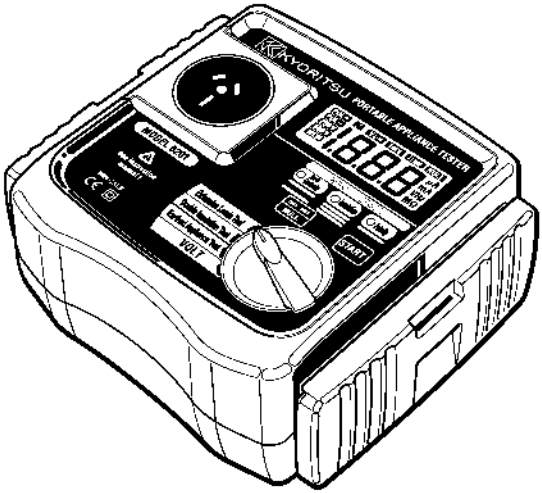
INSTRUCTION MANUAL



PORTABLE APPLIANCE TESTER

MODEL 6201

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

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1. Safe testing ⚠

Electricity is dangerous and can cause injury and death. Always treat it with the greatest of respectand care. If you are not quite sure how to proceed, stop a measurement and take advice from a qualified person.
This instruction manual ontains warning and safety rules which must be observed by the user to ensure safe operation of the instrument and retain it in safe condition. Therefore, read through these operating instructions before using the instrument.

IMPORTANT:

This instrument must only be used by a competent and trained person and operated in strict accordance with the instructions.
KYORITSU will not accept liability for any damage or injury caused by misuse or non-compliance with the instructions or with the safety procedures.
It is essential to read and to understand the safety rules contained in the instructions or with the safety procedures.
The symbol ⚠ indicated on the instrument means that the user must refer to the related sections in the manual for safe operation of the instrument.

⚠**DANGER**	is reserved for conditions and actions that are likely to cause serious or fatal injury.
⚠**WARNING**	is reserved for conditions and actions that can cause serious or fatal injury.
⚠**CAUTION**	is reserved for conditions and actions that can cause minor injury or instrument damage.

Be sure to carefully read instructions following each symbol ⚠ in this manual.

⚠DANGER

- This instrument can be connected only to the commercial power of 240V+10%-10%, 50Hz.
- For safety reasons, only use the Test Leads designed to be used with this instrument and recommended by KYORITSU.
- Use only grounded mains outlets to supply the instrument.
  Do not touch the device under test while testing is in progress.
- Since a high voltage of 500V is outputting continuously, especially while measuring insulation resistance, user may get electrical shock.
  Also not to touch the capacitor of the device under test as hazardous voltage may exist.
- When testing, always be sure to keep your fingers behind the safety barriers on the test leads.
- Disconnect the instrument from the power supply when measurement is finished.
  Do not leave the instrument with connected to the power supply.

⚠WARNING

- ⚠Never open the instrument case - because dangerous voltages are present. Only fully trained and competent electrical engineers should open the case.
- If abnormal conditions of any sort are noted (such as a faulty display, unexpected readings, broken case, cracked test leads, etc.)do not use the instrument and return it to your distributor for inspection and repair.
  Never attempt to use the instrument if the instrument or your hand is wet.

⚠CAUTION

- When using Test Leads with alligator clip, be sure to check the alligator clip is firmly connected to the metal part of the device under test. Otherwise, inaccurate measurement or arc at the contacts may occurs.
- The rated measuring voltage for insulation test is 500V.DC.
  For electrical devices to be tested, if this test voltage seems not proper to apply, contact your distributor and ask for advices.
- When testing faulty device, it may trip the circuit breaker of main power supply during test and may cause interruption of service.
  Be careful when the same main power supply is used for PCs.
- We are not liable for loss of data on PC during testing with this instrument. The device under test is powered on during most tests, but please turn it to OFF position after use. Use a cloth dipped in water or neutral detergent for cleaning the instrument.
  Do not use abrasives or solvents.

2. Procedure of removing cover

Model 6201 have a dedicated cover to protect against an impact from the outside and prevent the operation part, the LCD, and the connector socket from becoming dirty. The cover can be detached and put on the back side of the main body during measurement.

