

GENERAL HANDLING PRECAUTIONS

## OPERATOR'S MANUAL

**BIOELECTRIC AMPLIFIER**

**AB-621G**

**BIOELECTRIC INPUT BOX**

**JB-640G**

2001 07 23

 **NIHON KOHDEN**

## GENERAL HANDLING PRECAUTIONS

*This device is intended for use only by qualified medical personnel. Use only Nihon Kohden approved products with this device. Use of non approved products or in a non approved manner may affect the performance specifications of the device. This includes, but is not limited to, batteries, recording paper, pens and extension cables and cords for electrodes, input boxes and AC power.*

Please read these precautions thoroughly before attempting to operate the instrument.

1. To safely and effectively use the instrument, its operation must be fully understood.
2. When installing or storing the instrument, take the following precautions:
  - (1) Avoid moisture or contact with water, extreme atmospheric pressure, excessive humidity and temperatures, poorly ventilated areas, and dusty saline or sulphuric air.
  - (2) Place the instrument on an even, level floor. Avoid vibration and mechanical shock even during moving.
  - (3) Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.
  - (4) The power line source to be applied to the instrument must correspond in frequency and voltage to specifications, and have sufficient current capacity.
  - (5) Choose a room where a proper grounding facility is available.
3. **Before Operation**
  - (1) Check that the instrument is in perfect operating order.
  - (2) Check that the instrument is grounded properly.
  - (3) Check that all cords are connected properly.
  - (4) Pay extra attention when the instrument is in combination with other instruments to avoid misdiagnosis or other problems.
  - (5) All circuitry used for direct patient connection must be doubly checked.
  - (6) Check that battery voltage and battery condition are perfect when using battery-operated models.
4. **During Operation**
  - (1) Both the instrument and the patient must receive constant, careful attention.
  - (2) Turn power off or remove electrodes and/or transducers when necessary to assure the patient's safety.
  - (3) Avoid direct contact between the instrument and the patient.
5. **To Shutdown After Use**
  - (1) Turn power off with all controls returned to their original positions.
  - (2) Remove the cords gently; do not use force to remove them.
  - (3) Clean the instrument together with all accessories to keep them ready for their next use.
6. **The instrument must receive expert, professional attention for maintenance and repairs. When the instrument is not functioning properly, it should be clearly marked to avoid operation while it is out of order.**
7. **The instrument must not be altered or modified in any way.**



#### 8. Maintenance and Inspection:

- (1) The instrument and parts must undergo regular maintenance inspection at least every 6 months.
- (2) If stored for extended periods without being used, make sure prior to operation that the instrument is in perfect operating condition.
- (3) Technical information such as circuit diagrams, parts list, descriptions, calibration instructions or other information is available for qualified user technical personnel upon request from your Nihon Kohden distributor.

9. When the instrument is used with an electrosurgical instrument, pay careful attention to the application and/or location of electrodes and/or transducers to avoid possible burn to the patient.

10. When the instrument is used with a defibrillator, make sure that the instrument is protected against defibrillator discharge. If not, remove patient cables and/or transducers from the instrument to avoid possible damage.

## WARRANTY POLICY

Nihon Kohden Corporation (NKC) shall warrant its products against all defects in materials and workmanship for one year from the date of delivery. However, consumable materials such as recording paper, ink, stylus and battery are excluded from the warranty.

NKC or its authorized agents will repair or replace any products which prove to be defective during the warranty period, provided these products are used as prescribed by the operating instructions given in the operator's and service manuals.

No other party is authorized to make any warranty or assume liability for NKC's products. NKC will not recognize any other warranty, either implied or in writing. In addition, service performed by someone other than NKC or its authorized agents or technical modification or change of products without prior consent of NKC may be cause for voiding this warranty.

Defective products or parts must be returned to NKC or its authorized agents, along with an explanation of the failure. Shipping costs must be pre-paid.

This warranty does not apply to products that have been modified, disassembled, reinstalled or repaired without Nihon Kohden approval or which have been subjected to neglect or accident, damage due to accident, fire, lightning, vandalism, water or other casualty, improper installation or application, or on which the original identification marks have been removed.

