Thank you for purchasing a SANWA tester Model YX360TRF. You are kindly requested to thoroughly read this manual before use for safety. Especially, "SAFETY INFORMATION" and "MEASURING PROCEDURE" are important. Keep this manual together with the tester so as no to lose it.

NAMES OF COMPONENTS

BODY COVER, TEST LEADS, HAND STRAP

- Use of Cover (example for the body cover)
  When this tester is out of use:
  Attach the cover to the panel face for safekeeping. or use it as a stand as shown below.

- Storage of Test Leads
  When placing the test leads in the storage space, roll it 3 times, then put in the test pin slot as shown below.

- Attachment of Hand Strap
  Loosen the screws fixing the rear case and remove it.
  Hand strap is attached to contacting point.
  Put back the rear case where it was and fix it with the screws.

INTRODUCTION

The following are precautions to prevent accidents such as electrical shocks.
Be sure to read them before using the tester.

- Symbols
  The following cautionary signs appear on the multimeter and in this manual.

- Precautions for Safety Measurement
  To ensure that the meter is used safely, follow all safety and operating instructions.
  1. Never use the meter on the electric circuits that exceeds 3 kV.
  2. Pay special attention when measuring the voltage of AC 33 Vrms (41.7 V peak) or DC 10 V or more to avoid injury.
  3. Never apply input signals exceeding the maximum rating input value.
  4. Never use the meter for the line connected with equipment (i.e. motors) that generates induced or surge voltage since it may exceed the maximum allowable voltage.
  5. Never use the meter if the meter or test leads are damaged or broken.
  6. Never use an uncased meter.

SAFETY INFORMATION

APPLICATION

- Application
  This instrument is portable multimeter designated for measurement of weak current circuits.

The specifications described in this manual are subject to change without notice.

SPECS

- Measurement Range and Accuracy
  (Temperature : 23±2 ℃ humidity 75 % RH max. No condensation)

- General Specifications
  This instrument is portable multitester designated for measurement of weak current circuits.

- Electrical Safety
  The circuit is protected by fuse even when voltage of up to AC 250 V is impressed on the range for 5 seconds.

- Environmental conditions
  Operating temperature: 0 ~ 50 ℃, 40 ~ 90 % RH (decreasing linearly)
  Storage temperature/humidity: 31 ℃ ~ 40 ℃, 80 ~ 50 % RH (decreasing linearly)

- Circuit protection
  The circuit is protected by fuse even when voltage of up to AC 250 V is impressed on the range for 5 seconds.

- Environmental conditions
  Operating temperature: 0 ~ 50 ℃, 40 ~ 90 % RH (decreasing linearly)
  Storage temperature/humidity: 31 ℃ ~ 40 ℃, 80 ~ 50 % RH (decreasing linearly)

- Specifications
  Specifications

- Input impedance
  Measurement of input impedance:
  Input impedance 9 kΩ
  Input impedance 40 kΩ

- Internal battery
  Battery life: 1000 (10 Hz) 20 s, 60 °C, 60 °C, 60 °C, 60 °C (increasing linearly)
  Internal battery: 30 °C ± 10 °C, ± 10 °C

- Storage temperature/humidity
  0 ~ 50 ℃ 75 % RH max. No condensation

- Operating conditions
  Operating environment:
  Operating a ltiude up to 2000 m pollution degree 2
  Operating conditions:
  Operating conditions:

- Precautions for Safety Measurement
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  6. Never use an uncased meter.
MEASURING PROCEDURE

WARNING Confirm the range of use before measurement.

Preparation for Measurement
Adjustment of the zero position
- Turn the zero position adjuster so that the pointer may align exactly to the arbitrary zero position.

Range selection
- Set the range selector knob to an appropriate range for the item to be measured and set the range selector knob to the appropriate position.

NOTE
When determining a measuring range, select a one higher than the value to be measured as well as where the pointer of a meter moves to a considerable extent. However, select the maximum range and measure in case the extent of value to be measured cannot be predicted.

Measuring DCV
- Set the range selector knob to an appropriate DCV range.
- Apply the test black pin to the negative terminal, and the red test pin to the positive terminal of the circuit.
- Read the movement of the pointer by ±DCV scale.
- Read the indicated value by LI scale.

Measuring ACV
- Set the range selector knob to an appropriate ACV range.
- Apply the test leads to the circuit to be measured.
- Read the movement of the pointer by V and A scale.

