

**TM-2430**

**TM-2431**

**Ambulatory Blood Pressure Monitor**

## **MAINTENANCE MANUAL**



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# 1. Introduction

## 1-1 About this manual

This maintenance manual is to be used by qualified service personnel only. Please note that the specifications in this manual are different from those of the product when shipped.

## 1-2 List of tools used

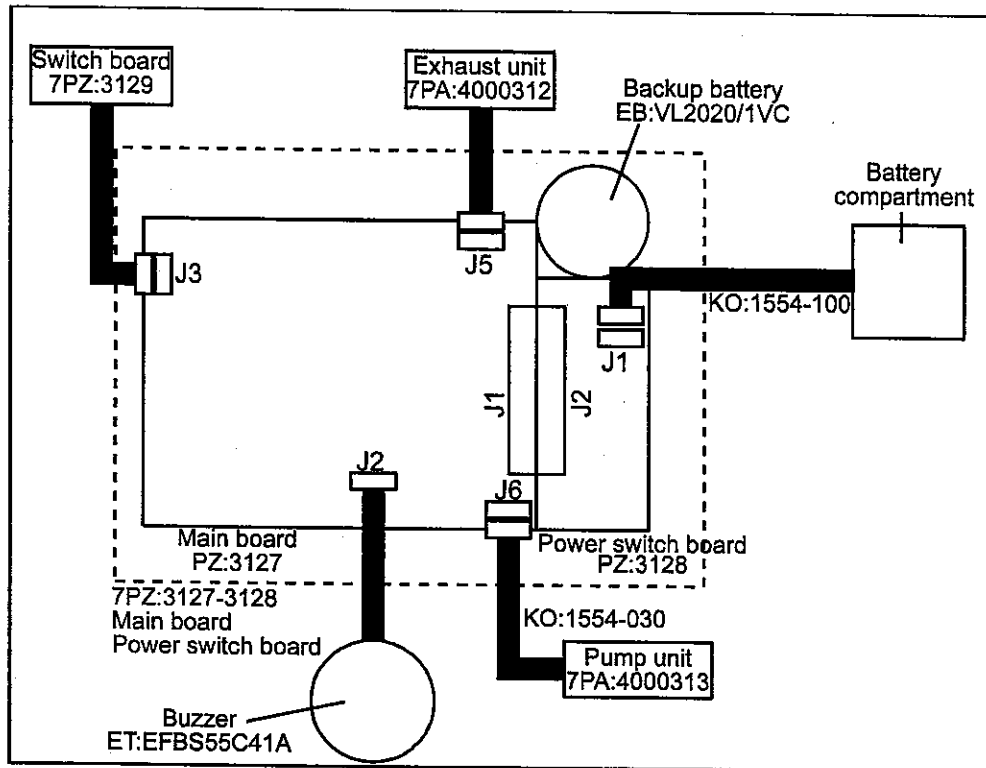
1. DC power supply: Output voltage=5 V max.  
Output current=2 A max.
2. Multimeter: DC voltage=10 V max. (Resolution=1 mV)  
DC current=100 mA max. (Resolution=1  $\mu$ A)
3. Manometer: 0 to 330 mmHg
4. Pressure generator: 0 to 330 mmHg
5. 500-cc tank
6. Air hose plug for inspection
7. Air hose
8. Forceps
9. Personal computer with the analysis software
10. TM-2481 (To be used for checking the IrDA)
11. Communication cable
12. Artificial limb with soft surface

## 1-3 TM-2430/TM-2431 units and maintenance parts

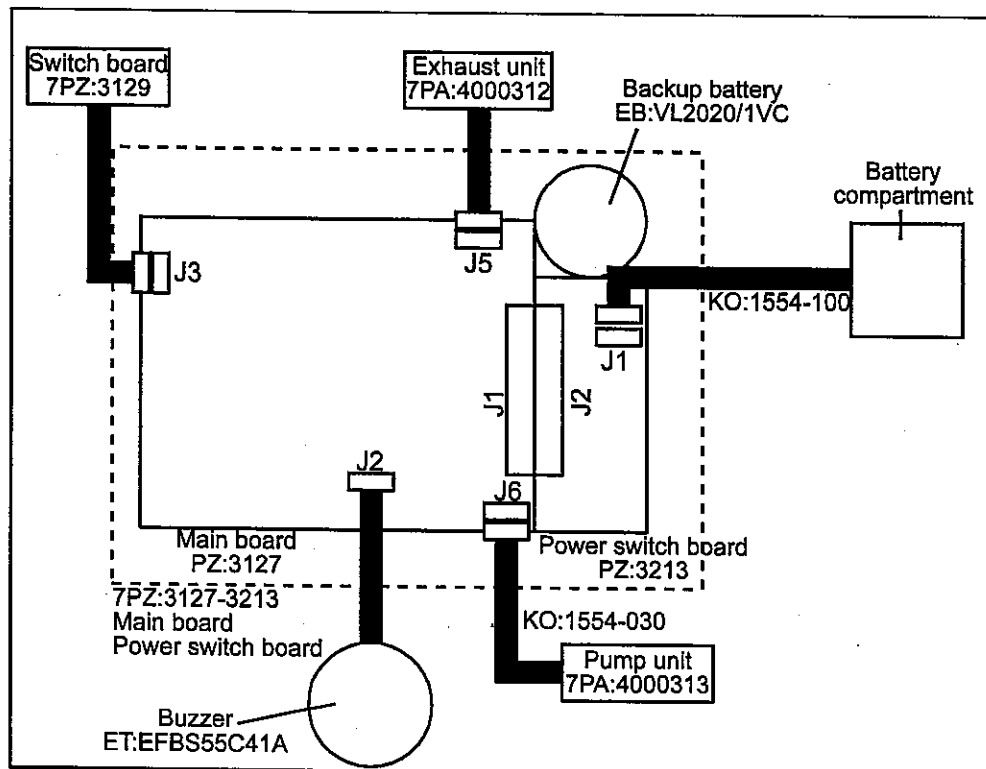
Model	Part number	Part name
TM-2430	7PZ:3127-3128	Main board-Power switch board
TM-2431	7PZ:3127-3213	Main board-Power switch board
TM-2430/TM-2431	7PZ:3129	Switch board
	7PA:4000312	Exhaust unit
	7PA:4000313	Pump unit (cable not included)
Recommended consumables for both models	EB:VL2020/1VC	VL2020/1VC (Lithium battery)
	ED:FRD-15788	LCD
	7PA:4000497	Filter