In the USA and Canada other warranty policies may apply.

# Introduction

# Features

The 1000 Series  
is a portable  
instrument  
for the  
analysis of  
solid state  
materials.

The 1000 Series  
is a portable  
instrument  
for the  
analysis of  
solid state  
materials.

High input impedance, low noise and  
high sensitivity AC amplifier.

The built-in 200 ohm resistor can  
be applied independently or can be  
superimposed on the input signal.

## CONTENTS

	PAGE
INTRODUCTION .....	1
FEATURES .....	1
COMPOSITION .....	1
CONTROLS AND SWITCHES .....	3
MEASUREMENT .....	6
Internal Switch Setting	
Connection Board Wiring	
Power On	
Electrodes and Code-Connection	
Input Connector Wiring	
Electrode Placement	
Calibration	
Measurement	
ALPHANUMERIC ANNOTATION .....	9
SPECIFICATIONS .....	9
STANDARD ACCESSORIES .....	10
OPTIONAL ACCESSORIES .....	11
RELATED INSTRUMENTS .....	11
PANEL ILLUSTRATION .....	11

## Introduction

The bioelectric amplifier model AB-621G is a plug-in amplifier for the Polygraph system RM-6000 Series. It can be used for the amplification of biophysical signals such as ECG, EEG, EMG etc.

Please read this manual thoroughly prior to operation. Also please refer to the operator's manual of the main unit.

## Features

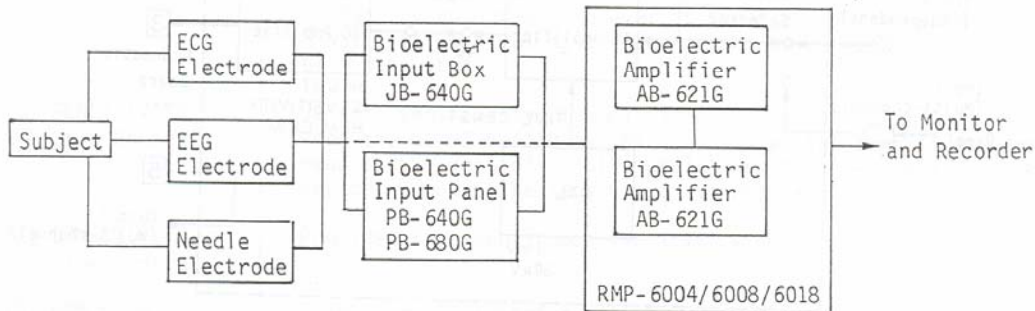
1. High input impedance, low noise and high sensitivity AC amplifier.
2. The built-in calibration signal can be applied independently or can be superimposed on the input signal.
3. AC-DC modes can be selected easily. At DC mode, the input is single-ended.

## Composition

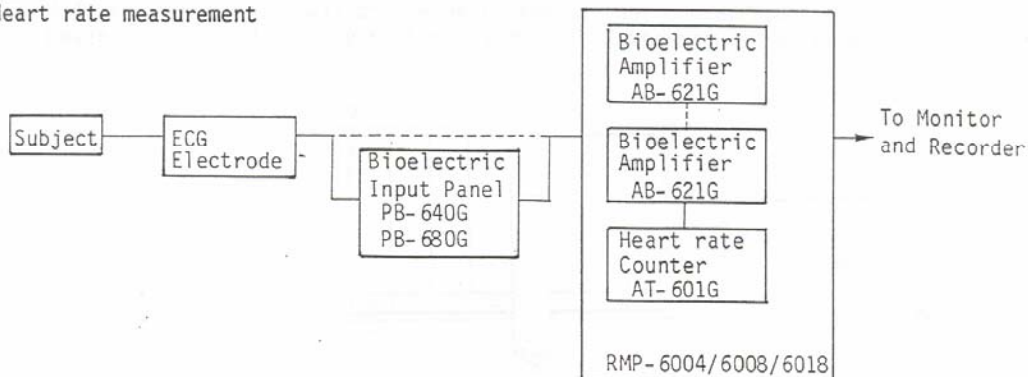
This unit can be plugged into the main unit of the Polygraph system. In combination with various types of electrodes, the AB-621G permits measurement as shown below.

