and time with MEMORY (+) and (-) button.
- * Set with MENU button and turn off the power.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.

- The year flashes at first in CLOCK SET mode.

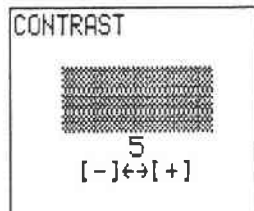
- Press MENU to move the flashing article from year to month, day, hour, minute and display ON or OFF.(After display ON or OFF, the flashing goes back to year.)

- Chose either Display ON or OFF and set whether clock be displayed or not while the power is turned off. As the display is set to ON, the clock is displayed when the power is turned off while as the display is set to OFF, nothing is displayed when the power is turned off.

- Adjust the flashing article with MEMORY (+) or (-) button.
- To quit clock adjustment or turn off the power, press POWER/START button at any point of clock adjustment process.

f) CONTRAST; adjust LCD contrast (brightness).

NOTE :The battery life will be short when Display is set to ON (approximately 2 months with one measurement a day), while the batteries will last longer as the display is set to OFF (approximately 10 months with one measurement a day).



- * Initially set value is 10.
- * The adjustment range is 1 to 10 (10 indicates the strongest contrast).
- * Adjust with MEMORY (+) or (-) button.
- * Press MENU to set and turn off the power.
- * The unit will be automatically turned off after 30 sec. unless it is operated.
- * Press POWER/START button to turn off the unit.

4) Clock mode

When the power is turned off, clock is shown on the LCD.

4-8 Battery replacement indication

- 1) When the battery power is insufficient, battery error appears on the LCD.
- 2) The battery error is released and the power will be turned off as the POWER/START button is pressed.
- 3) As the battery error appears, non of the buttons except POWER/START button is functionable.

4-9 Special performance in measuring mode

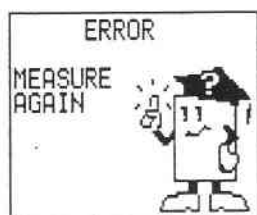
- 1) Measuring error indication
 - a) Error appears on the display and the air is rapidly exhausted from the cuff when inflation is not completed in 25 sec.
 - b) When any body movement leads to a measurement error, error appears on the display and the air is rapidly exhausted from the cuff.
 - c) When inflation is insufficient even after repressurization was repeated and pressure reached 300 mmHg, error will appear on the display.
 - d) Error appears on the display if measured systolic and diastolic blood pressures are extraordinary.
 - e) Whenever any outside factor leads pressure to exceed 330 mmHg, error appears on the display and the air will be rapidly exhausted from the cuff.
- 2) Press POWER/START button again during inflation to stop a measurement and turn off the power (turn the pump and ECV off).
- 3) Repressurization
When the inflation is judged insufficient during a measurement, pump is turned on again and the repressurization occurs to a level 30 mmHg higher than initially pressurized value.

5. ERROR DISPLAY

This blood pressure monitor displays error messages for incorrect measurement method and weak battery.

When any error message appears on the display during a measurement, exhaust the air from the cuff and measure again after confirming the correct method.

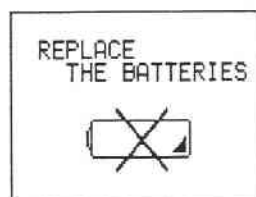
5-1. Improper pressure Error



- * Inflation exceeds 330 mmHg
- * Noise is detected by movement of body during a measurement.
- * The deflation speed is irregular.
The deflation speed is faster than 9 mmHg/sec. or slower than 3.5 mmHg/sec.