## 2. Block Diagram

### 2-1 TM-2430

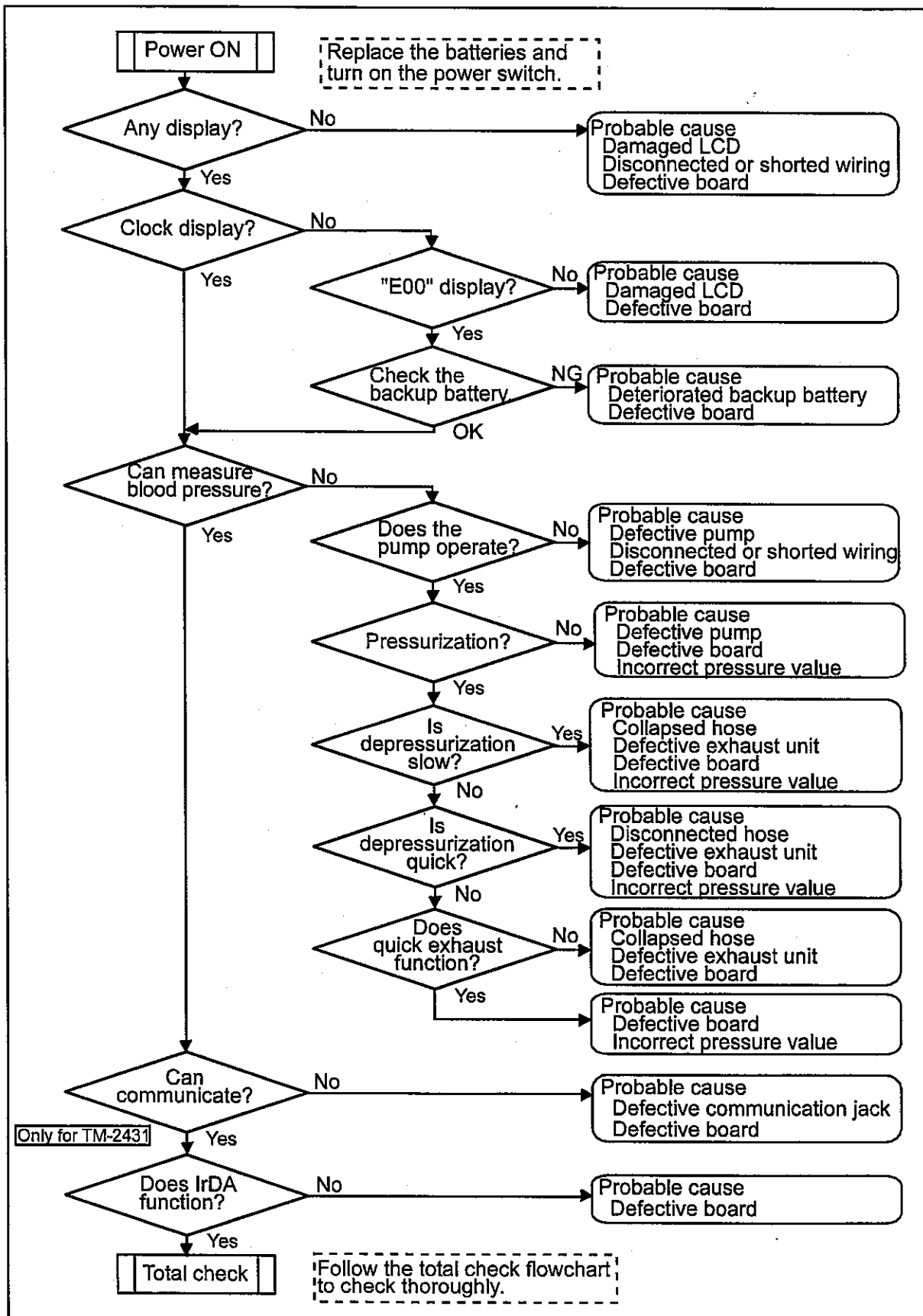


### 2-2 TM-2431



## 3. Flowchart

### 3-1 Diagnosis flowchart



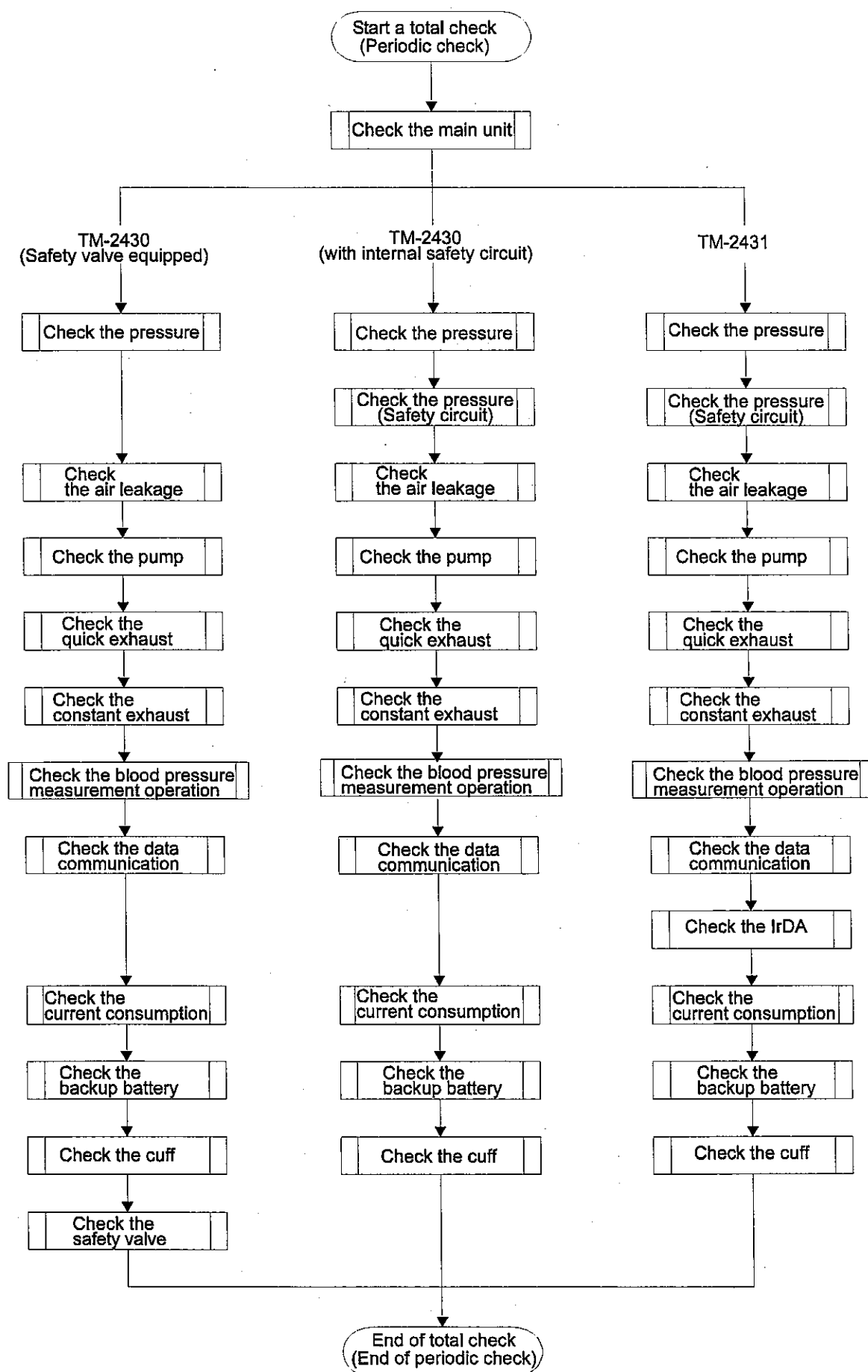
## 3-2 Items to be checked

Problem	Remedy
No display	<ul style="list-style-type: none"> <li>• Check the power connection.</li> <li>• Check the battery voltage.</li> <li>• Press the reset key.</li> <li>• Check the LCD for any damage.</li> </ul>
Incorrect display	<ul style="list-style-type: none"> <li>• Press the reset key.</li> <li>• Check the LCD for any damage.</li> <li>• Check the board voltage.</li> <li>• If "E00" appears when the clock parameters are set and the power switch is turned on: Check the backup battery.</li> </ul>
The keys do not function	<ul style="list-style-type: none"> <li>• Check the switch board wiring.</li> <li>• Check the switch contact for continuity.</li> </ul>
The batteries do not last long.	<ul style="list-style-type: none"> <li>• Check the consumption current.</li> <li>• Check the batteries for leakage.</li> </ul>
No pressurization	<ul style="list-style-type: none"> <li>• Check for collapsed or disconnected hose.</li> <li>• Check the pump wiring.</li> <li>• Check the pump.</li> <li>• Check the exhaust unit wiring.</li> <li>• Check that the case does not interfere with the exhaust unit.</li> <li>• Check for air leakage.</li> </ul>
No depressurization / slow depressurization / quick depressurization	<ul style="list-style-type: none"> <li>• Check for collapsed or disconnected hose.</li> <li>• Check the exhaust unit wiring.</li> <li>• Check that the case does not interfere with the exhaust unit.</li> <li>• Check for air leakage.</li> <li>• Check the constant exhaust.</li> </ul>
The buzzer does not sound. The buzzer does not stop sounding.	<ul style="list-style-type: none"> <li>• Check the buzzer wiring.</li> <li>• Check the buzzer for foreign matter.</li> <li>• Check that the buzzer is fastened.</li> </ul>
No communication	<ul style="list-style-type: none"> <li>• When "----" does not appear: The communication jack may be defective.</li> </ul>

### Caution on assembly

- Due to the compactness of the TM-2430/2431 ambulatory blood pressure monitor, much care is required for connecting internal tubing and wiring. Especially, use care when installing the exhaust unit. If a force greater than specified is applied on the exhaust unit, it will be broken.
- When the monitor is opened and repaired, close the case and be sure to follow "3-3 Total check flowchart" to check the monitor.

### 3-3 Total check flowchart



## 4. Test Procedure

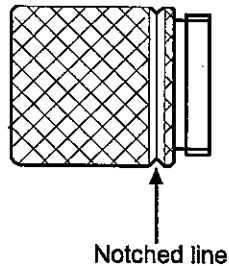
### 4-1 Checking the main unit

The items to be checked depend on the monitor model and version. First, identify the monitor to be checked.

1. Check the model number on the front name plate and rating plate.
2. For the TM-2430, two versions are available.
  - Safety valve equipped: Monitor with plug holder (05:4005350)
  - With internal safety circuit: Monitor with plug holder 2 (05:4007262)

How to identify the plug holder:

The holder with one notched line as shown below is plug holder 2 (05:4007262).



3. Perform a total check (periodic check) as listed in the table below.

	Model	Safety device	Corresponding serial number
1	TM-2430	Safety valve built in the cuff	M0600001 - M0600500
2	TM-2430	Internal safety circuit	M0600501 -
3	TM-2431	Internal safety circuit	—



## 4-2 Test modes

To check each item as described, the monitor must be in the test mode. Here, only the test modes used in this manual are explained.

### Inspection mode

1. Hold down the START STOP switch and turn on the power switch.
2. "0" is displayed blinking.
3. Release the START STOP switch. "0" will be illuminated or "E\*\*" will appear.

### Other test modes

1. Hold down the START STOP switch and turn on the power switch.
2. "0" is displayed blinking.
3. Release the START STOP switch. Press the AUTO ON/OFF switch. The monitor will enter the test mode and display "F-\*\*". After a while, the monitor will enter the test mode currently displayed.
4. While "F-\*\*" is being displayed, pressing the AUTO ON/OFF switch will display the next test mode number.

### Caution

- Be sure to exit the test mode as described below. The operation is required to prevent zero point shifting of the exhaust unit.
- There are more test modes than are explained here. Select the correct test mode number.

Test mode No.	Displayed as	Description	How to exit
<b>Inspection mode</b>	None	Used for inspection <ul style="list-style-type: none"><li>• Pressure display</li><li>• For values greater than 320 mmHg, "320" is displayed blinking.</li></ul>	Hold down the START STOP switch until the buzzer sounds. Release the switch. In ten seconds, the monitor will be reset automatically and display the clock or "E00".
<b>Test mode 13</b>	F-13	Check for air leakage.	Leave the monitor until "0" appears. Turn off the power switch.
<b>Test mode 14</b>	F-14	Check the exhaust unit. <ul style="list-style-type: none"><li>• Connect a 500-cc tank.</li></ul>	Press the START STOP switch. "0" appears. Turn off the power switch.
<b>Test mode 21</b>	F-21	Check the pump pressurizing time and quick exhaust time.	Press the START STOP switch. "0" appears. Turn off the power switch.
<b>Test mode 50</b>	F-50	Check the safety circuit pressure.	Hold down the START STOP switch until the buzzer sounds. Release the switch. In ten seconds, the monitor will be reset automatically and display the clock or "E00".

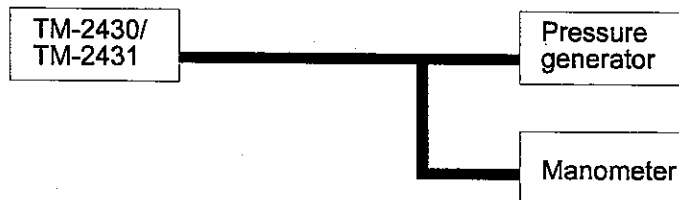
## 4-3 Checking the pressure

### Check procedure

1. Connect the pressure generator to the manometer. Adjust the pressure as shown in the table below.

Pressure generator	Manometer reading
50 mmHg	50±0.3 mmHg
100 mmHg	100±0.3 mmHg
150 mmHg	150±0.3 mmHg
200 mmHg	200±0.3 mmHg
250 mmHg	250±0.3 mmHg
300 mmHg	300±0.3 mmHg

2. Connect the pressure generator and manometer to the TM-2430 or TM-2431 using an air hose plug.



3. Enter the inspection mode.
4. When "0" appears, apply the pressure shown in the table below. Verify that the TM-2430 or TM-2431 displays the value shown in the table.

Pressure generator	TM-2430 or TM-2431 display
50 mmHg	50±3 mmHg
100 mmHg	100±3 mmHg
150 mmHg	150±3 mmHg
200 mmHg	200±3 mmHg
250 mmHg	250±3 mmHg
300 mmHg	300±3 mmHg

5. Release the pressure and exit the inspection mode as described in section 4-2.

### Repair procedure

1. Refer to "5-1 Adjusting the pressure" to adjust the pressure.
2. If the pressure is not within specifications even after the adjustment, adjust the board as described in section 5-3. Then, adjust the pressure again.
3. If the pressure is still not within specifications, replace the board.

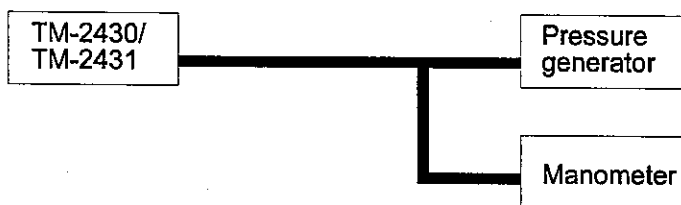
## 4-4 Checking the safety circuit pressure

### Check procedure

1. Connect the pressure generator to the manometer. Adjust the pressure as shown in the table below.

Pressure generator	Manometer reading
314 mmHg	314±0.3 mmHg

2. Connect the pressure generator and manometer to the TM-2430 or TM-2431 using an air hose plug.



3. Enter test mode 50.
4. When "0" appears, apply the pressure shown in the table below. Verify that the TM-2430 or TM-2431 displays the value shown in the table.

Pressure generator	TM-2430 or TM-2431 display
314 mmHg	314±4 mmHg

5. Release the pressure and exit test mode 50 as described in section 4-2.

### Repair procedure

1. Refer to "5-2 Adjusting the safety circuit pressure" to adjust the pressure.
2. If the pressure is not within specifications even after the adjustment, adjust the board as described in section 5-3. Then, adjust the pressure again.
3. If the pressure is still not within specifications, replace the board.

## 4-5 Checking the air leakage

---

### Check procedure

1. Connect the 500-cc tank to the TM-2430 or TM-2431 using an air hose plug.



2. Enter test mode 13.
3. When "0" is displayed, press the START STOP switch to start a test.
4. The pump pressurizes up to 300 mmHg and stops.
5. The pressure drops between 10 and 40 seconds after the pump stops. The monitor measures and displays the value (the value with the down arrow). Verify that the value is within the specifications.  
Specification: 30 or less (30 mmHg/30 sec)
6. "0" appears after a while. Another test can be performed if necessary.
7. Exit test mode 13 as described in section 4-2.

### Repair procedure

1. Refer to the exploded view. Verify that the hose is correctly connected and not collapsed.
2. If the connection is correct, use the forceps to identify leaking parts. Replace any parts that are leaking.

## 4-6 Checking the pump and quick exhaust

---

### Check procedure

1. Connect the 500-cc tank to the TM-2430 or TM-2431 using an air hose plug.



2. Enter test mode 21.
3. When "0" is displayed, press the START STOP switch to start a test.
4. The pump pressurizes, then executes quick exhaust while the monitor displays the corresponding values in turn. Verify that the values are within the specifications.

Specification:

• Up arrow (Pressurizing time)	200 or less	(20.0 sec)
• Down arrow (Quick exhaust time)	120 or less	(12.0 sec)

5. Press the START STOP switch. "0" appears. Another test can be performed if necessary.
6. Exit test mode 21 as described in section 4-2.

### Repair procedure

#### Pressurization time

1. Refer to the exploded view. Verify that the hose is correctly connected and not collapsed.
2. If the connection is correct, the pump may be defective. Replace it with a new pump.
3. If the specified pressurization time can not be obtained even after the pump replacement, replace the board.

#### Quick exhaust time.

1. Refer to the exploded view. Verify that the hose is correctly connected and not collapsed.
2. If the connection is correct, the exhaust unit may be defective. Replace it with a new unit.
3. If the specified quick exhaust time can not be obtained even after the unit replacement, replace the board.