### MEASURING COMPOSITION

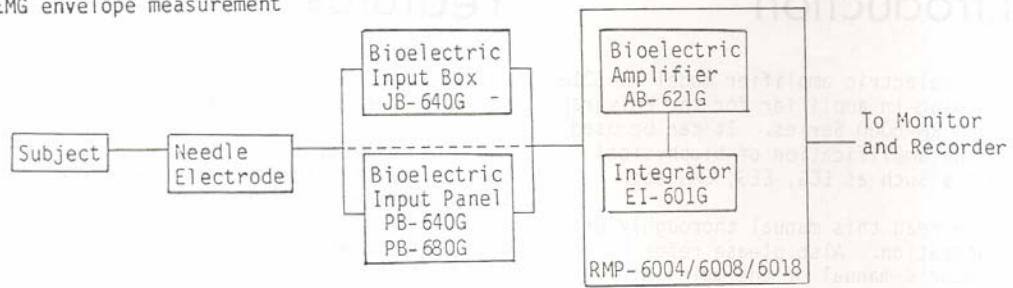
Bioelectric signal (ECG, EEG, EMG, ENG, etc.) measurement



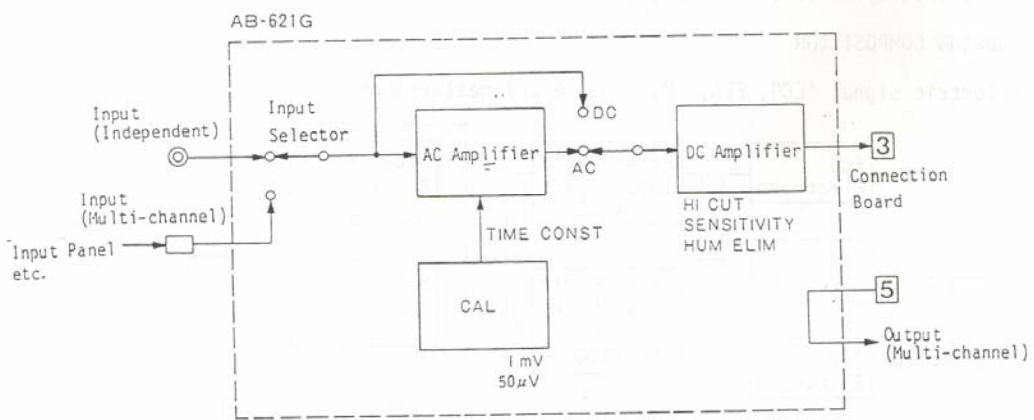
Heart rate measurement



EMG envelope measurement



BLOCK DIAGRAM

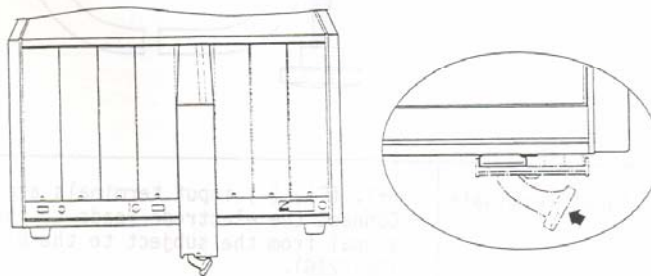




# Controls and Switches

See the last page for illustration.