5-2. Weak battery

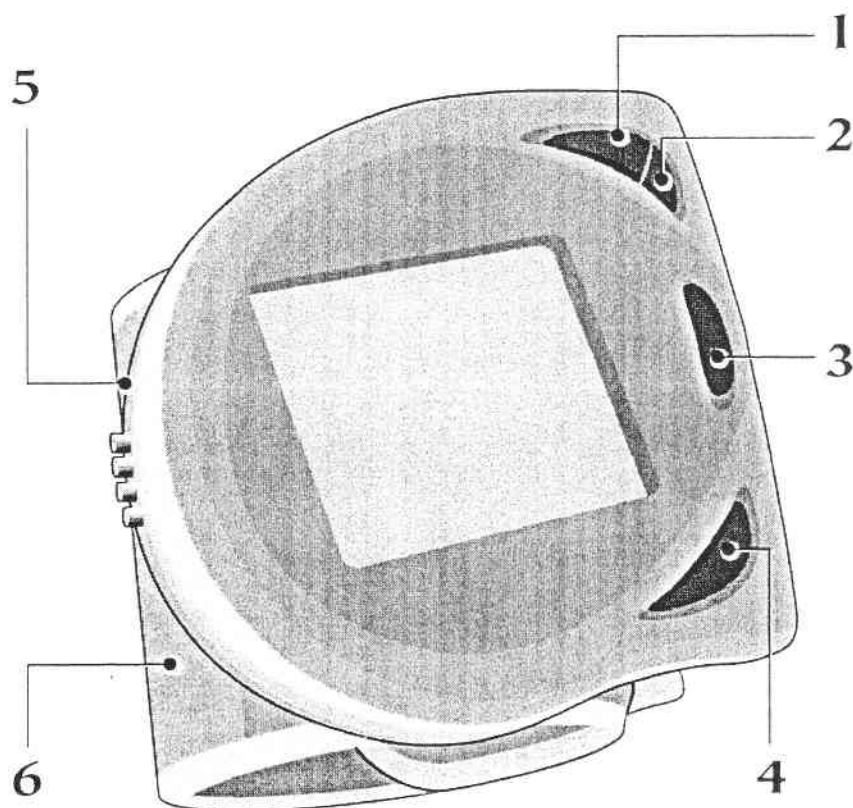
Weak battery provides inadequate voltage for operation of the unit. Batteries need to be replaced.