## 4-7 Checking the constant exhaust

---

### Check procedure

1. Connect the 500-cc tank to the TM-2430 or TM-2431 using an air hose plug.



2. Enter test mode 14.
3. When "0" is displayed, press the START STOP switch to start a test.
4. The pump pressurizes, exhausts the air first at a constant speed, then quickly while the monitor displays the corresponding values in turn. Verify that the value with the UP arrow is within the specifications.

Specification:  $325 \pm 200$  (32.5  $\pm$  20.0 V)

Verify that the value with the middle arrow is not zero.

5. Press the START STOP switch. "0" appears. Another test can be performed if necessary.
6. Exit test mode 14 as described in section 4-2.

### Repair procedure

1. Refer to the exploded view. Verify that the hose is correctly connected and not collapsed.
2. If the connection is correct, refer to section 5-4 to adjust the exhaust unit. If the unit can not be adjusted, replace it with a new unit.
3. If the specified constant exhaust can not be obtained even after the unit replacement, replace the board.

## 4-8 Checking the blood pressure measurement operation

---

### Check procedure

1. Apply the monitor to a human arm and measure the blood pressure several times in the usual way.
2. When the measurement result is displayed without an error, the monitor's blood pressure measurement function is good.

### Repair procedure

1. Refer to the exploded view. Verify that the hose is correctly connected and not collapsed.
2. If the connection is correct, the board may be defective. Replace it with a new board.

## 4-9 Checking the data communication

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### Check procedure

1. Connect a personal computer or TM-2481 to the TM-2430 or TM-2431 using a communication cable.
2. Set the clock. Confirm that the TM-2430 or TM-2431 displays the correct time.

### Repair procedure

1. If the TM-2430 or TM-2431 does not display the correct time, the board may be defective. Replace it with a new board.

## 4-10 Checking the IrDA

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### Check procedure

1. Connect the TM-2481 to the TM-2431 for the IrDA.
2. Set the clock. Confirm that the TM-2431 displays the correct time.

### Repair procedure

1. If the TM-2431 does not display the correct time, the board may be defective. Replace it with a new board.

## 4-11 Checking the current consumption

---

### Check procedure

1. Remove the batteries from the TM-2430 or TM-2431.
2. Set the DC power supply voltage to  $4.0 \pm 0.1$  V.
3. Connect the DC power supply and multimeter to the TM-2430 or TM-2431.



4. Verify that the current value is within the specifications.

Specification: At clock display 6 mA or less

In inspection mode 50 mA or less

### Repair procedure

1. Replace the board.

## 4-12 Checking the backup battery

Confirm that an 8-hour charged battery can have backup power of at least one hour.

### Check procedure

1. Place the batteries in the TM-2430 or TM-2431 battery compartment.
2. Set the correct time.
3. With the clock displayed, leave the TM-2430 or TM-2431 for eight hours as is.
4. Turn off the power switch. Leave the TM-2430 or TM-2431 for one hour as is.
5. Turn on the power switch. Verify that the correct time is displayed.

### Repair procedure

1. If "E00" appears, the backup battery is deteriorated. Replace it with a new battery.
2. If the time displayed is not correct, replace the board.

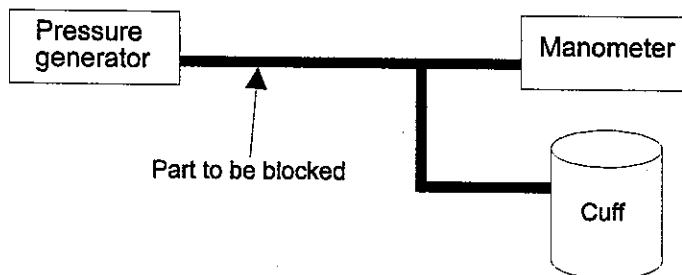
## 4-13 Checking the cuff and safety valve

### Check procedure

1. Connect the pressure generator to the manometer. Adjust the pressure as shown in the table below.

Pressure generator	Manometer reading
120 mmHg	$120 \pm 0.3$ mmHg

2. Connect the pressure generator and manometer to the cuff using an air hose plug.



3. Attach the cuff to the artificial limb. Attach it with much care. The blood pressure reading varies with the attaching method.
4. Apply the specified pressure to the cuff using the pressure generator.
5. When the pressure value is stabilized, block the part indicated in the figure above with a pair of forceps.
6. Read the pressure after 30 seconds. Verify that the value is within the specifications.

Specification: 60-105 mmHg



## **Repair procedure**

1. For the cuff with a safety valve, check the valve. If it is open, refer to section 5-5 to reset the valve.
2. Check the hose and bladder for disconnection or holes. Replace the defective parts.
3. If nothing wrong is found in step 2, replace the leak valve.

## 5. Repairing

### Caution on assembly

- Due to the compactness of The TM-2430/2431 ambulatory blood pressure monitor, much care is required while connecting internal tubing and wiring. Especially, use care when installing the exhaust unit. If a force greater than specified is applied to the exhaust unit, it will be broken.
- When the monitor is opened and repaired, close the case and be sure to follow "3-2 Total check flowchart" to check the monitor.

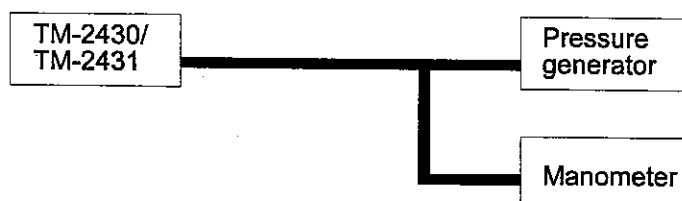
### 5-1 Adjusting the pressure

In this procedure, the pressure is adjusted without opening the case.

1. Remove the rating plate.
2. Connect the pressure generator to the manometer. Adjust the pressure as shown in the table below.

Pressure generator	Manometer reading
280 mmHg	$280 \pm 0.3$ mmHg

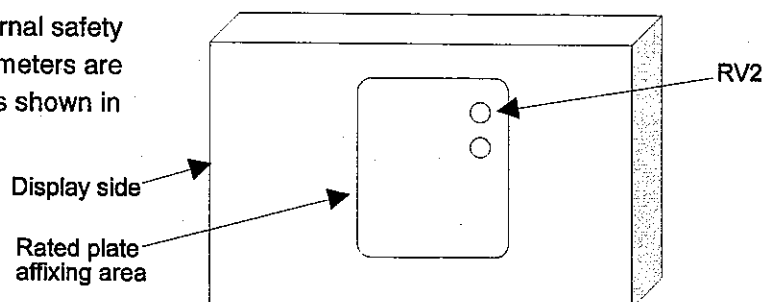
3. Connect the pressure generator and manometer to the TM-2430 or TM-2431 using an air hose plug.



4. Enter the inspection mode.
5. Set the pressure generator to 280 mmHg.
6. Adjust the main board trimmer potentiometer (RV2) so that the pressure displayed on the TM-2430 or TM-2431 will be within the specifications.

Specification:  $280 \pm 2$  mmHg

**Note:** For the monitor with the internal safety circuit, two trimmer potentiometers are available. Locate the RV2 as shown in the figure at the right.



7. Release the pressure and exit the inspection mode as described in section 4-2. Be sure to perform this exiting operation.
8. Check the pressure again as described in section 4-3.

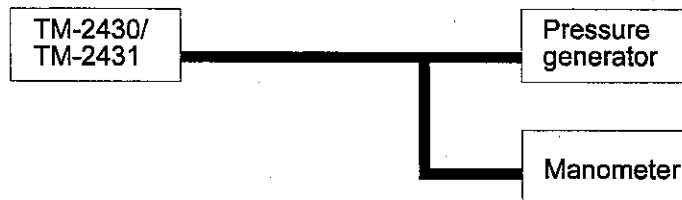
## 5-2 Adjusting the safety circuit pressure

In this procedure, the pressure is adjusted without opening the case.

1. Remove the rating plate.
2. Connect the pressure generator to the manometer. Adjust the pressure as shown in the table below.

Pressure generator	Manometer reading
280 mmHg	$280 \pm 0.3$ mmHg

3. Connect the pressure generator and manometer to the TM-2430 or TM-2431 using an air hose plug.

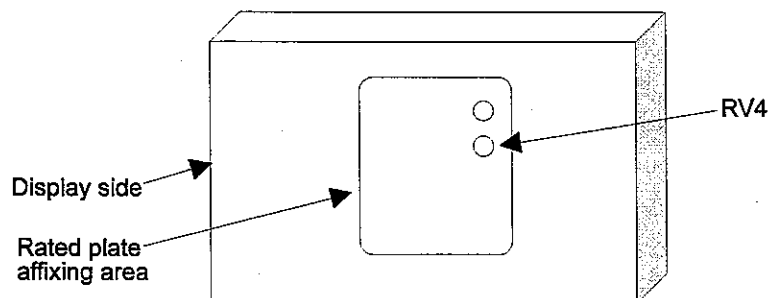


4. Enter test mode 50.
5. Set the pressure generator to 280 mmHg.
6. Adjust the main board trimmer potentiometer (RV4) so that the pressure displayed on the TM-2430 or TM-2431 will be within the specifications.

Specification:  $280 \pm 4$  mmHg

**Note:** For the monitor with an internal safety circuit, two trimmer potentiometers are available.

Locate the RV4 as shown in the figure below.



7. Release the pressure and exit test mode 50 as described in section 4-2. Be sure to perform this exiting operation.
8. Check the pressure again as described in section 4-4.

## 5-3 Adjusting the board

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In this procedure, the board's voltages will be checked.

Note that older version boards may not have the corresponding testing points.

1. Set the DC power supply voltage to  $4.0 \pm 0.1$  V.
2. Connect the DC power supply to the battery compartment .
3. Enter the inspection mode.
4. Check the voltage at each test point as shown in the table below.

Test point	Reference point	Specification
TP01	TP00	$4.000 \pm 0.100$ V
TP02	TP00	$2.000 \pm 0.100$ V
TP03	TP00	$5.000 \pm 0.100$ V
TP04	TP00	$5.100 - 4.700$ V
TP05	TP00	$3.600 \pm 0.100$ V
TP06	TP00	$3.600 \pm 0.100$ V
TP07	TP00	$3.600 \pm 0.100$ V
TP08	TP00	$0.500 \pm 0.100$ V
TP09	TP00	$1.000 \pm 0.100$ V
TP10	TP00	$3.600 \pm 0.100$ V
TP11	TP00	$0.500 \pm 0.100$ V
TP12	TP00	$(TP08 - TP00) \pm 2$ mV <sup>*1</sup>
TP13	TP00	$0.500 \pm 0.100$ V
TP14	TP00	$1.000 \pm 0.100$ V
TP16	TP00	$(TP08 - TP00) \pm 2$ mV <sup>*3</sup>
TP17	TP00	$0.500 \pm 0.100$ V

\*1:Adjust the RV01 so that the value will be within the specifications.

\*3:Adjust the RV03 so that the value will be within the specifications.

5. Exit the inspection mode as described in section 4-2.

## 5-4 Adjusting the exhaust unit

Here, the exhaust unit, ECEV, is adjusted.

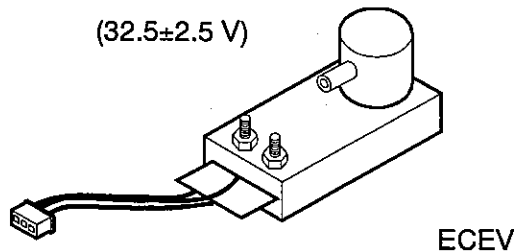
1. Leave the hose and wiring as it is. Open the case.
2. Enter test mode 14.
3. Connect the 500-cc tank to the TM-2430 or TM-2431 using an air hose plug.



4. Press the START STOP switch to start a test.
5. The pump pressurizes, exhausts the air first at a constant speed, then quickly while the monitor displays the corresponding values in turn. Verify that the value with the up arrow is within the specifications.

Specification:  $325 \pm 25$

( $32.5 \pm 2.5$  V)



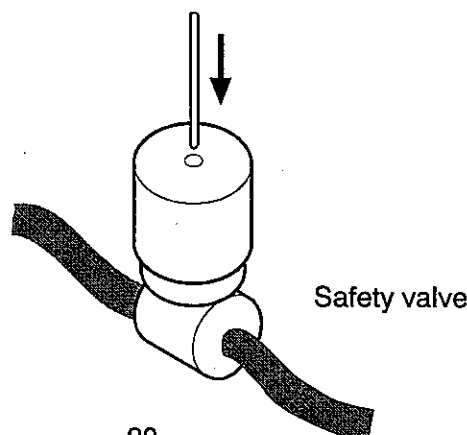
6. Verify that the values with the middle and down arrow are within the specifications. If the values are not within the specifications, replace the exhaust unit.