- |                                 |  |
|---------------------------------|--|
| (1) MEAS-OFF                    | Controls on and off of the input signal.<br>(☐): In this mode, the amplifier is off.<br>(☒): In this mode, the amplifier measures input signals.<br>Press this switch to turn the amplifier to OFF mode.   |
| (2) AC-DC                       | Selects AC and DC mode of amplification.<br>When this switch is set to DC, the signal is DC-amplified.<br>When the switch is set to AC, the signal is AC-amplified.  |
| (3) TIME CONST                  | Selects the Time Constant of the amplifier.<br>Set time constant as follows according to parameters.<br><br>ECG : 2 sec<br>EEG : 0.1, 0.3 sec<br>EMG : 0.01, 0.03 sec  |
| (4) HI-CUT                      | Controls high frequency characteristic of the amplifier.<br>Cut-off frequency at OFF position is 5KHz.   |
| (5) DC BALANCE                  | Adjusts to eliminate trace shift when the SENSITIVITY control is turned. This adjustment is usually not needed since it is factory adjusted. However if the trace shifts when the SENSITIVITY control is turned, it should be adjusted to eliminate shift. |
| (6) SENSITIVITY<br>Step Control | Selects sensitivity of amplifier.<br>When the AC-DC switch is set to AC mode, the sensitivity is read at the unit of mV/DIV, while when the AC-DC switch is set to DC mode, the sensitivity is read at the unit of V/DIV.                                  |
| (7) SENSITIVITY<br>Fine Control | Provides fine continuous sensitivity control.  |
| (8) HUM ELIM                    | Eliminates AC interference when turned on.   |
| (9) Module Lock<br>Lever        | Pull the lever to remove the module from the housing cabinet, and push the lever to lock the module in the housing cabinet.  |



(10) IND-PAN  
Input Selector

Located inside the amplifier.  
Selects either IND (Independent) or PAN (Panel).

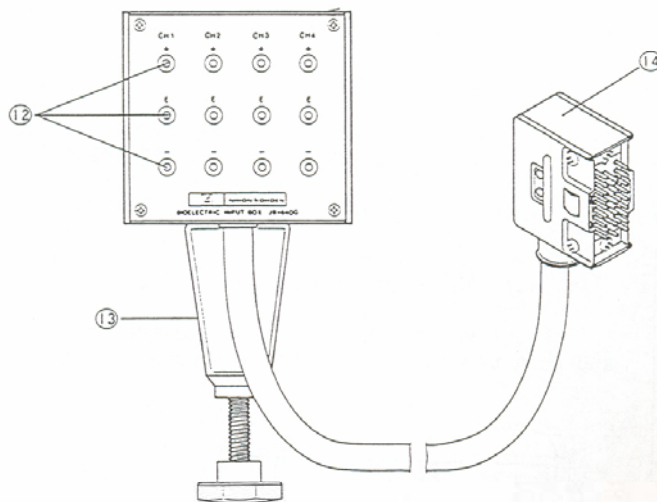
IND : Signal is supplied to the amplifier through a connector (round, 5pin) mounted on the rear panel of the Polygraph Amplifier Console (RMP-6004/6008/6018). When the Polygraph Amplifier Console is installed in the rack of RM-6000, signal is supplied to the amplifier through an Input Panel (PI-680G).

PAN : Signal is supplied to the amplifier through a connector (square, 20pin) mounted on the rear panel of the Polygraph Amplifier Console (RMP-6004/6008/6018) from a Bioelectric Input Panel (PB-680G) and an Input Box (PB-682G).

(11) 50 $\mu$ V-1mV  
Calibration  
Voltage  
Selector

Located inside the amplifier.  
Selects either a 50 $\mu$ V or 1mV calibration signal. Usually this switch is set to the 1mV position. To select the calibration signal, remove the shield plate mounted on the rear of the amplifier. Be sure to attach the shield plate again after selecting the calibration signal.

#### BIOELECTRIC INPUT BOX JB-640G



(12) Input Terminals

(+), (E), (-) input terminals are provided in each channel. Connect the electrode leads to these terminals to supply the signal from the subject to the bioelectric amplifier (AB-621G).



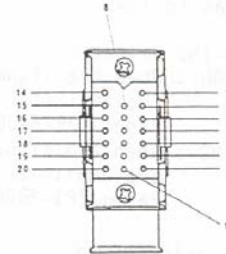
(13) Input Box Holder

Put the input box onto the Stand (KC-610G). The Input Box can be also used on the desk independent of this Holder.

(14) Connector

Connects the signal of each channel to the amplifier in each channel through a connector mounted on rear side of the Polygraph Amplifier Console (RMP-6004/6008/6018), or through an Auxiliary Input Panel (PI-600G).