2.1 Method of removing the cover

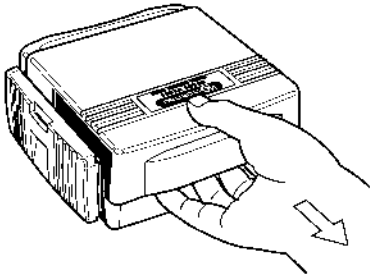


Fig.1

2.2 Method of storing the cover

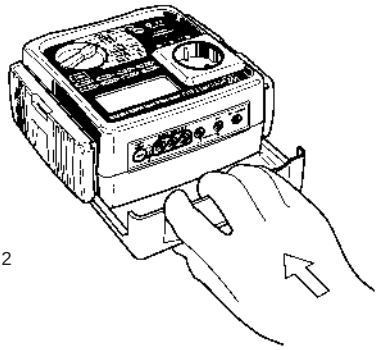


Fig.2

3. Product summary and explanation

3.1 Product summary

The Model 6201 is a hand-held portable appliance tester, performing four functions to ensure the Safety of Class I and Class II appliances. And also can measure the mains voltage. Readings are displayed on a large liquid crystal display(LCD) below which are three LEDs, light up in 2color, 2 color LEDs which unambiguously display a pass or fail indication for results dictated by international standards.
This instrument is suitable for performing tests as required by the following standards.

AS/NZS 3760: 2001 In-service safety inspection and testing of electrical equipment.
This instrument is designed to check the electrical safety of appliances of Class I and Class II categories.
As a guide IEC standard define these two categories as follows:

Class 1 : Appliances which have a functional insulation throughout and an earth connected case. These are often described as earthed appliances.
Class 2 : Appliances which have both functional and additional insulation where any metal parts cannot become "Live" under fault conditions.

3.2 Test range

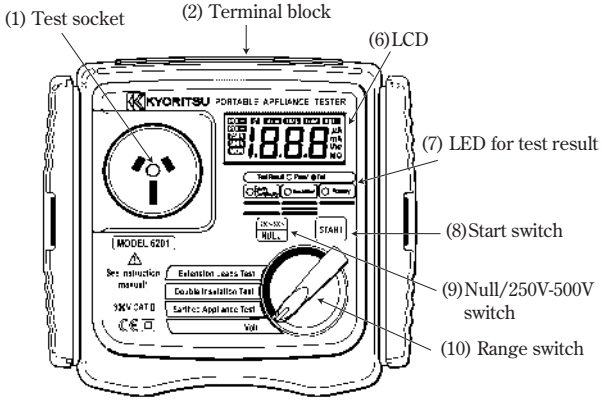
MODEL 6201 have following features.

Range	Tests
Earthed Appliance test (Class 1 appliance)	(1) Protective conductor resistance (2) Insulation
Double Insulation test (Class 2 appliance)	(1) Insulation
Extension Leads test	(1) Protective conductor resistance (2) Insulation L-N and L/N-PE (3) Polarity

3.3 Features

- ✻ Compact, light weight and truly portable
- ✻ Robust Panel and Case
- ✻ Capable of measuring the voltage of main power supply
- ✻ Large custom digital display
- ✻ Capable of judging pass/fail of tests by LED on the panel and by buzzer.

3.4 Instrument layout (Illust: M-6201)



Terminal Block

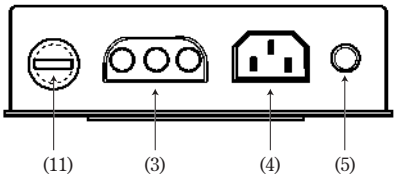


Fig. 3

（1）Test socket
Insert the mains plug of DUT to this socket for the polarity test of protective conductor resistance, insulation resistance and Extension leads.

（2）Terminal block
Connect the attached mains cord and Test Leads to this terminal block.

（3）Terminal for mains cord
This terminal is connected to a mains supply via M7123.

（4）Terminal for Extension leads adaptor
It corresponds to L, N, E of test socket, and the extension leads adaptor(M-7140) connected with the cord reel to be plugged to it.

（5）Rpe terminal
Connect the Test Lead with alligator clip(M7129)(13) to this terminal for the measurement of protective conductor resistance, and clip the metal parts of DUT with the alligator clip.

（6）LCD
Measured value is displayed.

（7） LED for test result
When the value of protective conductor resistance and insulation resistance exceeds the limit dictated by applicable standards, LED lights up in red. When it is within the limit, LED lights up in green.

（8）Start switch
A measurement starts by pressing this switch.

（9）NULL/250V-500V switch
- Earthed appliance test measurementIt is used in order to push the NULL button before protection earth resistance measurement and to cancel the resistance of a test leads.
- Double insulation test measurement
  The test voltage of insulation resistance is changed to 500V and 250V.