Arrow	Specification
Middle	1000 -1200
Down	0 - 250

7. Press the START STOP switch.
8. Exit test mode 14 as described in section 4-2.

## 5-5 Resetting the safety valve

As shown in the figure below, insert a round pin gently into the safety valve hole to reset the rubber inside. Do not insert the pin forcibly.



## 6. Error Codes

The table below lists error codes and corresponding causes.

Error code	Description	Probable cause/Checking item
<b>Information</b>		
E00	No clock parameter	<ul style="list-style-type: none"> <li>If this error appears even after setting the clock, the backup battery may have deteriorated. <b>See "4-12 Checking the backup battery".</b></li> </ul>
<b>During measurement</b>		
E03	Zero point pressure error	<ul style="list-style-type: none"> <li>The board may be defective. <b>See "5-3 Adjusting the board".</b></li> </ul>
E04	Low battery	<ul style="list-style-type: none"> <li>If this error appears with new batteries, the board may be defective. <b>See "5-3 Adjusting the board".</b></li> </ul>
E05	Inflation error	<ul style="list-style-type: none"> <li>There may be air leakage. <b>See "4-5 Checking the air leakage".</b></li> <li>The pump may be defective. <b>See "4-6 Checking the pump / quick exhaust".</b></li> </ul>
E06	The pressure value has exceeded 320 mmHg.	<ul style="list-style-type: none"> <li>The pressure value displayed is incorrect <b>See "4-3 Checking the pressure".</b></li> </ul>
E07, E08, E10, E20, E21, E22, E23, E30, E31, E32		<ul style="list-style-type: none"> <li>Disconnected or collapsed hose. <b>See "10 Exploded View".</b></li> <li>There may be air leakage. <b>See "4-5 Checking the air leakage".</b></li> <li>The pump may be defective. <b>See "4-6 Checking the pump / quick exhaust".</b></li> </ul>
E90	Zero point pressure error in the safety circuit	<ul style="list-style-type: none"> <li>The board may be defective. <b>See "5-3 Checking the board".</b></li> </ul>
E91	The safety circuit has detected the maximum pressure.	<ul style="list-style-type: none"> <li>The pressure value displayed is incorrect. <b>See "4-4 Checking the safety circuit pressure".</b></li> </ul>
<b>Mechanical parts</b>		
E50 E52	Zero point error in the pulse detecting area Memory error	<ul style="list-style-type: none"> <li>The board may be defective. <b>See "5-3 Checking the board".</b></li> </ul>
E53	Battery contact error	<ul style="list-style-type: none"> <li>The electrodes may be defective. <b>See "10 Exploded View".</b></li> </ul>
E55, E56, E57	Exhaust error	<ul style="list-style-type: none"> <li>There may be air leakage. <b>See "4-5 Checking the air leakage".</b></li> <li>The exhaust unit may be defective. <b>See "4-7 Checking the constant exhaust".</b></li> </ul>
<b>Communications</b>		
E7X	Communication error	<ul style="list-style-type: none"> <li>The board may be defective. <b>See "5-3 Adjusting the board".</b></li> </ul>
E47	Voltage drop during communication	<ul style="list-style-type: none"> <li>If this error appears with new batteries, the board may be defective. <b>See "5-3 Checking the board".</b></li> </ul>

## 7. Parts List

### 7-1 TM-2430

No.	Part No.	Part Name	Q'ty
1		M2x6 binding head machine screw	2
2	07:4005442	IrDA blind cover	1
3	15:4005550	Electrode B	1
4	15:4005156	Electrode (-)	1
5	07:3001923	Lower case	1
6	06:4005153	Shock absorber A	2
7	7PA:4000313	Pump for upper arm	1
8	06:4005154	Shock absorber B	1
9		M2x4W sems	1
10	07:4004845	Optical connector blind cover	1
11	KO:1554-030	Cable	1
12	07:3001922B	Upper case	1
13	06:4004794	Jack cover	1
14	ET:EFBS55C41A	Buzzer	1
15	7PZ:3127-3128	Main board + Power switch board	1
16	08:4005441	Rating plate	1
17	15:4005157	Electrode (+)	1
18	15:4005549	Electrode A	1
19	07:4004796	Battery cover	1
20	7PZ:3129	Switch board	1
21		M2x4B precision tightening pan head screw	1
22	06:4006754	Sensor F-joint	1
23	7PA:4000312	ECEV	1
24	06:4005193	T-joint	1
25	7PA:4000497	Filter	1
26	06:4004810	Air socket	1
27	06:4004795	Key top rubber	1
28	08:4005245	Buzzer affixing adhesive	1
29	08:4004812	Front name plate	1
30	06:T101-15	Silicon tube	1
31	06:T101-20	Silicon tube	1
32	06:T101-040	Silicon tube	1
33	06:T101-090	Silicon tube	1
34	KO:1554-100	Cable	1
35	JI:2P-S125T3-E	Connector	1

## 7-2 TM-2431

No.	Part No.	Part Name	Q'ty
1		M2x6 binding head machine screw	2
2	07:4004844	IrDA cover	1
3	15:4005550	Electrode B	1
4	15:4005156	Electrode (-)	1
5	07:3001923	Lower case	1
6	06:4005153	Shock absorber A	2
7	7PA:4000313	Pump for upper arm	1
8	06:4005154	Shock absorber B	1
9		M2x4W sems	1
10	07:4004845	Optical connector blind cover	1
11	KO:1554-030	Cable	1
12	07:3001922B	Upper case	1
13	06:4004794	Jack cover	1
14	ET:EFBS55C41A	Buzzer	1
15	7PZ:3127-3213	Main board + Power switch board	1
16	08:4006122	Rating plate	1
17	15:4005157	Electrode (+)	1
18	15:4005549	Electrode A	1
19	07:4004796	Battery cover	1
20	7PZ:3129	Switch board	1
21		M2x4B precision tightening pan head screw	1
22	06:4006754	Sensor F-joint	1
23	7PA:4000312	ECEV assembly	1
24	06:4005193	T-joint	1
25	7PA:4000497	Filter	1
26	06:4004810	Air socket	1
27	06:4004795	Key top rubber	1
28	08:4005245	Buzzer affixing adhesive	1
29	08:4006121	Front name plate	1
30	06:T101-15	Silicon tube	1
31	06:T101-20	Silicon tube	1
32	06:T101-040	Silicon tube	1
33	06:T101-090	Silicon tube	1
34	KO:1554-100	Cable	1
35	JI:2P-S125T3-E	Connector	1



### 7-3 TM-2430-06

No.	Part No.	Part Name	Q'ty
1	05:4005306	Air hose plug	1
2	05:4005305	Plug holder	1
3		E ring (nominal diameter 3)	1
4		Tubing ( $\Phi 6 \times \Phi 2$ )	1
5	06:4004932	Tubing ( $\Phi 6 \times \Phi 2$ )	1
6	05:U44162A	Cuff tubing joint	1
7	06:B49400	Adult bladder boso	1
8	13:3001968	Fan-shaped adult cuff cloth	1
9	PA:4000360	Safety valve assembly for cuff	1
10	PA:4000427	Leak valve assembly for cuff	1

### 7-4 TM-2430-06A

No.	Part No.	Part Name	Q'ty
1	05:4005306	Air hose plug	1
2	05:4007262	Plug folder 2	1
3		E ring (nominal diameter 3)	1
4	06:4004932	Tubing ( $\Phi 6 \times \Phi 2$ )	1
5	05:U44162A	Cuff tubing joint	1
6	PA:4000427	Leak valve assembly for cuff	1
7	13:3001968	Fan-shaped adult cuff cloth	1
8	06:B49400	Adult bladder boso	1
9	16:4007612	"A"-labeled tubing	1

### 7-5 7PZ:3127-3128 (TM-2430)

Circuit Symbol	Part No.	Part Name	Q'ty
	PZ:3127	Main board	1
PZ:3127 U1	UC:TM2430-P004	CPU	1
	PZ:3128	Power switch board	1
PZ:3127 J6	ET:MZ-2-1-12P	Connector	1
	04:4005244	Board support	2

### 7-6 7PZ:3127-3213 (TM-2431)

Circuit Symbol	Part No.	Part Name	Q'ty
	PZ:3127	Main board	1
PZ:3127 U1	UC:TM2430-P004	CPU	1
	PZ:3213	Power switch board	1
PZ:3127 J6	ET:MZ-2-1-12P	Connector	1
	04:4005244	Board support	2

## 7-7 PZ:3127

Circuit Symbol	Part No.	Part Name	Q'ty
U1		CPU	0
U2	UC:LVX573FS	8-bit latch	1
U3	UN:M5M5256DRV	RAM	1
U4	UC:7S04FU	Inverter	1
U5	UC:7225GB	LCD driver	1
U6	UC:4721GS	RS232C driver	1
U7	UF:LTC1288CS8	A/D converter	1
U8, 9, 18	UA:OP491GS-REEL	OP-Amp	3
U10	UR:RH5RH651A-C	DC/DC 6.5V	1
U11, 12	UR:RH5RL50AA-C	Regulator 5.0V	2
U13, 16	UR:RH5RL36AA-C	Regulator 3.6V	2
U14	UA:RN5VL21AA-C	Detector 2.1V	1
U15	UC:7S14FU	SCHMITT inverter	1
U17	UC:7W241FU	3-state output	1
	PC:3127D	Print board	1
R1, 2, 3, 20, 23, 24, 49, 54	RC:1/16W104F	Chip resistor 1/16W 100K	8
R4, 40, 47	RC:1/16W563F	Chip resistor 1/16W 56K	3
R5, 28, 32	RC:1/16W184F	Chip resistor 1/16W 180K	3
R6, 16	RC:1/16W100F	Chip resistor 1/16W 10R	2
R7, 8, 9, 10, 12, 15, 22, 34, 35, 53, 66	RC:1/16W224F	Chip resistor 1/16W 220K	11
R11	RC:1/16W514F	Chip resistor 1/16W 510K	1
R13	RC:1/16W222F	Chip resistor 1/16W 2.2K	1
R14, 51, 60	RC:1/16W103F	Chip resistor 1/16W 10K	3
R17, 58	RC:1/16W511F	Chip resistor 1/16W 510R	2
R18	RC:1/16W391F	Chip resistor 1/16W 390R	1
R19, 25, 29	RC:1/16W512F	Chip resistor 1/16W 5.1K	3
R21	RC:1/16W472F	Chip resistor 1/16W 4.7K	1
R26, 30, 39	RC:1/16W681F	Chip resistor 1/16W 680R	3
R27, 31	RC:1/8W106F	Chip resistor 1/8W 10M	2
R33, 65	RC:1/16W102F	Chip resistor 1/16W 1K	2
R38, 55, 56, 59, 67	RC:1/16W101F	Chip resistor 1/16W 100R	5
R41	RC:1/16W622F	Chip resistor 1/16W 6.2R	1
R42, 45, 48	RC:1/16W220F	Chip resistor 1/16W 22K	3
R43	RC:1/16W473F	Chip resistor 1/16W 47K	1
R44	RC:1/16W123F	Chip resistor 1/16W 12K	1
R46	RC:1/16W223F	Chip resistor 1/16W 22K	1
R50, 52	RC:1/16W364F	Chip resistor 1/16W 360K	2
R63, 64	RC:1/16W0	Chip resistor 1/16W 0R	2
RN1, 2	RN:EXBV8V223GV	Chip resistor assembly (4 pcs) 22K	2
RN3, 4	RN:EXB28V224JX	Chip resistor assembly (4 pcs) 220K	2
RV1, 3	RV:EVM3W221	Trigger potentiometer 220R	2
RV2	RV:EVM1DSW202	Trigger potentiometer 2K	1
RV4	RV:EVM3W202	Trigger potentiometer 2K	1