Pin	Signal	Pin	Signal
1	0V	11	4ch(-)
2	1ch(+)	12	Not used
3	2ch(+)	13	Not used
4	3ch(+)	14	Shield
5	4ch(+)	15	Not used
6	Not used	16	Not used
7	Not used	17	Not used
8	1ch(-)	18	Not used
9	2ch(-)	19	Not used
10	3ch(-)	20	Not used



Connector Type: P-1320-CEA 20P  
male  
Code Number: 5411706

# Measurement

## INTERNAL SWITCH SETTING

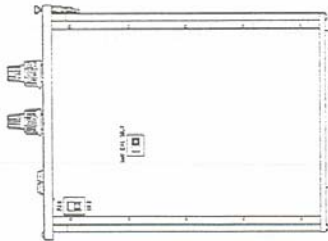
Pull the Model Lock Lever and remove the amplifier from the Polygraph Amplifier Console. Remove the side shield plate and check if the switches are correctly set as follows.

### PAN-IND Selector

- PAN : When the signal is supplied to the amplifier through the Input Panel (PB-640G/680G, JB-640G).
- IND : When the signal is supplied to the amplifier through the Input Panel (PI-680G).

### CAL Selector Switch

- 1mV : When measuring ECG.
- 50 $\mu$ V : When measuring EEG or EMG.

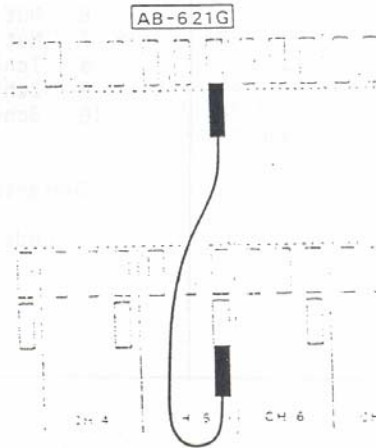


Confirm that the MEAS-OFF switch (1) is set to the OFF position and then plug the amplifier unit into the housing cabinet.

## CONNECTION BOARD WIRING

Draw out the Signal Connection Board from the Console. Connect socket No.3 to 5. After connecting the pin terminals, insert the connection board into its original location.

Also refer to the operator's manual of the Polygraph Amplifier Console for the connection board wiring.



## POWER ON

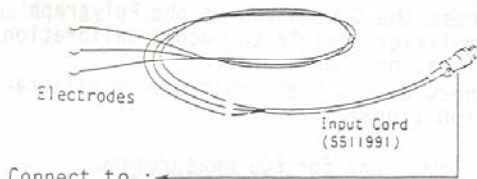
After making sure that the ground lead and power cord are properly connected, push the power switch of the rack, Polygraph Amplifier Console, monitor oscilloscope, and recorder to turn the power on. Check to see that the power indication lamps light.

# Alphanumeric

## ELECTRODES AND CORDS CONNECTION

- A. When using Input Extension Cord  
Code No.5511991 (accessory of  
Polygraph Amplifier Console)

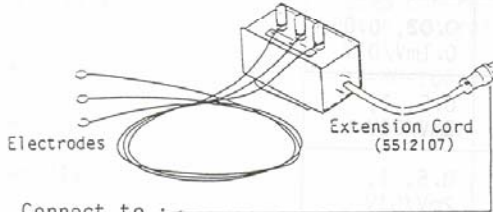
Set the internal switch to IND



- Connect to :  
\* Input Panel PI-680G  
\* Polygraph Amplifier Console, rear  
\* Extension Cord Code No.5512125  
\* Extension Cord Code No.5512161

- B. When using Input Box Code No.5512107  
(Option)

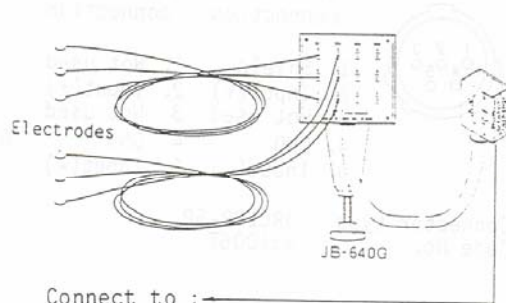
Set the internal switch to IND



- Connect to :  
\* Input Panel PI-680G  
\* Polygraph Amplifier Console, rear  
\* Extension Cord Code No.5512125  
\* Extension Cord Code No.5512161