（10）Range switch
Select a range with this switch.

(11) Fuse

Protected by a fuse of 600V/500mA ceramic fuse (F type Φ6.3x32mm). User can replace this fuse.

(12) Mains cord(AU) M-7123

This mains cord can be connected to the mains supply so that the instrument can derive power from it. To measure contact current, the socket of the main power supply is to be equipped with an earth terminal.

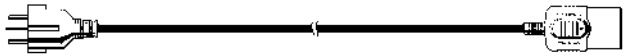


Fig.4

(13) Test Lead with safety alligator clip(M-7129) and Probe with Blade type Prod(M-7101).The adapter of a tip part is exchangeable for analligator clip and a test stick type.

Please use it according to a measurement use.

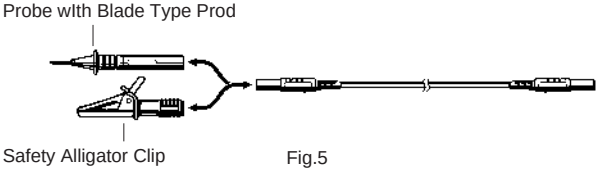


Fig.5

(14) Extension leads adaptor(M-7140)

This is for connecting the instrument and a cord reel.

Fig.6

3.5 Explanation for indications

3.5.1 LCD Display

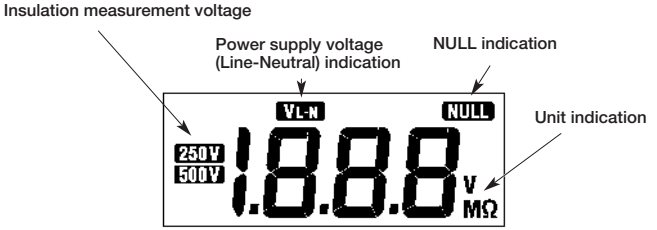


Fig.7

Note) Over range display: "OL" is displayed on the LCD.

3.5.2 LED for threshold value indication and buzzer

Range	Status	LED Color	Warning buzzer (Continuous sounds)
Earth Continuity	RPE < 1Ω	Green	---
	RPE ≧ 1Ω	Red	ON
Insulation	RINS ≧ 1MΩ	Green	---
	RINS < 1MΩ	Red	ON
Polarity(L/N/PE)	Correct wiring	Green	---
	Faulty wiring	Red	ON

3.6 Applicable standards

Instrument operation

AS/NZS 3760: 2001 In-service safety inspection and testing of electrical equipment.

Safety: IEC/EN61010-1 CAT.III 300V-instrument

IEC/EN61010-2-031 CAT.III 300V(600V)-test lead

4. Specification

● General specification, measuring range and accuracy
Voltage(VOLT) measurement of main power supply

Measuring range	207 ~ 264V AC
Resolution	1V
Accuracy	± (2%rdg+3dgt)

Measurement of Protective conductor resistance(RPE)

Measuring range	0 ~ 19.99Ω
Resolution	10mΩ
Open-circuit voltage	±5.0± 0.4V DC
Measuring current	Within 200 ~ 250mA DC (when measuring 0 ~ 2Ω
Accuracy	± (2%rdg+3dgt)

Measurement of Insulation resistance (RINS)

Rating	250V/200MΩ and 500V / 200MΩ
Measuring range	0~19.99MΩ/ 199.9MΩ (2 auto ranges)
Resolution	10kΩ/100kΩ
Rated voltage	250V/500V DC(+20%/-10%) @1MΩ
Short-circuit current	14mA DC or less
Accuracy	± (2% rdg+3dgt)

Threshold and display

Range	Status	LED Color	Warning buzzer (Continuous sounds)
Earth Continuity	RPE ＜ 1Ω	Green	---
	RPE ≧ 1Ω	Red	ON
Insulation	RINS ≧ 1MΩ	Green	---
	RINS ＜ 1MΩ	Red	ON
Polarity(L/N/PE)	Correct wiring	Green	---
	Faulty wiring	Red	ON

Reference test condition

Unless otherwise specified, this specification is dependent on following condition.