Continued

Continued

C1, 2, 3, 9, 10, 11, 12, 13, 14, 22, 24, 25, 26, 27, 28, 32, 33, 34	CC:ECUV1H103MBV	Ceramic capacitor 0.01u	18
C4, 5, 6, 15, 29, 30, 31, 23	CC:ECUV1C104ZFV	Ceramic capacitor 0.1u	8
C7, 8	CC:ECUV1H220KCV	Ceramic capacitor 220P	2
C16, 18, 20	CC:ECUV1H101KCV	Ceramic capacitor 100P	3
C17, 19	CC:GHM1535B104K	Ceramic capacitor (250V) 0.1u	2
C51, 52, 53, 54, 55	CT:ECST1DX335R	Tantalum capacitor 20V/3.3u	5
C56, 63, 64, 65	CT:1A4R7-C	Tantalum capacitor 10V/4.7u	4
C57	CT:ECST0JX226R	Tantalum capacitor 6.3V/22u	1
C58	CT:ECSTIDV336R	Tantalum capacitor 20V/33u	1
C59, 60, 61, 62	CT:ECST1AV476R	Tantalum capacitor 10V/47u	4
C71	CM:HU1C473J-C	Film capacitor 0.047u	1
C72, 73, 74	CM:HU1C104J-C	Film capacitor 0.1u	3
Q1, 2, 4, 10	QT:C2712Y-C	Transistor C2712	4
Q3, 5	QT:C3075LB	Transistor C3075	2
Q6, 11	QF:K1960-C	FET K1960	2
Q8, 9	QT:RN4604	Transistor RN4604	2
D1	DI:1SS306	Diode 1SS306	1
D2, 3, 4, 5	DZ:02CZ47-C	Zener diode 02CZ47	4
D6	DI:1SS349-C	Diode 1SS349	1
D7	DI:MA704WA-C	Diode MA704WA	1
D8, 9, 10, 12	DI:MA721WA-C	Diode MA721WA	4
D13, 14, 15	DZ:RD3.6MB2-C	Zener diode	3
X1	XT:EF0S5004E5	Ceramic oscillator	1
X2	XT:306-32.768K	Crystal oscillator	1
S1	ET:P-2000-501G	Pressure sensor	1
S2	ET:ADP4904	Pressure sensor	1
E1	ED:FRD-15788	LCD	1
L1, 2	LL:LHL08TB822J	Coil 8200uH	2
L3	LL:NLC5650T-101	Coil 100uH	1
NF1, 2	NF:MCZ2525RD301	Noise filter	2
SW1	SP:EVQPLMA15	EVQPLMA15	1
J3, 5	J1:3P-S125T3-E	Connector	2
J4	JJ:HSJ1456-01	Connector	1
TP:00, 12, 16	TM:RCT00000C	Check pin	3

## 7-8 PZ:3128

Circuit Symbol	Part No.	Part Name	Q'ty
SW1	SS:TS01-A-G-E	Switch	1
J1	J1:2P-S125L3-E	Connector	1
E1	EB:VL2020/1VC	Battery	1
R1, 2,	RC:1/10W224J	Chip resistor 1/16W 220K	2
	PC:3128B	Print board	1

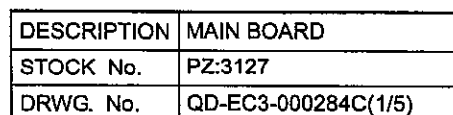
## 7-9 7PZ:3129

Circuit Symbol	Part No.	Part Name	Q'ty
SW1, 2	SP:EVQPJC05T	Switch	2
KO	KO:1555-050	Cable (3PIN)	1
	PC:3129A	Print board	1

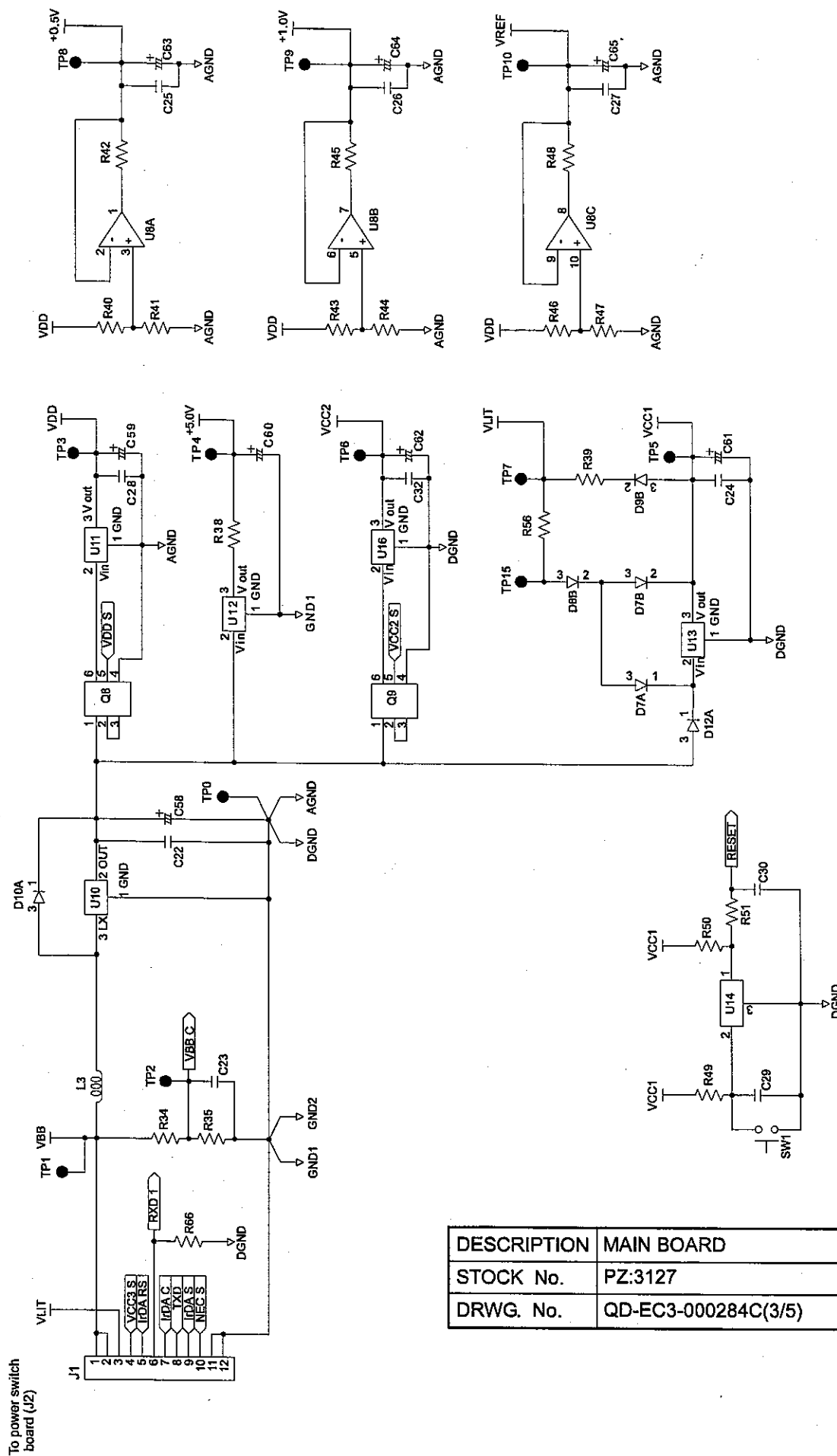
## 7-10 PZ:3213

Circuit Symbol	Part No.	Part Name	Q'ty
U1	UR:RN5RG36AA-C	Regulator 3.6V	1
U2	UC:LCX04FS	Hex inverter	1
U3	UC:7S04FU	Inverter	1
U11	UA:RPM800CBS	Infrared transceiver	1
Q1	QT:A1314B-C	Transistor	1
D1, 11	DI:MA704WA-C	Shot key barrier diode	2
SW1	SS:TS01-A-G-E	Slide switch	1
J1	J1:2P-S125L3-E	Connector	1
X11	XT:EF0P3684E5	Ceramic vibrator	1
E1	EB:VL2020/1VC	Battery	1
R2, 3	RC:1/16W101F	Chip resistor 1/16W 100R	2
R1	RC:1/16W103F	Chip resistor 1/16W 10K	1
R11, 22	RC:1/16W224F	Chip resistor 1/16W 220K	2
R13	RC:1/16W225F	Chip resistor 1/16W 2.2M	1
C1	CT:ECST1AY106R	Tantalum capacitor 10V/10u	1
C11, 12	CC:ECUV1H103MBV	Ceramic capacitor 0.01u	2
C13, 14	CC:33P-C	Ceramic capacitor 33p	2
	PC:3213A	Print board	1

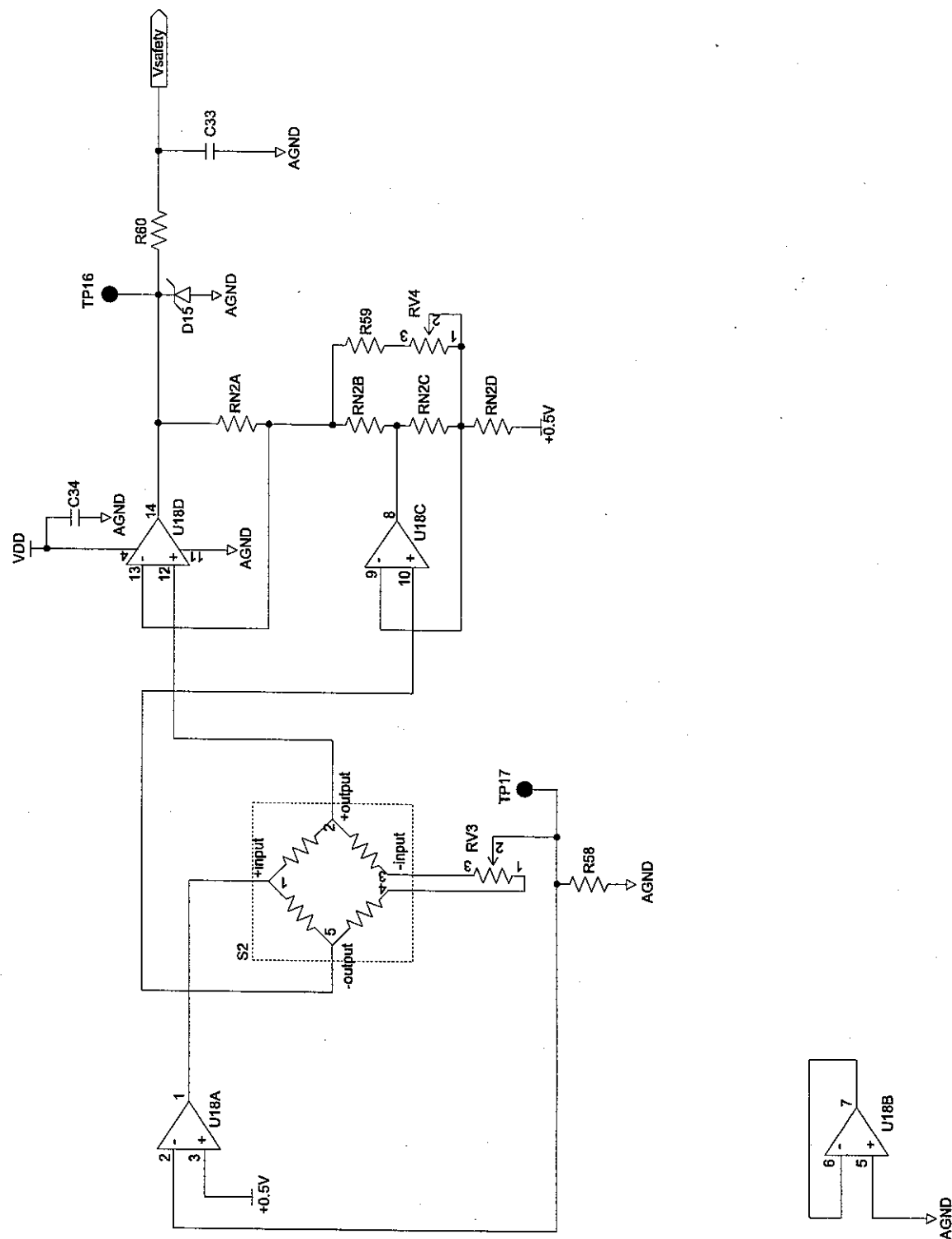
**8-1 PZ:3127**







DESCRIPTION	MAIN BOARD
STOCK No.	PZ:3127
DRWG. No.	QD-EC3-000284C(3/5)