Weak battery

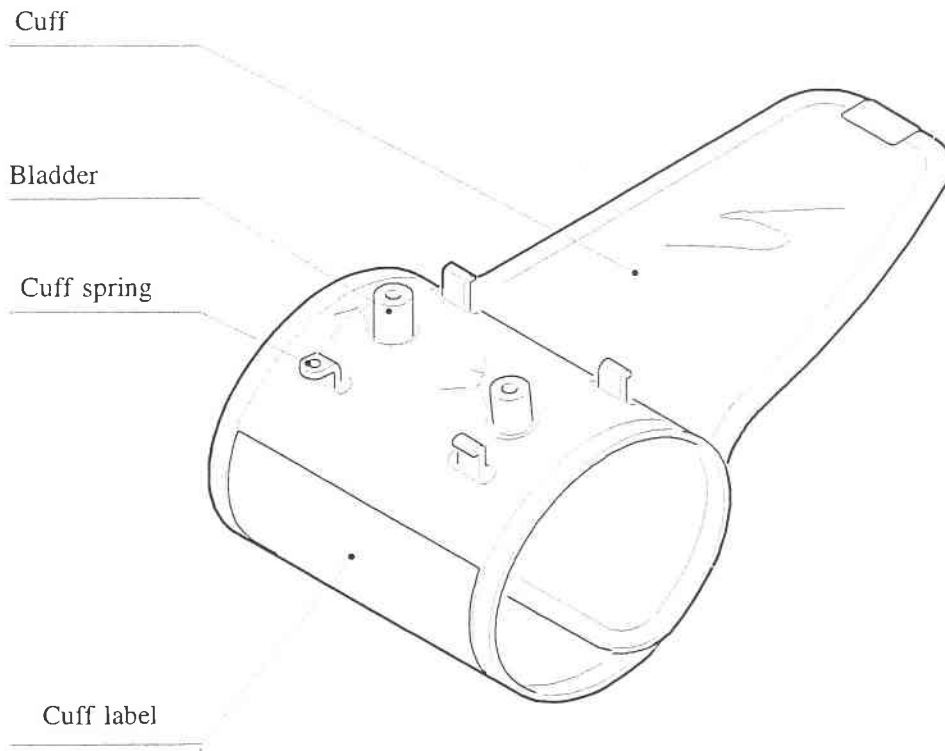
6. OUTSIDE DRAWING

6-1.MAIN UNIT

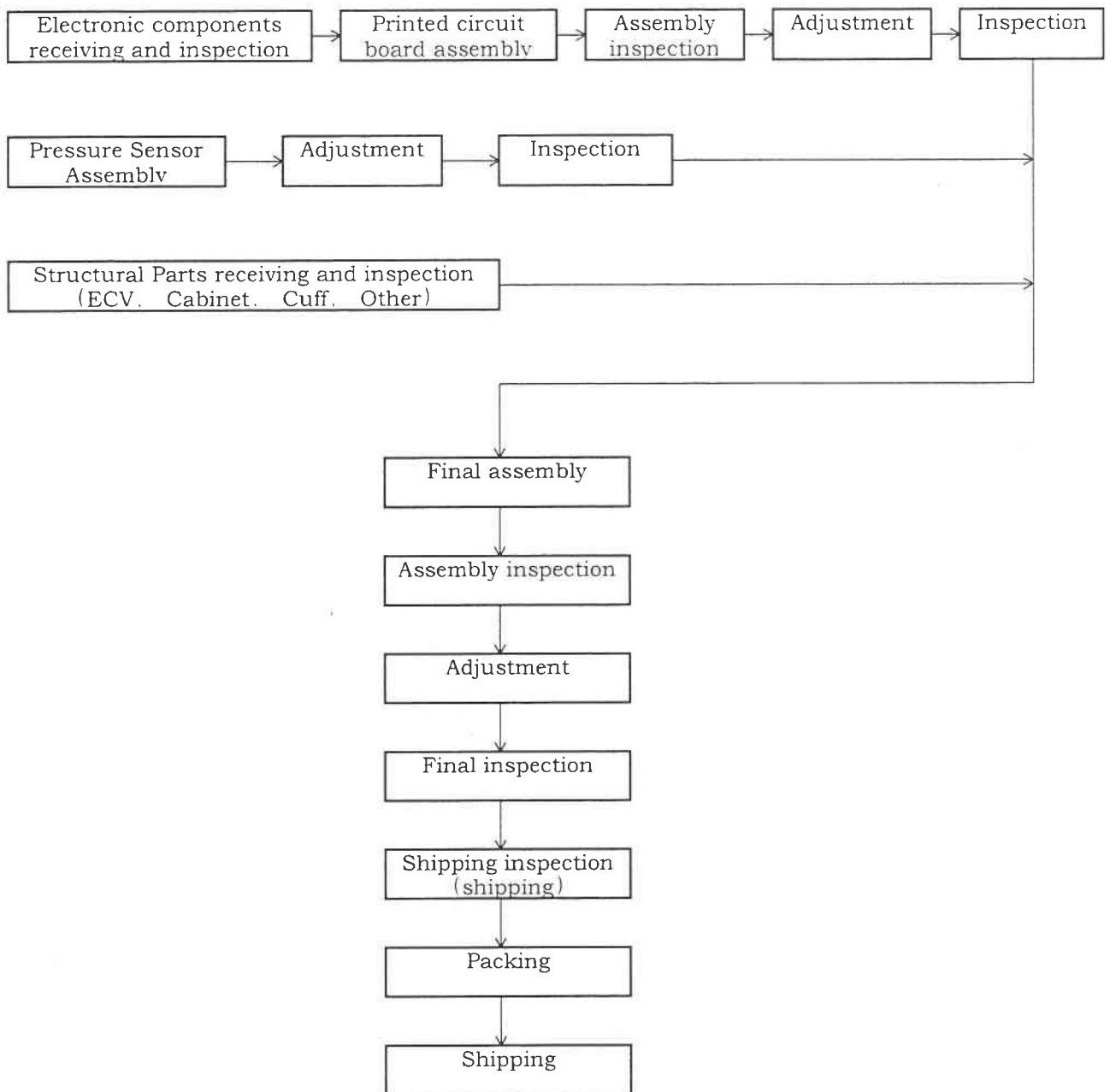


1. "MEMORY (-)" Switch
2. "MEMORY (+)" Switch
3. "MENU" Switch
4. "ON/OFF" Switch
5. BATTERY COVER
- 6 .CUFF