- C. When using Bioelectric Input Box  
(JB-640G)

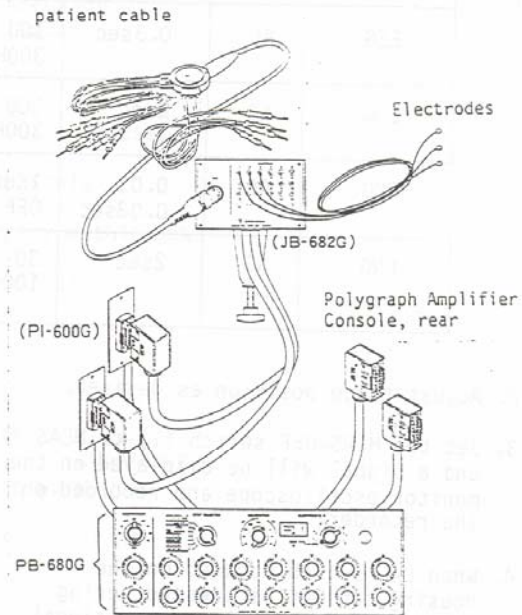
Set the internal switch to PAN



- Connect to :  
\* Auxilliary Input Panel PI-680G  
\* Polygraph Amplifier Console, rear

- D. When using Bioelectric Input Panel  
(PB-680G)

Set the internal switch to PAN



## INPUT CONNECTOR WIRING

Input connector is wired as follows.



AC connection	DC connection
1. Shield	1. Not used
2. Input(+)	2. Input(+)
3. Not used	3. Not used
4. GND	4. GND
5. Input(-)	5. Input(-)

Connector type : JRC13P-5P  
Code No. : 5310067

## ELECTRODE PLACEMENT

Refer to operator's manual of PB-640G/680G.

## CALIBRATION

Set the MEAS-OFF switch (1) to MEAS. Press the CAL switch on the Polygraph Amplifier Console to record calibration signal on the recorder. Check to see that amplitude of calibration signal is :

1cm : 1mV for ECG measurement  
5mm : 50 $\mu$ V for EEG, EMG measurement (at sensitivity of "1")

## MEASUREMENT

1. After electrode placement, set control switches as follows.

Parameters	AC/DC	TIME CONST	H <sub>I</sub> CUT	SENSITIVITY
EEG	AC	0.3sec	100 300Hz	0.02, 0.05 0.1mV/DIV
ECG	AC	2sec	100 300Hz	0.5, 1, 2mV/DIV
EMG	AC	0.01 0.03sec	1KHz OFF	0.5, 1, 2mV/DIV
ENG	AC	2sec	30 100Hz	0.02, 0.05 0.1mV/DIV

- Adjust trace position as desired.
- Set the MEAS-OFF switch (1) to MEAS and a signal will be displayed on the monitor oscilloscope and recorded on the recorder.
- When CAL switch located on the housing cabinet is pressed during measurement, the calibration signal

will be superimposed on the input signal. INST switch located on the housing cabinet resets the baseline when pressed.

When Bioelectric Input Panel PB-680G or PB-640G is used, refer to operator's manual of PB-680G/640G.



# Alphanumeric Annotation

The AB-621G provides the following alphanumeric data to be printed on the recorder with printing facility.