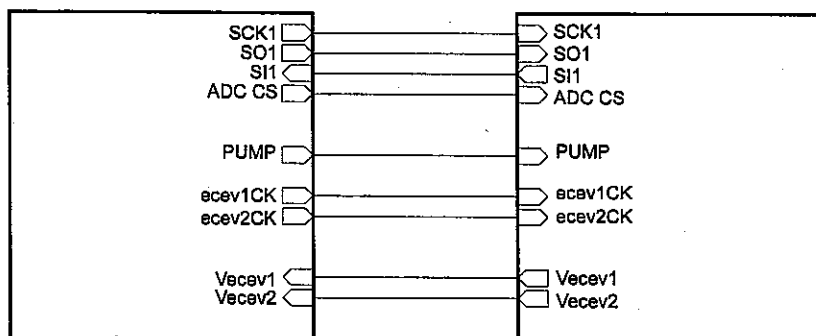


DESCRIPTION	MAIN BOARD
STOCK No.	PZ:3127
DRWG. No.	QD-EC3-000284C(4/5)

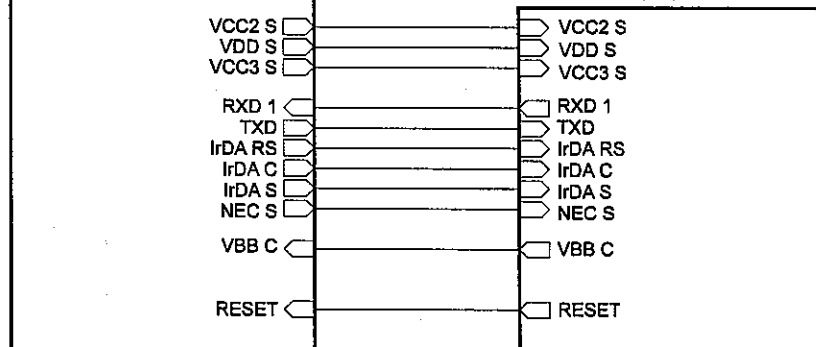


MAIN BOARD (1/5)

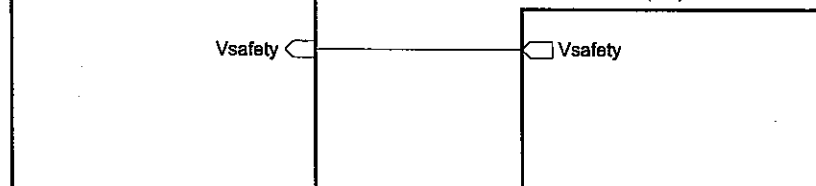
MAIN BOARD (2/5)



MAIN BOARD (3/5)

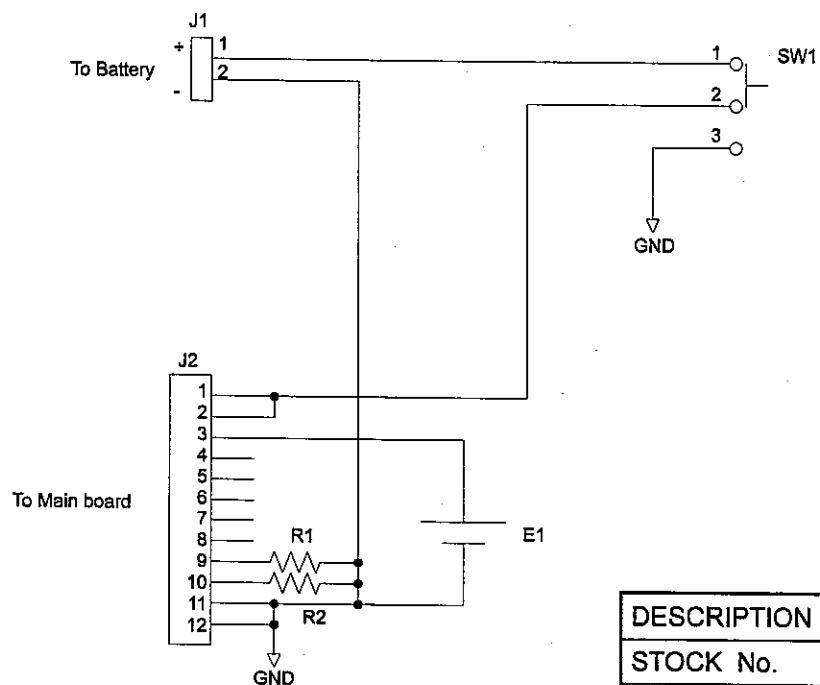


MAIN BOARD (4/5)



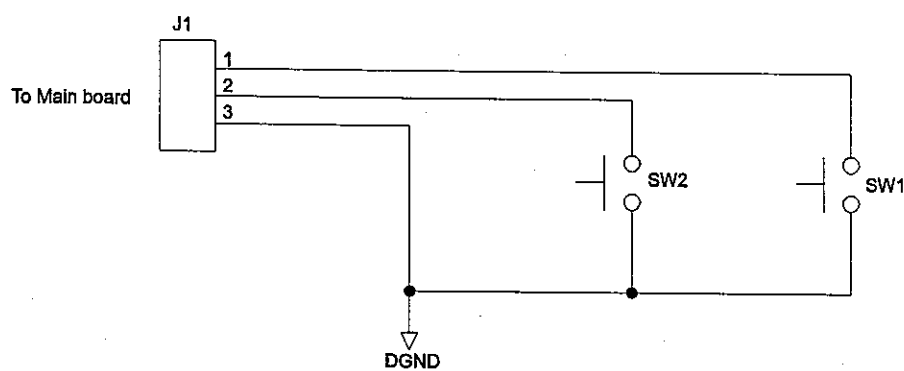
DESCRIPTION	MAIN BOARD
STOCK No.	PZ:3127
DRWG. No.	QD-EC3-000284C(5/5)

## 8-2 PZ:3128



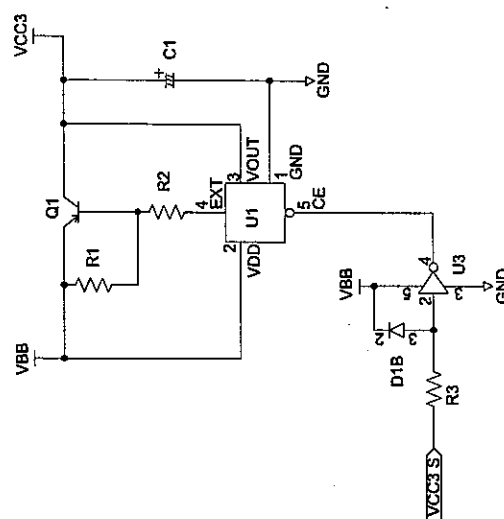
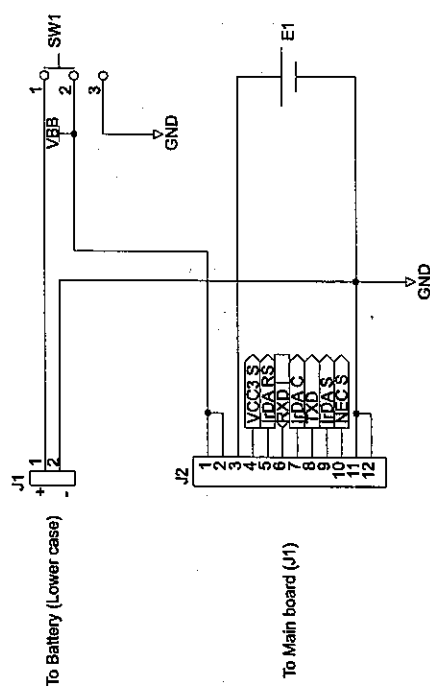
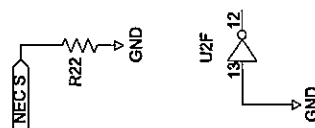
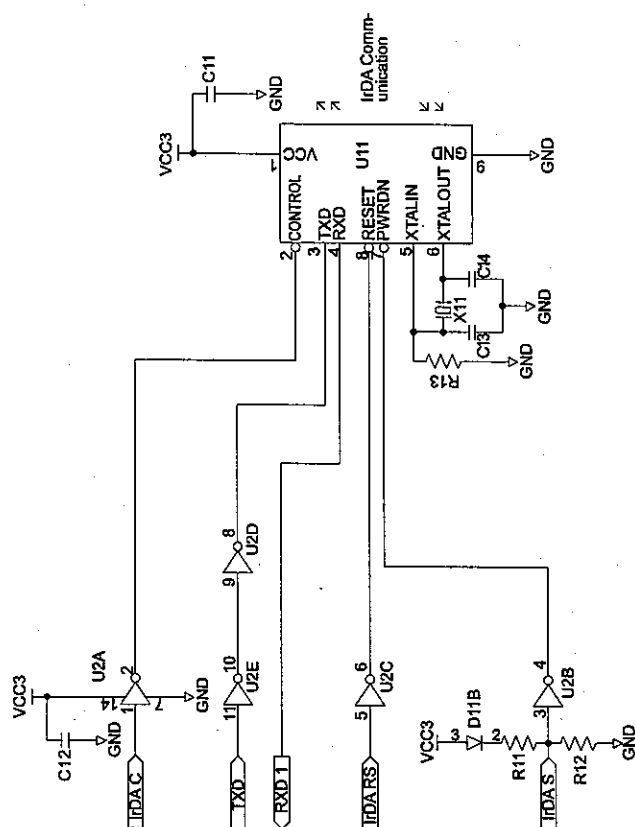
DESCRIPTION	POWER SWITCH BOARD
STOCK No.	PZ:3128
DRWG. No.	QD-EC4-000107B