6-2.CUFF UNIT



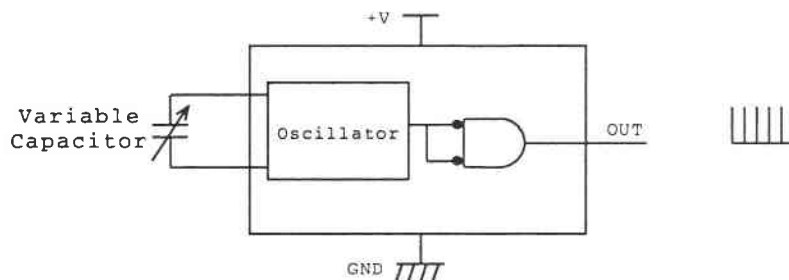
7. PRODUCTION PROCESS TABLE



8. PRESSURE SENSOR

8-1 Model : CS-100

8-2 Construction : Pressure / Frequency Converter



8-3 Usage Condition

(1) Pressure range	: 0 ~ 300 mmHg
(2) Safety over load	: 390 mmHg
(3) Compensation temperature range	: 0 ~ 50 °C
(4) Storage temperature range	: -34 ~ 65 °C
(5) Humidity	: 85% Rh or below
(6) Power supply	: 3 V ±0.2V

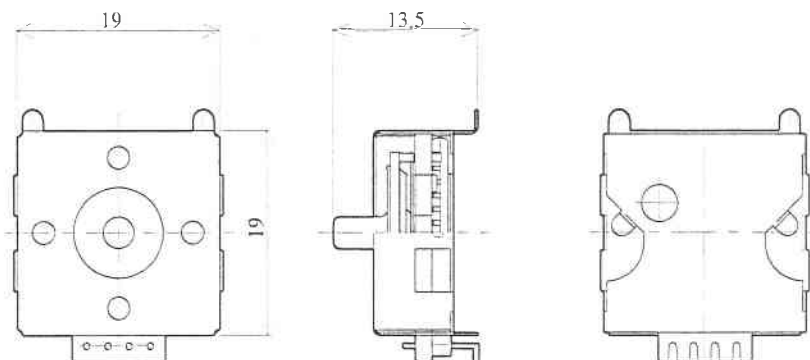
8-4 Outline

Outline dimension	: 19 × 19 × H13.5mm
Weight	: Approx. 7g

8-5 Performance

1 Output frequency	: 0 mmHg : 800 KHz ±300 KHz ··· f0 : 300 mmHg : f0-240 KHz
2 Linearity	: Within ±0.3 % of FS
3 Hysteresis	: Within ±0.3 % of FS
4 Span drift	: ±1% (10 °C ~ 45 °C)

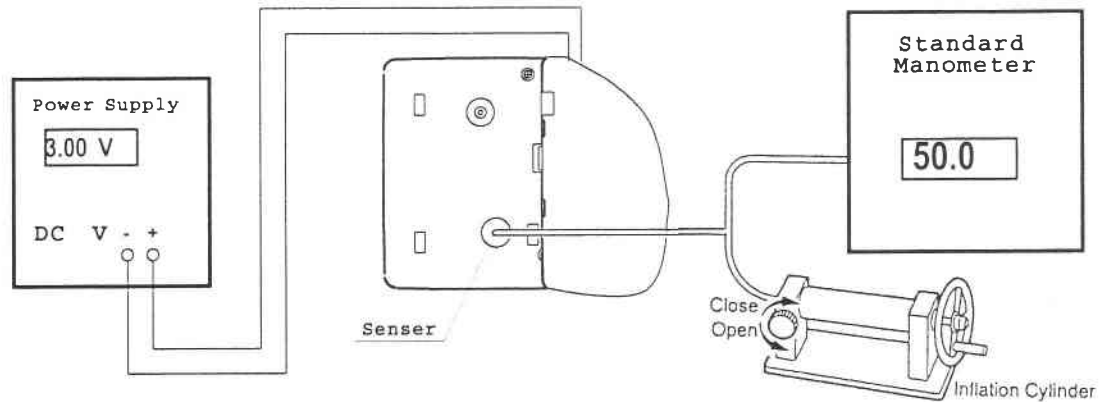
CS-100 Outline Drawing



9. PRESSURE ACCURACY TEST

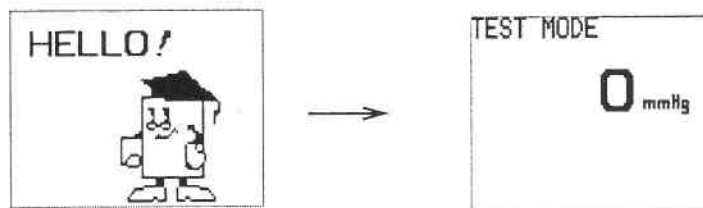
9-1.Connection with Test Device

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.