Unit : mV  
Mode : MEAS-OFF  
Sensitivity : 0.02-0.05-0.1-0.2-0.5-1-2-5-10

## Specifications

Input Resistance	5M $\Omega$ -E-5M $\Omega$ , differential input 100K $\Omega$ -E, single-ended input (At DC)
Internal Noise	<3 $\mu$ Vp-p (At Hi-cut 100Hz)
Maximum Sensitivity	>V/20 $\mu$ V >V/20mV (At DC)
Sensitivity	Step control: Accuracy within $\pm 5\%$ Fine control: 10 $\pm 2$ dB
High Cut	10-30-100-300-1KHz
Time Constant	0.003-0.01-0.03-0.1-0.3-2sec
Linearity	< $\pm 2\%$ in $\pm 5$ V full scale
Calibration	50 $\mu$ V, 1mV, accuracy within $\pm 5\%$
C.M.R.R.	>60dB (At DC to 65Hz)
Hum Elimination Ratio	>23dB
Output Impedance	<50 $\Omega$
Stability	Temperature drift < 20 $\mu$ V/C Time drift < 20 $\mu$ V/hour (After 10 minutes warm-up)
Size and weight	50(W) x 200(H) x 280(D) mm Approx. 1kg.

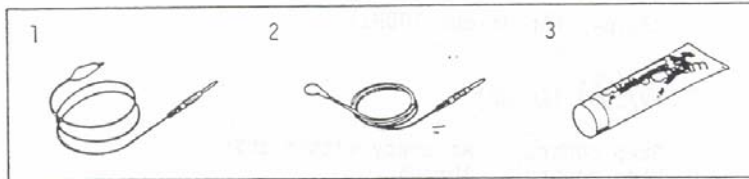
# Standard Accessories

BIOELECTRIC AMPLIFIER AB-621G

No accessories

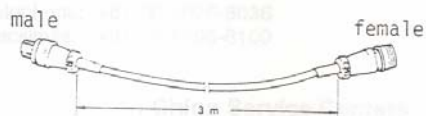
BIOELECTRIC INPUT BOX JB-640G

No.	Description	Q'ty	Code No.
1	EEG lead wire, BE-3K	6	5520535
2	EEG scalp disc electrode NE-101A, 3pcs/set	4	5021218
3	ECG paste (CardioCream), 100g	1	5090027