(1) Ambient temperature: 23±5℃
(2) Relative humidity: 45 ~ 75%
(3) Attitude: Horizontal
(4) AC power supply: 240V, 50Hz
(5) Altitude: 2000m or less

Operating temperature and humidity range

0℃ ~ +40℃ Relative humidity: 85% or less(no condensation)

Storage temperature and humidity range

-20℃ ~ +60℃ Relative humidity: 85% or less(no condensation)

Rate voltage and frequency

Rated voltage: 240V ±10%
Rated frequency: 50Hz ±1%

Maximum rated power

Approx. 7VA

Outer dimension and weight

Outer dimension: 185(L) × 167(W) × 89(D)mm
Weight: Approx. 1kg (only the instrument body)

Symbols used on the instrument:

⧈ Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
⚠ Caution (Refer to the accompanying instruction manual)

5. Preparation before a measurement

5. 1 Visual inspection

Before starting a measurement, user should undertake visual checks on the mains cord, case and that the correct type and rated fuse is fitted to the DUT. And also there should be no evidence of damage of a nature that may impair the electrical safety of the item.

5.2 Connection to main power supply

5.2.1 Connection of mains cord

Set the range switch to VOLT range, and connect the mains supply and the instrument with M7123 mains cord.

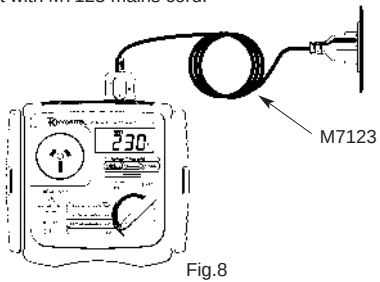


Fig.8

⚠CAUTION

- Always be sure to check there is no abnormal conditions or damages on the instrument and cords. If any evidence of abnormality found, measurement shall be stopped immediately.
- The outlet of mains power supply must have earth terminal.
- This instrument can be only connected to the commercial power of 240V+10%-10%, 50Hz.

5.2.2 Check the power supply voltage

There is no power switch and the instrument is immediately ready for use. Power supply voltage is displayed on the LCD. Please check the value, and when it is from 216V to 264V, the instrument can perform correct measurements. If the displayed value is out of above range, do not make a measurement.

⚠WARNING

● When the voltage of mains power supply is 265V or more, "HI-V" is displayed on the LCD and buzzer sounds (discontinuous sounds). In that case, disconnect the mains cord of the instrument from main power supply.

5.2.3 NULL setting

Criteria of judgment for Earth Continuity is 1Ω, and it is low value.
So even the resistance of Test Leads will affect the measurement result.
This instrument, M-6201, can cancel the resistance of Test lead by pressing

250V/ 500V
NULL

switch. The procedure of NULL setting is shown below.

The NULL function is not released even if power off the instrument, therefore, there's no need to do NULL setting at every measurement.
However, when replacing fuses or test leads, it is recommended to do NULL setting again

Procedure:

(1) Set the range switch to Earth Appliance Test range.
(2) Connect the mains supply and the instrument with M7123 mains cord.

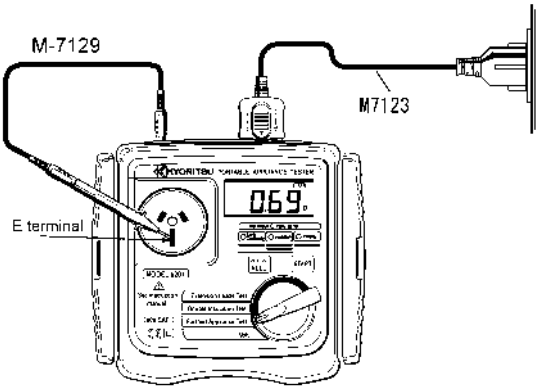


Fig.9

(3) Insert Test Lead with safety alligator clip(M-7129) in to the E terminal of the instrument, and contact the tip of the Test Lead with the metal parts of the socket on the instrument.
Press start switch with contacting the Test Lead and the metal parts,the resistance of Test Lead will be displayed on the LCD as shown above fig.10 for 2sec.
Then, the instrument cancels the resistance value of Test Lead and adjust the displayed value to "0.00" as shown below fig.10.
At this bout, NULL mark is displayed in the LCD.

Display at NULL setting

Fig.10

(4) NULL setting can be released by pressing 250V/ 500V / NULL switch for 2sec.

The "NULL" mark on the LCD will disappear when NULL setting is released. NULL setting and release can be done on Earthed Appliance Test range only.