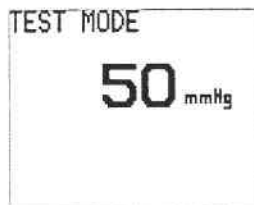


9-2.Test method

1. Open the inflation cylinder, then turn on the power supply.
2. Keep pressing the start switch of the unit till logo-indication disappear.
After 2 second , The unit display "0" and now the unit is in pressure test mode.



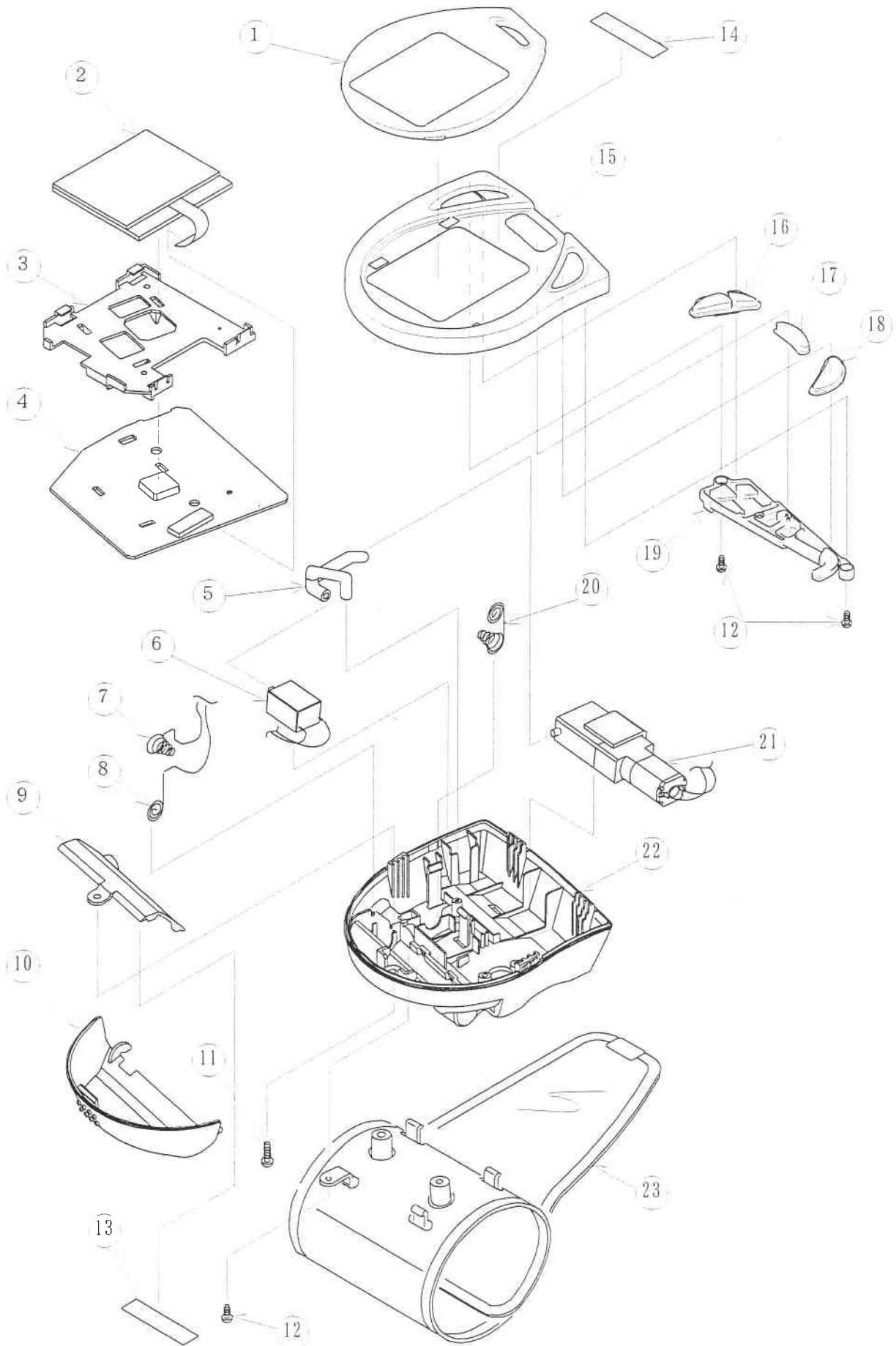
3. Close the inflation cylinder, then turn the cylinder handle to inflate air until a reading of 50 mmHg on the standard manometer is obtained.
At that time, the display of the unit should show " 50" instead of the " 0" mentioned Step 2 above. Both numbers " 50" should not deviate too much 50 ± 3 at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