## 8-3 7PZ:3129



DESCRIPTION	POWER SWITCH BOARD
STOCK No.	7PZ:3129
DRWG. No.	QD-EC4-000108A

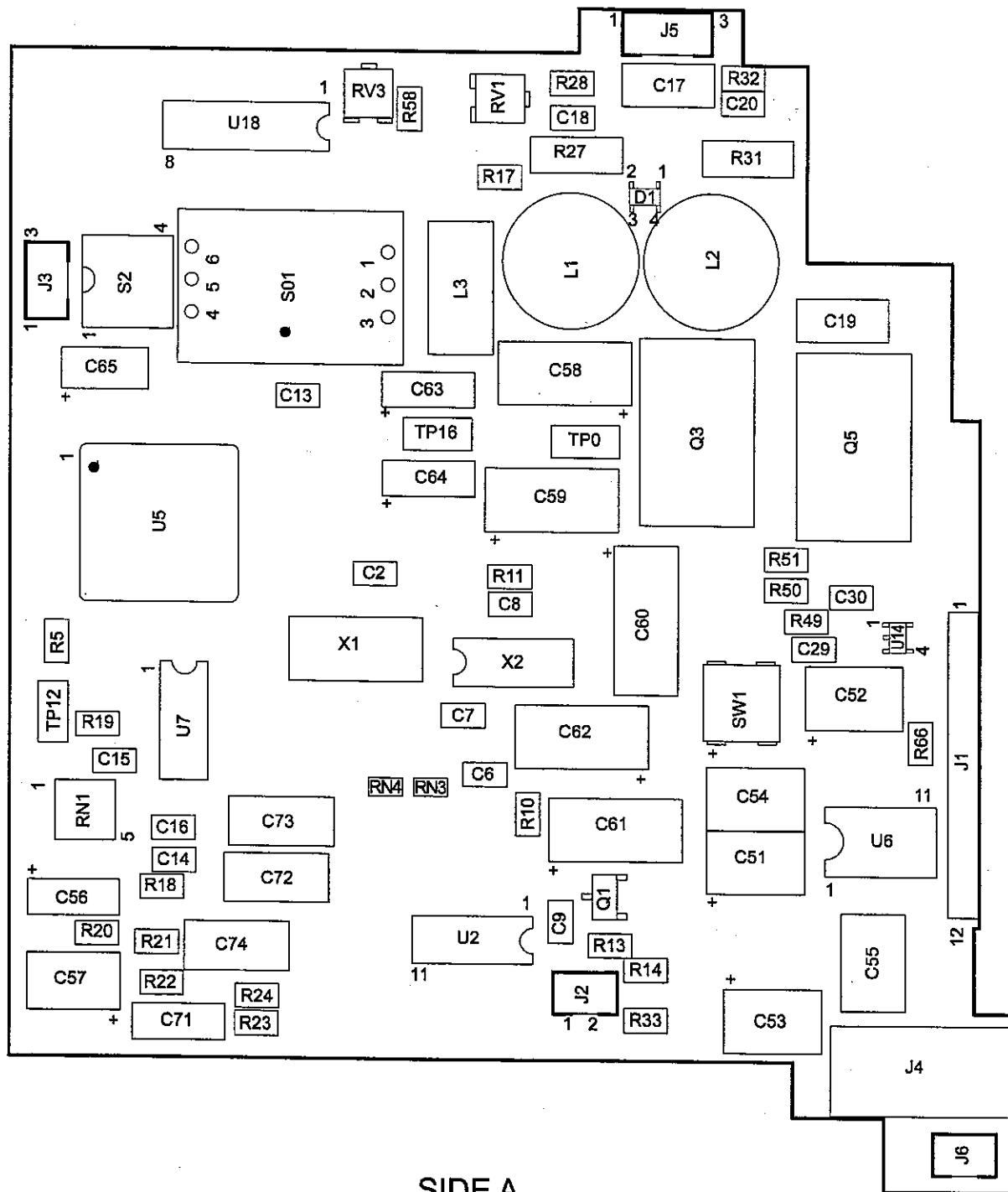
**8-4 PZ:3213**



DESCRIPTION	POWER SWITCH BOARD
STOCK No.	PZ:3213
DRWG. No.	QD-EC3-000334B

# 9. Parts Layout

## 9-1 PZ:3127

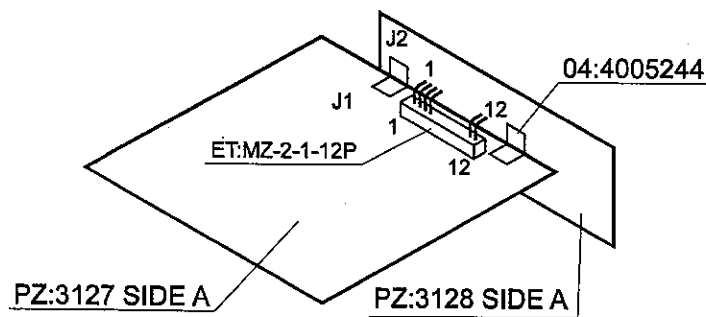
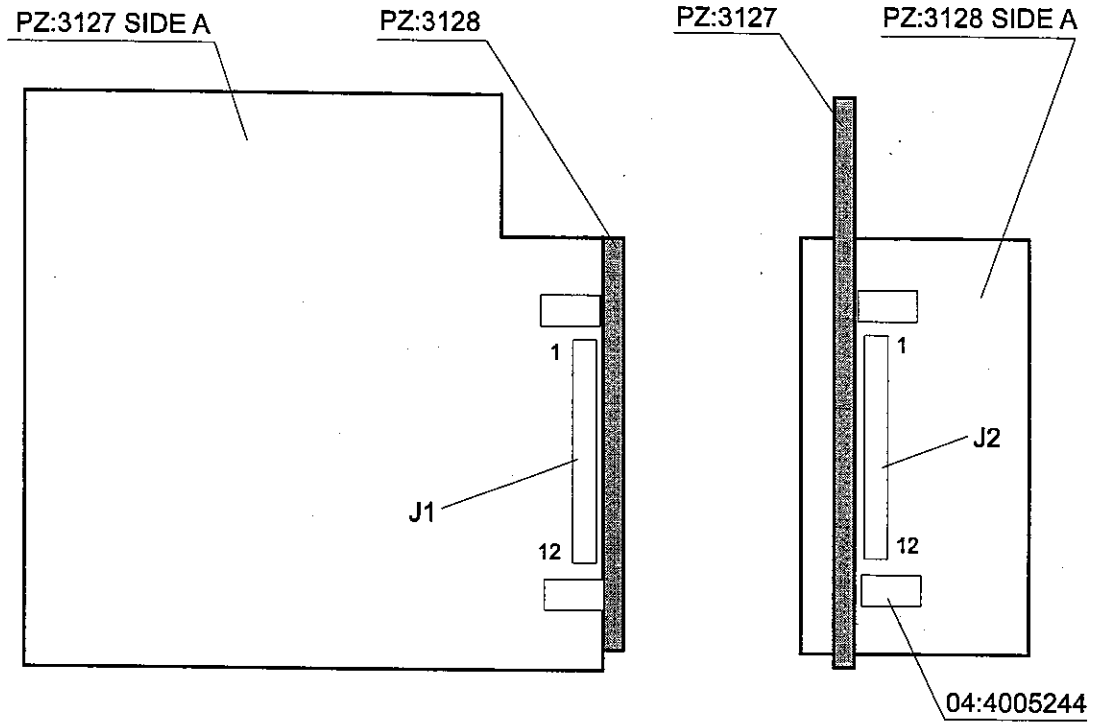


SIDE A

DESCRIPTION	MAIN BOARD
STOCK No.	PZ:3127
DRWG. No.	QD-KZ3-000261G(1/2)

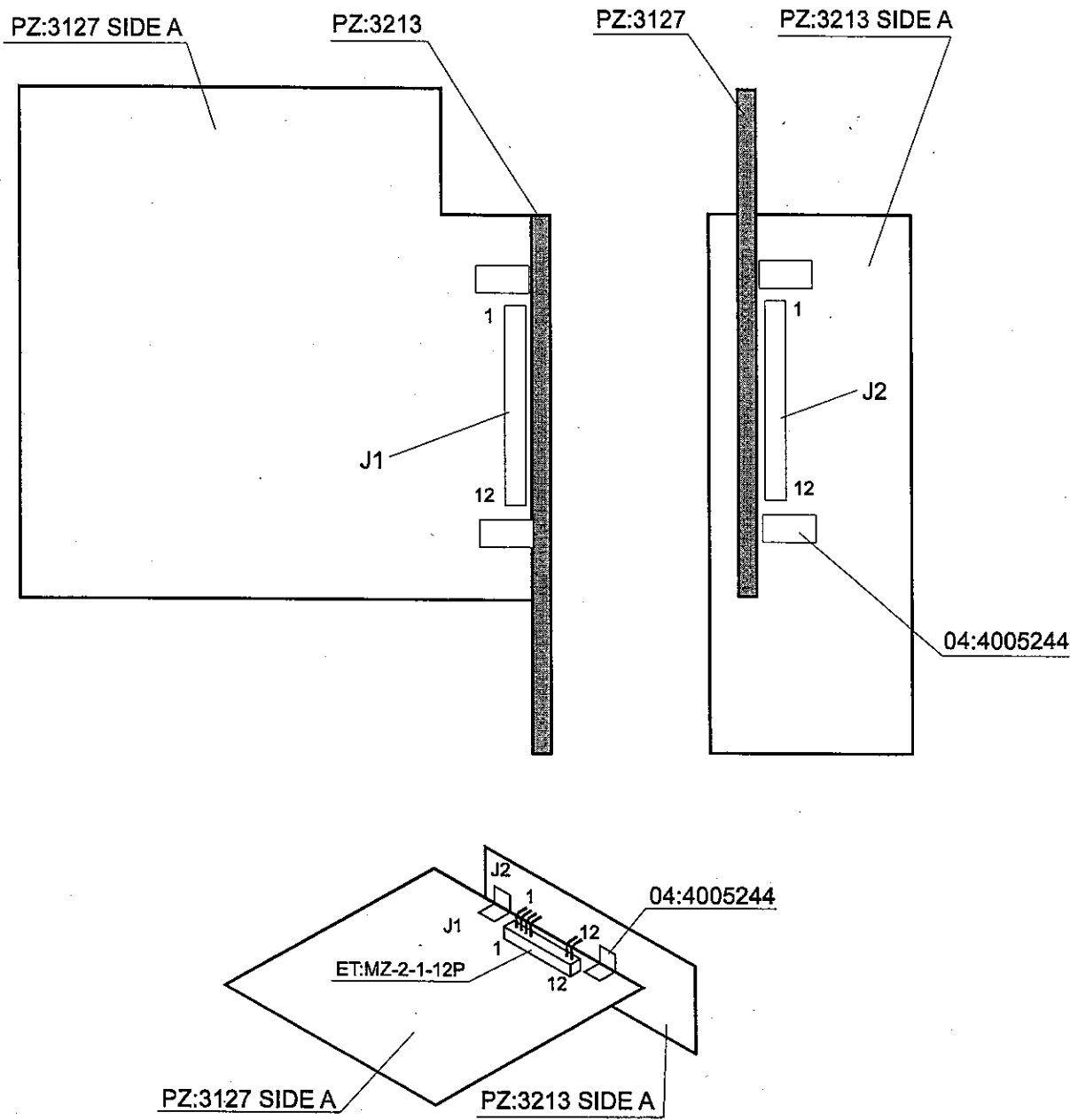


## 9-2 7PZ:3127-3128



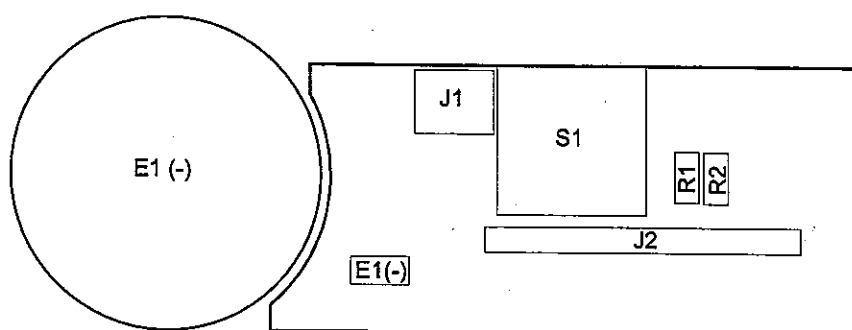
DESCRIPTION	MAIN+POWER SWITCH BOARD
STOCK No.	7PZ:3127-3128
DRWG. No.	QD-KZ4-000098B

9-3 7PZ:3127-3213

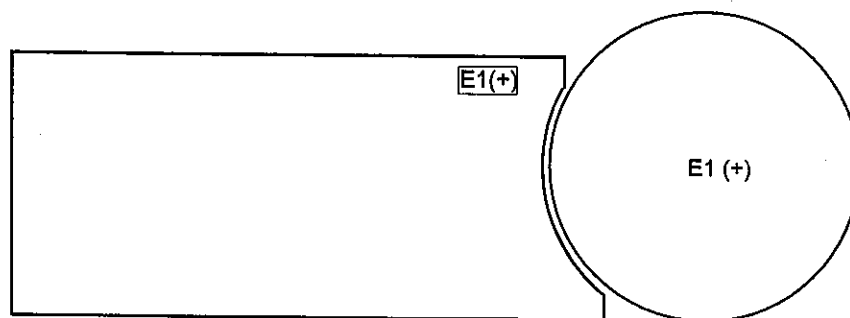


DESCRIPTION	MAIN+POWER SWITCH BOARD
STOCK No.	7PZ:3127-3213
DRWG. No.	QD-KZ4-000121A

## 9-4 PZ:3128



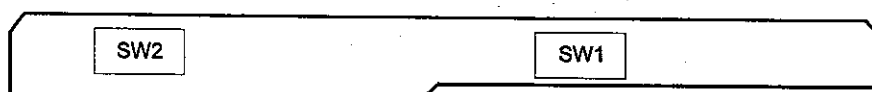
SIDE A



SIDE B

DESCRIPTION	POWER SWITCH BOARD
STOCK No.	PZ:3128
DRWG. No.	QD-KZ4-000085B

## 9-5 7PZ:3129



SIDE A

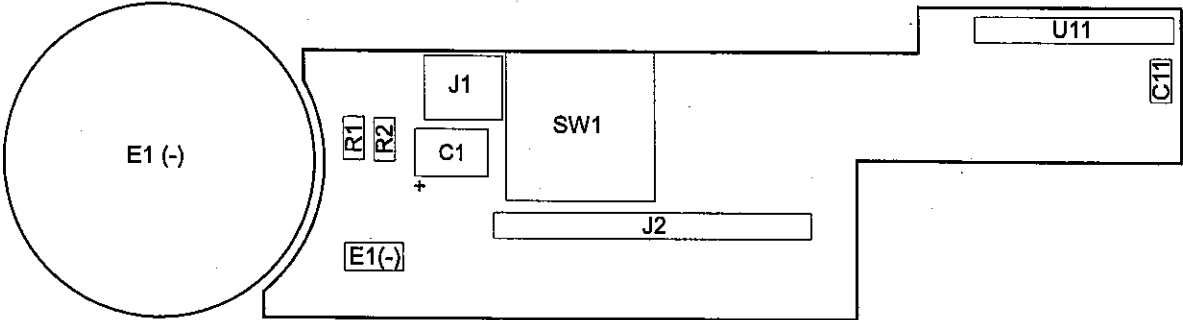


SIDE B

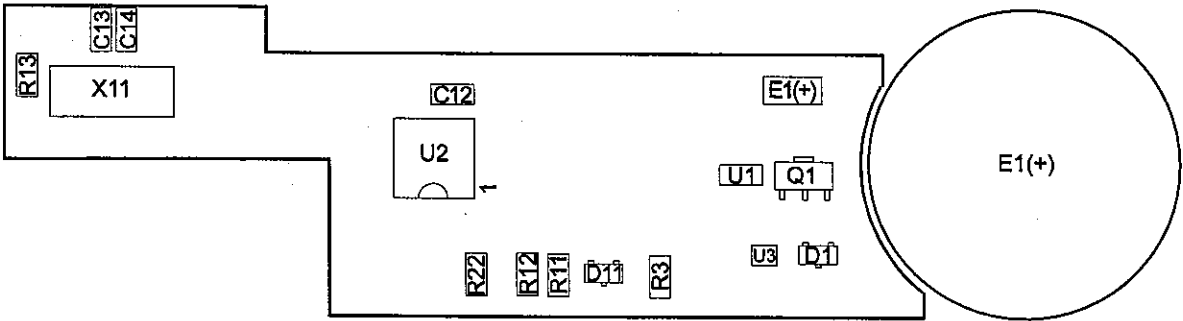
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STOCK No.	7PZ:3129
DRWG. No.	QD-KZ4-000086A