5.2.4 Voltage setting for insulation resistance measurement (How to change 250V and 500V)

(1) Set the range switch to Double Insulation range, and press the 250V/ 500V / NULL switch.
Then the mark to indicate the selected voltage is shown on the LCD. By pressing 250V/ 500V / NULL switch, 250V and 500V can be changed over.

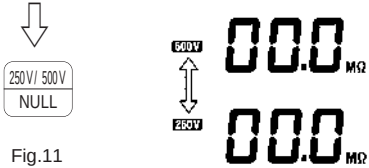


Fig.11

6. Measuring method

6.1 Earthed appliance Test

The purpose of the test carried out for Class 1 appliances is to check the insulation resistance between accessible conductive parts and connection of protective earth and between live wire parts and accessible conductive parts is within the range defined in the standards.

To conduct the tests of protective conductor resistance and insulation resistance for DUT, connect the mains plug of DUT to the test socket (1) described in clause **3.4 INSTRUMENTS LAYOUT** and PE probe terminal (5).

Use the following setups, depending upon the type of DUT.

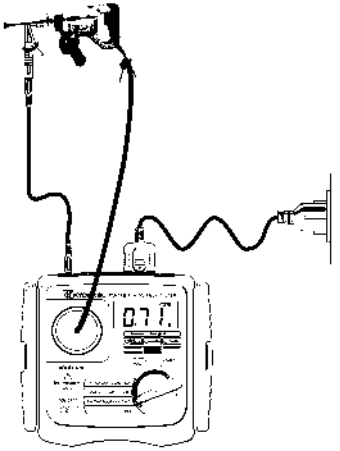


Fig.12

(1) Power on the DUT
(2) Connect the mains plug of Safety class 1 DUT to test socket on the instrument.

(3) Connect Test Lead M-7129 to Rpe terminal and clip the metal part of DUT with alligator clip.

(4) Press the START switch when above preparation is completed.

(5) First, measure the protective conductor resistance.
When it passes(1Ω or less), ◯ Earth Continuity lights up in green and display the measured result on the LCD.

(6) Then the instrument automatically performs insulation resistance measurement. When it passes(1MΩ or more), ◯Insulation lights up in red and the measurement is completed. The measured values of protective conductor resistance and insulation resistance, which are passed the test, will be alternately displayed on the LCD.

(7) When it fails, ◯ Earth Continuity or ◯Insulation will light up in red, and "no" is displayed on the LCD.
The measured value, which is failed the test, and the message "no" will be alternately displayed on the LCD.

⚠CAUTION

- Follow the procedure described in 5.2-3 and do NULL setting before a measurement.
- Alligator clip must make good contact with the enclosure of the DUT.
- When the terminal is open or the resistance value exceeds measuring range, "OL" mark (over range display) appears on the LCD.
- Do not touch the device under test while testing is in progress.
  Since a high voltage of 500V, user may get electrical shock.

6.2 Double Insulation Test

The Class 2 appliances have the indication of "DOUBLE INSULATION" or the symbol of ⧈. Double insulation test is to check the insulation resistance of the appliances is within the range defined in the standards.

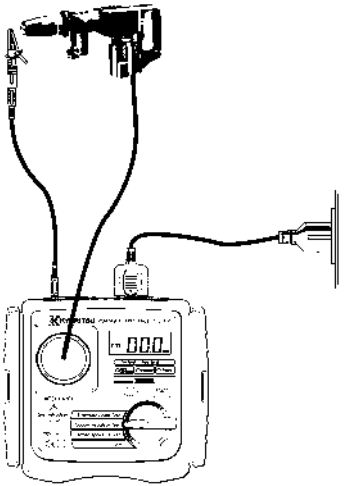


Fig.13

(1) Power on the DUT
(2) Connect Test Lead M-7129 to Rpe terminal and clip the metal part of DUT with alligator clip.
(3) Connect the mains plug of Safety class 2 DUT to test socket on the instrument.
(4) Press the START switch when above preparation is completed.
(5) Measure the insulation resistance.
When it passes(1MΩ or more), ○Insulation lights up in green and the test is completed. The measured value, which is passed the test, will be displayed on the LCD .

⚠CAUTION

- When the terminal is open or the resistance value exceeds measuring range, "OL" mark (over range display) appears on the LCD.
- Do not touch the device under test while testing is in progress. Since a high voltage of 500V, user may get electrical shock.

6.3 Extension Leads Test

This test is for extension leads, and check:

* Protective conductor
* Insulation resistance between L and N, and insulation resistance between L/N and PE.
* Polarity check of the Line and Neutral terminal of plug and socket.