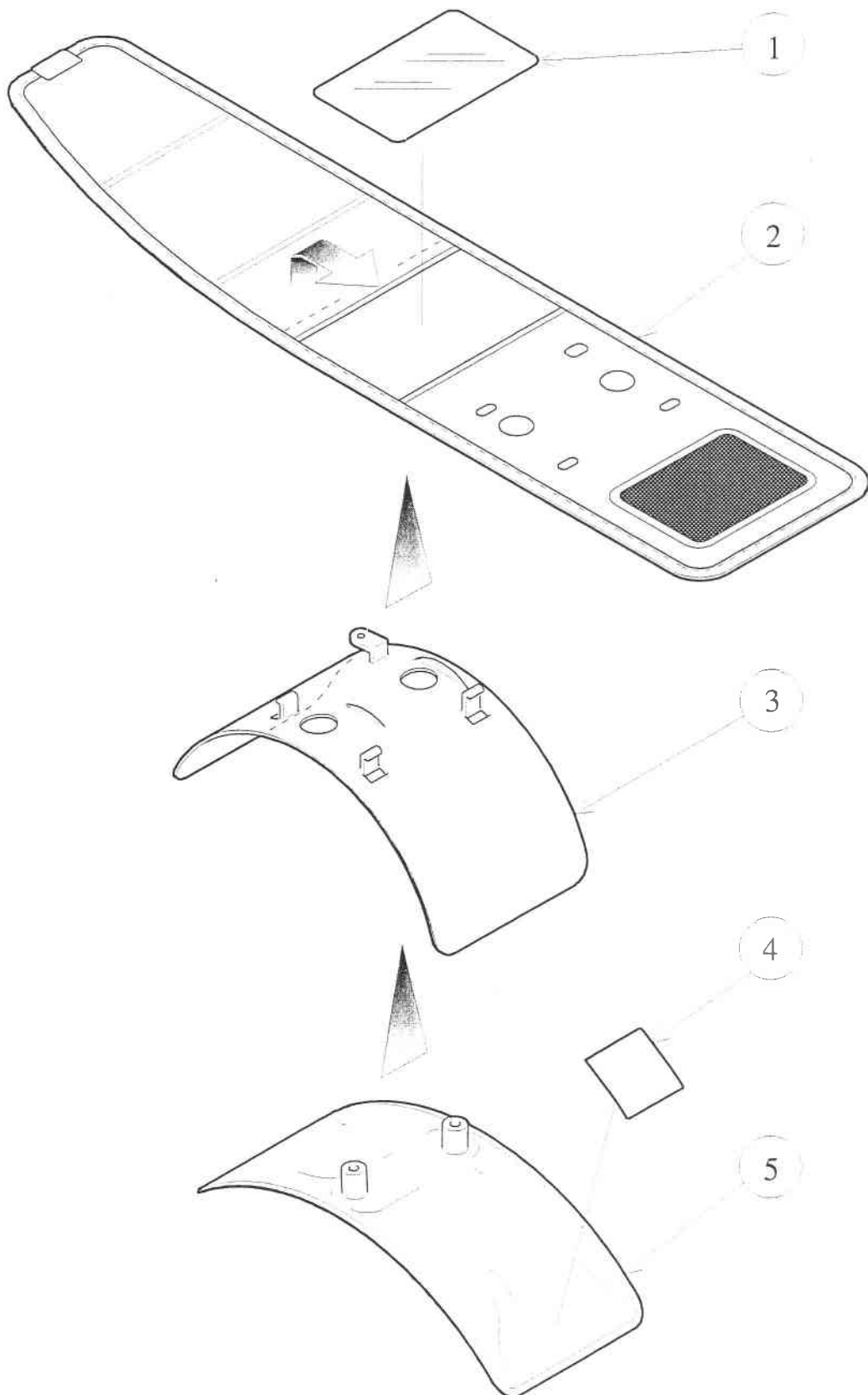
4. Do the check described in Step 3 above at 100,150,200,250, and 300 mmHg as well(± 3 mmHg).