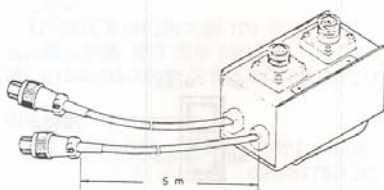


# Optional Accessories

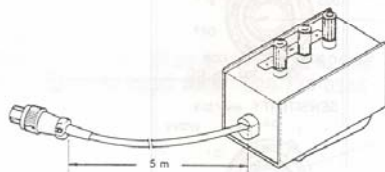
INPUT EXTENSION CORD Code No.5512125



INPUT BOX Code No.5512161



INPUT BOX Code No.5512107



# Related Instruments

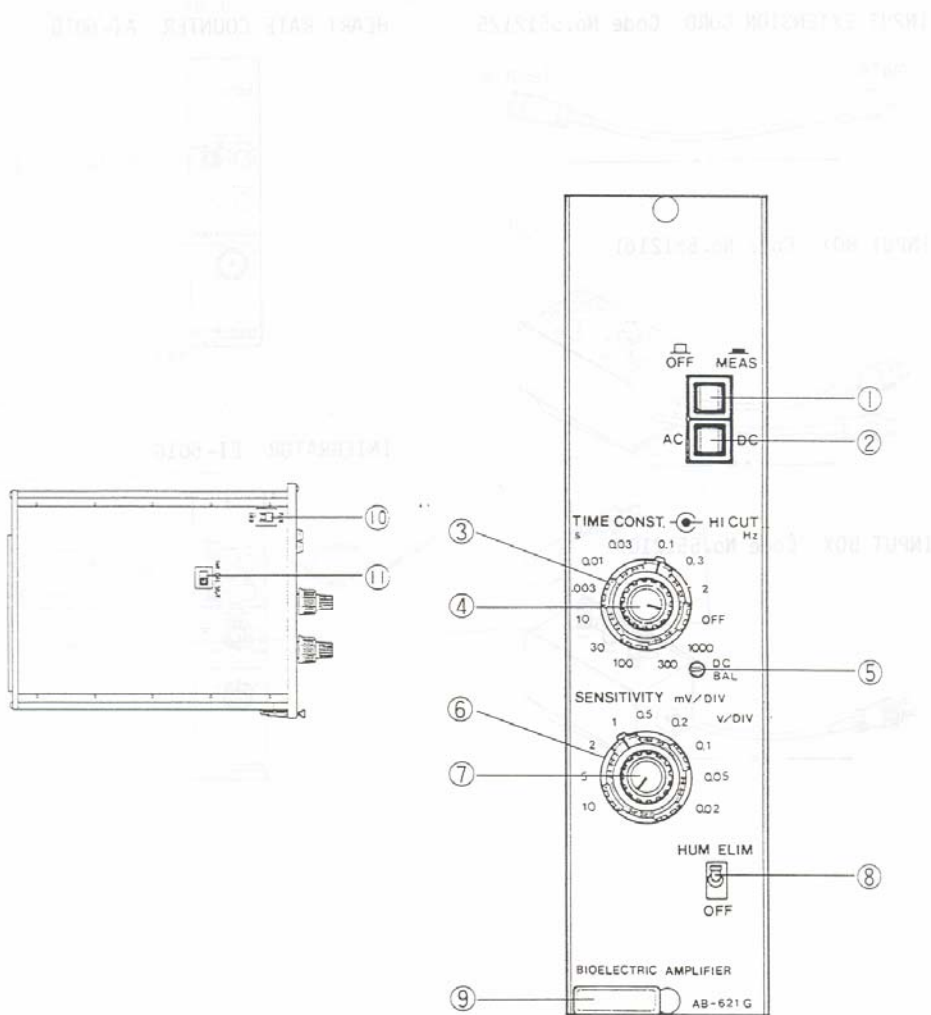
HEART RATE COUNTER AT-601G



INTEGRATOR EI-601G



# Panel Illustration





**Nihon Kohden Corporation**

**Head Office**

31-4, Nishiochiai 1-chome, Shinjuku-ku,  
Tokyo 161-8560, Japan

**International Division Sales Department**

Tokyo (Head Office)

Telephone: +81 (3) 5996-8036

Facsimile: +81 (3) 5996-8100

**Nihon Kohden China Service Centers**

**上海维修站**

上海市徐汇区南丹路 169 号 新旺大厦 3008 室  
电话: 021-6469-9016 传真: 021-6486-7218

**北京维修站**

北京市西城区复兴门内大街 101 号  
百盛大厦写字楼 第 7 层第 020B 室  
电话: 010-6603-7229 传真: 010-6603-7216

**广州维修站**

广州市环市东路 371~375 号 世贸中心南塔 2516 室  
电话: 020-8777-9108 传真: 020-8778-1882

**沈阳维修站**

沈阳市和平区北二马路 35 号  
中国医药集团沈阳有限公司 2 楼 208 室  
电话: 024-2383-1147 转 315 传真: 024-2383-2557

**成都维修站**

成都市一环路西二段 25 号 华立大厦 420 室  
电话: 028-773-6236 传真: 028-773-6236

**Nihon Kohden America, Inc**

90 Icon Street, Foothill Ranch, CA 92610, USA  
Telephone: +1 (949) 580-1555  
Facsimile: +1 (949) 580-1550

**Nihon Kohden Europe GmbH**

Saalburgstraße 157, Bürohaus 1,  
D-61350 Bad Homburg v.d.H., Germany  
Telephone: +49 (6172) 309200  
Facsimile: +49 (6172) 303611

**Nihon Kohden Singapore Pte Ltd**

70 Shenton Way, #14-05 Marina House  
Singapore 079118  
Telephone: +65 224-6700  
Facsimile: +65 224-6216

**Nion Kohden Italy S.r.l**

Via San Tomaso 78  
24125 Bergamo, Italy  
Telephone: +39 35-219543  
Fax: +39 35-232546

The model and serial number of your instrument are identified on the rear or bottom of the unit. Write the model and serial number in the spaces provided below. Whenever you call your distributor concerning this instrument, these two pieces of information should be mentioned for quick and accurate service.

Model \_\_\_\_\_

Serial number \_\_\_\_\_

YOUR DISTRIBUTOR

PRINTED IN JAPAN