Test procedure and the connection are as follows.

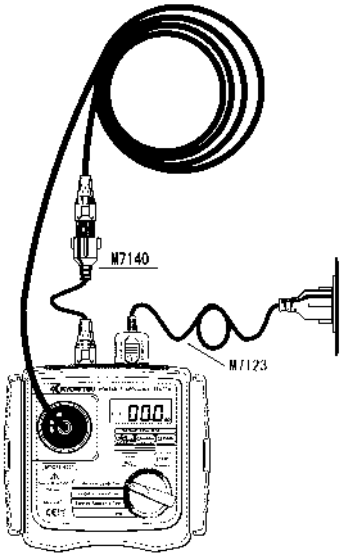


Fig.14

(1) Plug the extension leads adaptor M-7140 to the IEC socket of M-6201 connector block.

(2) Connect the plug of the adaptor M-7140 for extension lead with the connector of the extension lead.

(3) Insert the plug of extension lead into the socket on the front side of M-6201.

(4) Set the range switch on M-6201 to Extension Leads Test range, and press the START switch.

(5) Then protective conductor resistance is measured.
When it passes(1Ω or less),lights up in green and display the measured result on the LCD.

(6) Then the instrument automatically performs insulation resistance measurement. When it passes(1MΩ or more), ○Insulation lights up in green and the measured result is displayed on the LCD.

(7) Polarity test will be performed the next, and when it passes, ○Polarity lights up in green and the measured values of protective conductor resistance and insulation resistance will be alternately displayed on the LCD .

(8) When it fails at any of three: ○Earth Continuity ○Insulation ○Polarity , the corresponding LED lights up in red and further measurement will be stopped. The measured value, which is failed the test, and the message "no" will be displayed on the LCD in turn.

⚠CAUTION

- Follow the procedure described in 5.2-3 and do NULL setting before a measurement.
- Alligator clip must make good contact with the enclosure of the DUT.
- When the terminal is open or the resistance value exceeds measuring range, "OL" mark (over range display) appears on the LCD.
- Do not touch the device under test while testing is in progress. Since a high voltage of 500V, user may get electrical shock.

7. Fuse replacement

When the fuse blows during use, please replace with new one according to below procedure.

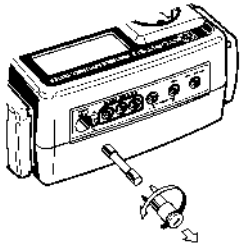


Fig.15

(1) Use a flat head screwdriver and turn it about 45˚ to left and remove the fuse cap and fuse.
(2) Remove the fuse from the fuse cap and replace it with new one.
(3) Install the fuse cap and fuse again. At that point, the screwdriver groove shall be at about 45˚ turned to left from the initial position. Use the flat head screwdriver and turn it to right.
(The screwdriver groove will stop at the horizontal position.)

⚠WARNING

- Be sure to remove mains cord from the instrument before replacing fuse.
- The fuse that user can replace is this fuse only. Never attempt to perform the other repairing.

⚠CAUTION

- Please use the specified fuse
(Fast acting type ceramic fuse: 600V/500mA - Φ6.3×32mm).
For the specified fuse, purchase it by yourself or order it from our agency.

8. Services

If this instrument should fail to operate correctly, return it to your distributor. Please remember to give all the information possible concerning the nature of the fault, as this will mean that the instrument will be serviced and returned to you more quickly.

9. Case and strap assembly

Strap belt and probe case can be attached to the instrument as below.

Pass the strap belt down through the side panel of the main body from the top, and up through the slots of the probe form the bottom. (Fig. 16).
Pass the strap through the buckle, adjust the strap for length and secure.

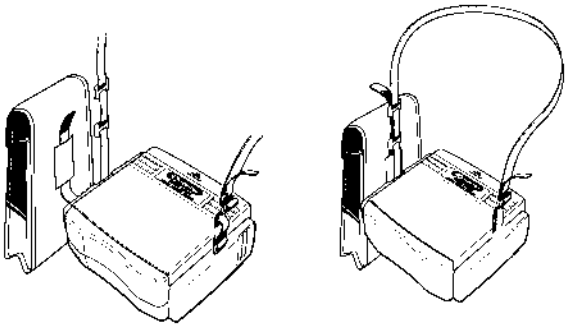


Fig.16

DISTRIBUTOR

Kyoritsu reserves the rights to change specifications or designs described in this manual without notice and without obligations.

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