10. EXPLODED VIEWS

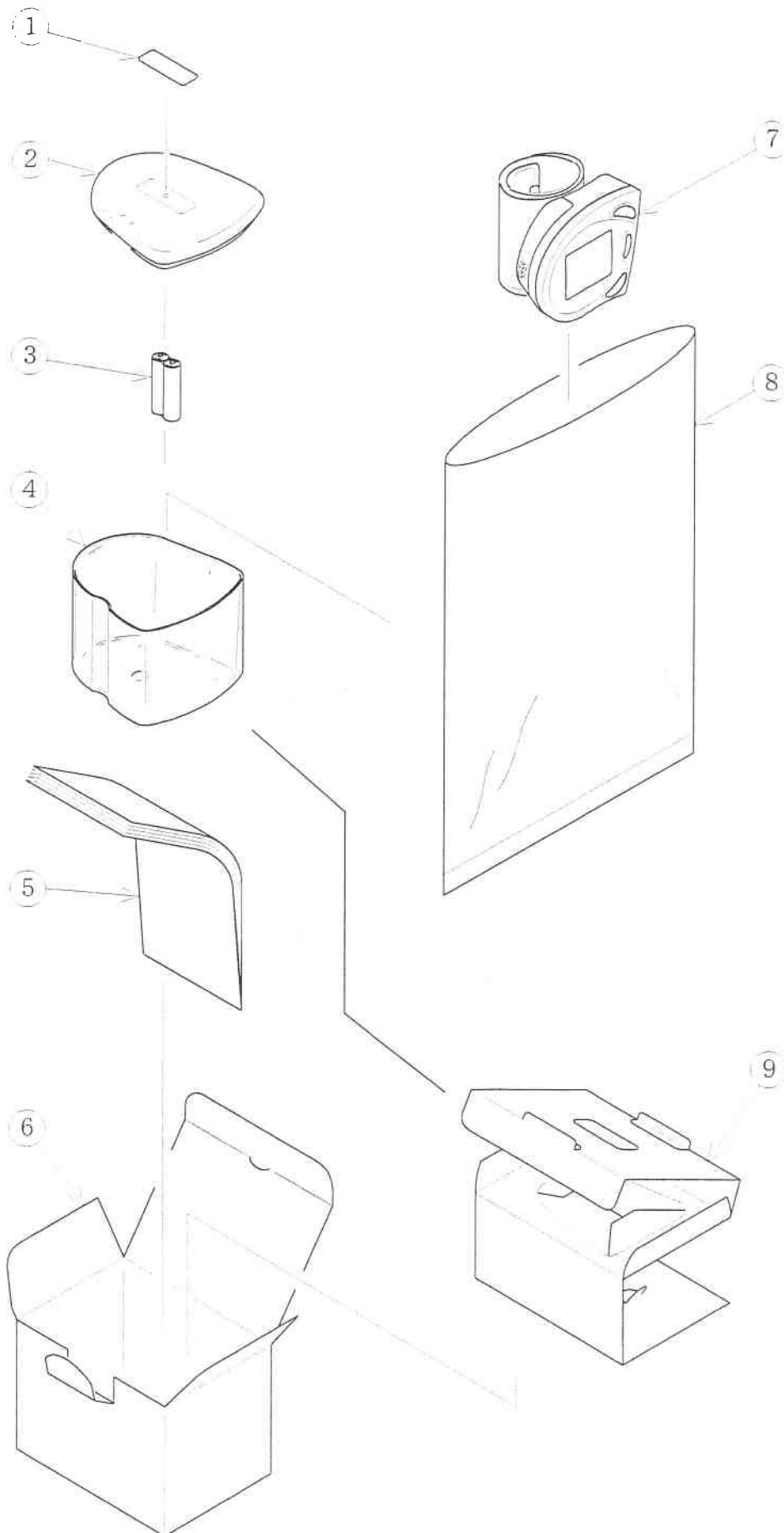
10-1.MAIN UNIT



10-2.CUFF UNIT



10-3. PACKING



11. PARTS LIST

MAIN UNIT

Ref.No.	Description	Part No.	Material technical date	Quantity /unit
1	Display Panel	A109431-1	PMMA	1
2	LCD Module	A210170-1	Glass	1
3	LCD Folder	B105829-1	ABS	1
4	PC Board	B250698-1	CEM3	1
5	Preformed Tube	A105831-1	Latex	1
6	ECV(ECV-03-01)	A104764-1	PBT	1
7	Battery Terminal -	A106441-1	Steel(Nickel Plating)	1
8	Battery Terminal +	A106440-1	Steel(Nickel Plating)	1
9	Battery inner Cover	C105819-1	ABS	1
10	Battery Cover	C105817-2	ABS	1
11	Case Holding Screw	A100034-2008	Steel(Chromate treatment)	1
12	Cuff Holding Screw	A100034-2006	Steel(Chromate treatment)	3
13	Serial No.Label	A102736-1	PVC	1
14	Adhesive Tape	A106900-1	Non woven cloth	1
15	Upper Case	A106464-2	ABS	1
16	MEMORY button Knob	A106701-1	ABS	1
17	MENU button Knob	C106404-1	ABS	1
18	POWER/START button Knob	A106700-1	PMMA	1
19	Switch inner folder	C106400-1	ABS	1
20	Battery Terminal ±	A104569-1	Steel(Nickel Plating)	1
21	Air Pump Assembly(DP-140-01)	A106340-1	ABS+Steel	1
22	Bottom Case	A106460-2	ABS	1
23	Cuff Unit	A109429-1	-----	1

CUFF UNIT

1	Cuff Label	A109501-1	PVC	1
2	Cuff	A106284-1	PVC+Nylon	1
3	Cuff Spring	B104559-1	PP	1
4	Adhesive Tape	43771PM	Non woven cloth	1
5	Bladder	A104589-1	PVC	1

PACKING

1	Carry Label	A105398-1	Paper	1
2	Carry Cap	B106261-1	ABS	1