9-6 PZ:3213



SIDE A

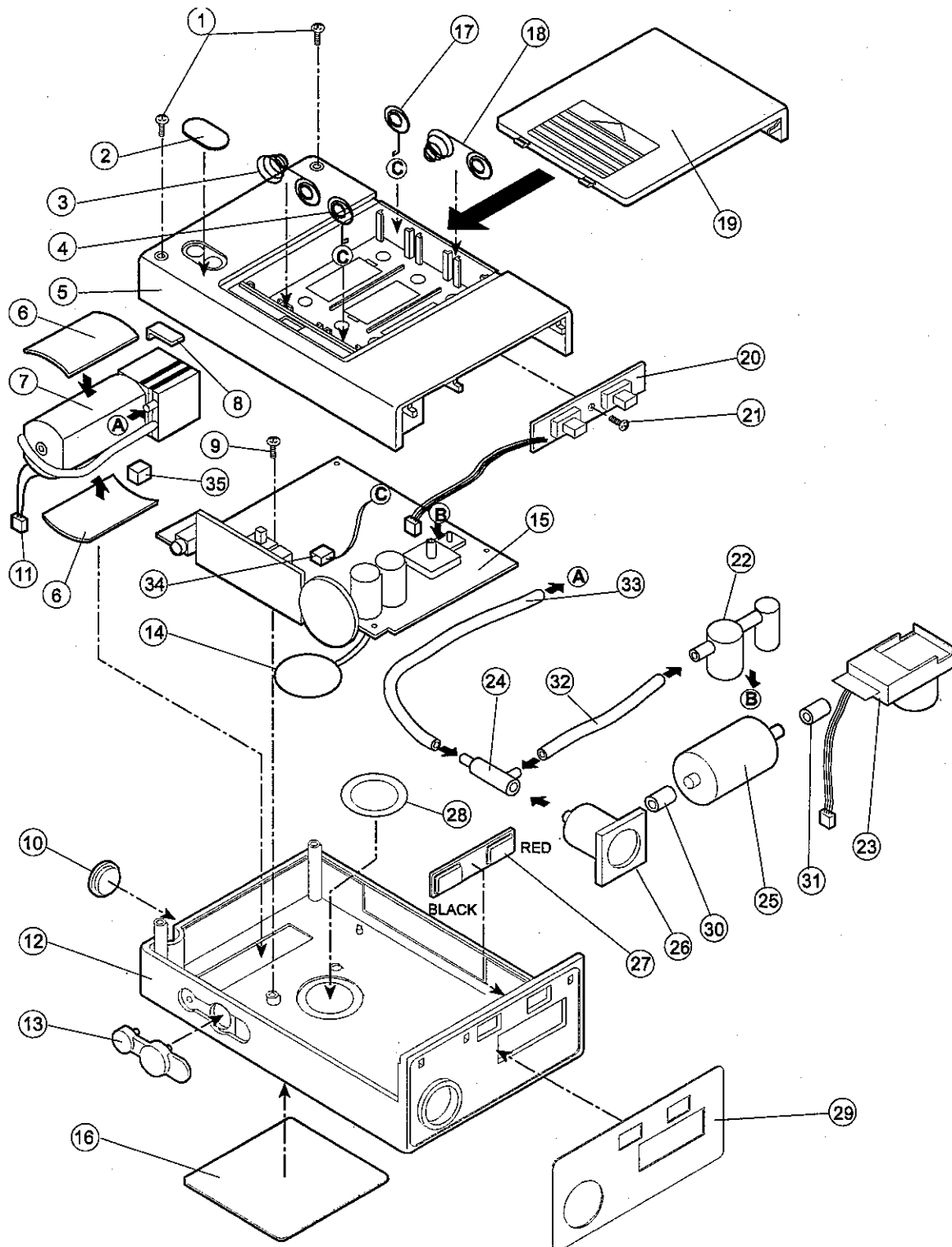


SIDE B

DESCRIPTION	POWER SWITCH BOARD
STOCK No.	PZ:3213
DRWG. No.	QD-KZ4-000123B

## 10. Exploded View

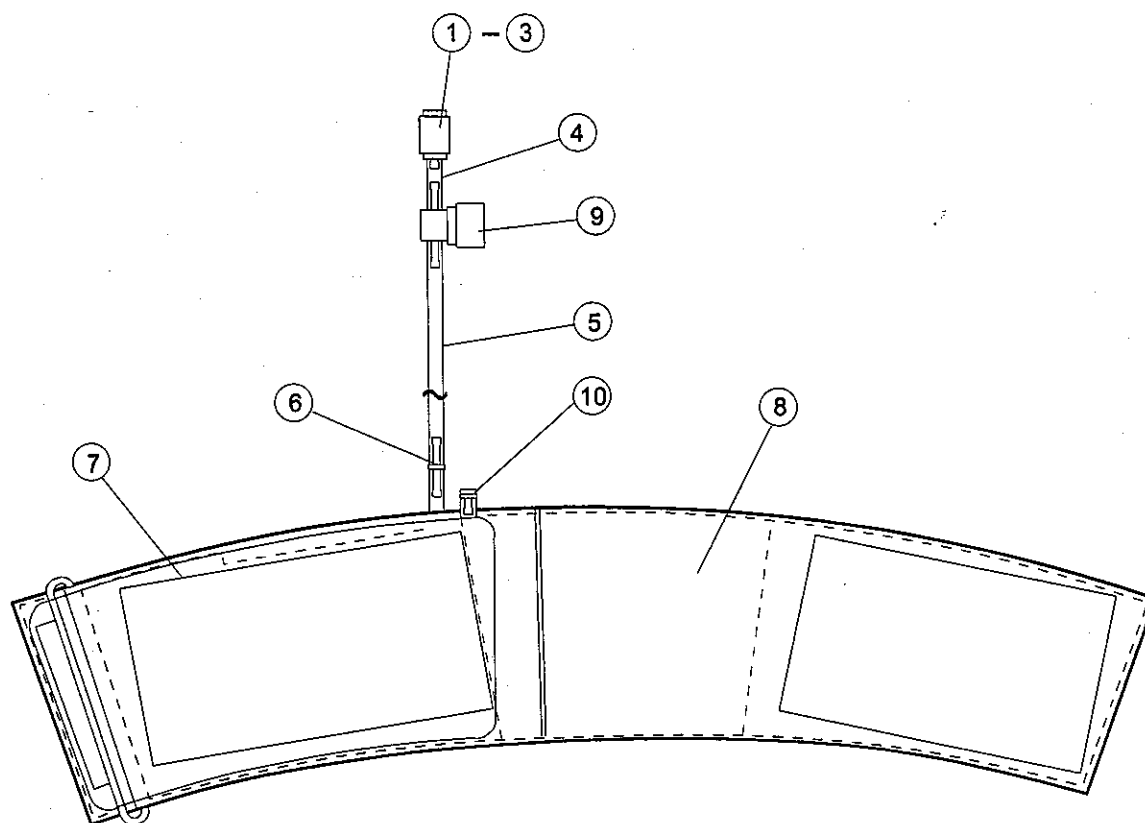
### 10-1 TM-2430 / TM-2431



**EXPLODED VIEW  
TM-2430/TM-2431**

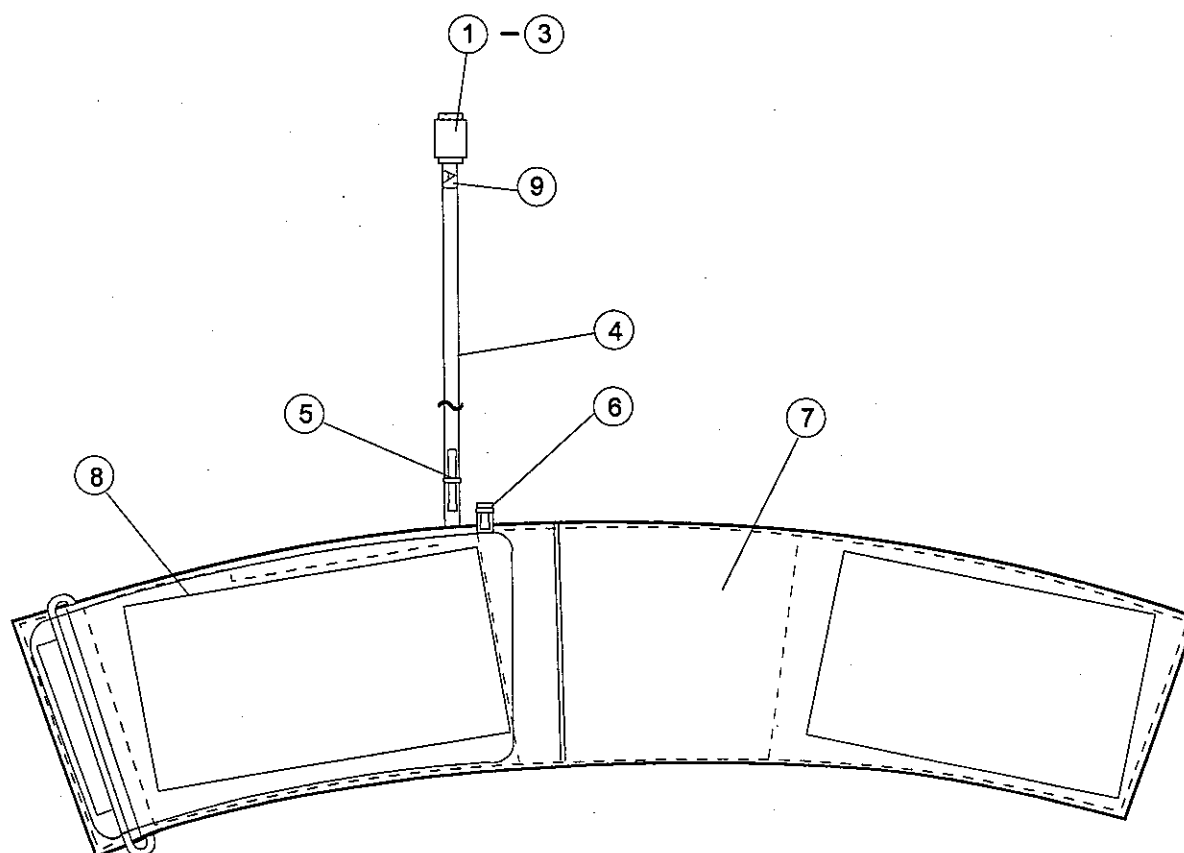
## 10-2 TM-2430-06 (Adult cuff, left arm, with safety valve)

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## 10-3 TM-2430-06A (Adult cuff, left arm, without safety valve)

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