3	Battery	A210116-1	-----	1
4	Carry Box	B106263-1	PS	1
5	Instruction English	A109427-1A	Paper	1
	Spanish	A109428-1A	Paper	1
	Deutsch	A109426-1A	Paper	1
6	Gift Box	A109426-1A	Paper	1
7	Main Unit	WS-720-12	-----	1
8	Polyethylene Bag No.10	A100663-10	PE-LD	1
9	Spacer	A106361-1	Paper	1

1 2 . T R O U B L E S H O O T I N G C H A R T

Symptom	Cause	Remedy
Cuff setting trouble	Broken cuff.	Replace the cuff.
Unit is inoperative	Batteries are too weak.	Replace batteries.
	Broken battery terminal or soldering.	Replace the bottom case assembly or resolder.
	Defective circuit.	Replace the circuit board.
No display	Defective LCD.	Replace the circuit board.
Cannot inflate (pressure display does not increase.)	Defective pump.	Replace the pump.
	Defective tube.	Replace the tube.
	Defective bladder.	Replace the bladder.
	Defective pressure sensor or circuit.	Replace the circuit board.
Exhaust is too fast	Defective ECV.	Replace the ECV.
	Bursted bladder.	Replace the bladder.
♥ does not flash	Circuit failure.	Replace the circuit board.
Systolic and diastolic, Puls rate is not measured	Circuit failure.	Replace the circuit board.
"Err" appears very often	Exhaust is too fast. (Bursted bladder.)	Replace the circuit board and ECV .
		Replace the bladder.
	Circuit failure.	Replace the circuit board.
Inaccurate reading	Circuit failure.	Replace the circuit board.