Measuring DCA (NULL)
- Set the range selector knob to an appropriate ±DCV (NULL) range.
- Turn the ±DCV adjuster so that the pointer may align exactly to the arbitrary zero position.
- Apply the test black pin to the negative terminal and the red test pin to the positive terminal side of the circuit.
- Read the movement of the pointer by ±DCV scale.

Measuring of Ico (Leak Current) for Transistor
- Adjust by setting the range selector knob to a proper range from X1 ~ X1 k.
- For NPN transistor, apply a black test pin to the collector and a red one to the emitter.
- For PNP transistor, the red one to the collector and the black one to the emitter.
- Determine the leak current by ICEO scale indicated on the scale plate. (Unit in µA, mA)

Measuring of Diode (including LED)
- Adjust by setting the range selector knob to a proper range from X1 to X1000 x 1.5 µA
- Apply the test black lead to anode side and the red one to cathode side when measuring IR (forward current).
- Apply the black test lead to cathode side and the red one to anode side when measuring IR (reverse current).
- Read the indicated value by L1 scale. (The pointer moves to a considerable extent for IF, and a little extent for IR)
- The value indicated on L1 scale during the measurement is the forward voltage of diode.

Usage of Optional Probes
- Usage of High Voltage Probe (HV-10T)
  Up to DC 25 kV of CRT anode voltage can be measured by connecting optional HV-10T probe.
  WARNING
  - Keep the hand (finger) away from high voltage power supply. Electric shock may occur due to discharge.
  - Measurement should be limited only to microcur.
  - Larger voltage may cause an error.
  - When the probe tip contacts with the CRT anode, the displayed reading may swing upward.
  - Use proper load when measuring such signal as having direct current.

How to Replace the Fuse
- If voltage over 1 V is applied to DCA or AC range, the fuse may blow out to protect the circuit.
  - Loose the screws fixing the rear case and remove it.
  - Replace R6 (UM-3) to fresh dry batteries.
  - Put back the rear case where it was, and fix it with the screws.
  - Be sure to use the same rated fuse. In case a fuse other than the same rate (see “SPECIFICATIONS”) is used, an error in indication occurs and/or circuit protection is made unable.

Usage of hFE Probe (HFE-6T)
- Set the range selector knob to X1 range. (PROBE)
- Short circuit both the red and black test pins to adjust D 0.
- Connect the black test pin to the probe jack when a transistor to be measured is NPN, and the red pin to the probe jack for PNP transistor.
- Connect the black clip of the probe to the transistor base and the red clip to the collector.
- Connect the remaining test lead to the emitter and measure hFe.
- Read the indicated value of the meter on hFe scale.

Measuring IQ
- Turn the range selector knob to an appropriate IQ range.
- Apply the test leads to the circuit to be measured.
- Read the movement of the pointer by V and A scale. (Use AC 10 V scale for 10 V range only.)
- Since this instrument provides the mean value system for its AC voltage measurement circuit, AC waveform other than sine wave may cause an error.
- Errors occur under such frequencies other than those in the specification table.

WARNING
Do not measure the resistance in a circuit where a voltage is present.
- Turn the range selector knob to an appropriate IQ range.
- Short the red and black test pins and turn the 0 adjuster so that the pointer may align exactly to 0 Ω. (If the pointer fails to swing up to 0 Ω even when the 0 adjuster is turned clockwise fully, replace the internal battery with a fresh one.)
- Apply the test pin to measure resistance.
- Read the movement of the pointer by Ω scale.

NOTE
- The polarity of + and - is reverse to that of the test leads when measurement is done in Ω range.
- How to replace battery:
  - Loose the screws fixing the rear case and remove it.
  - Replace R6 (UM-3) to fresh dry batteries.
  - Put back the rear case where it was, and fix it with the screws.

Measuring Output of DC current (DB)
- DB (decibel) is measured in the same way as the ACV measurement, by reading the dB scale instead.
- For measurement on the 10 V range, the dB scale (10 dB +22 dB) is read directly, but, when measured on the 50 V range, 14 dB is added. On the 250 V range, 28 dB is added on the reading on the scale, and on the 1000 V range, 45 dB added.
- Thus, the maximum dB readable is 22 + 40 = 62 (dB) measured on the 1000 V range.

WARNING
- Be sure to short circuit the both ends of the capacitor for discharge prior to the initial measurement or in such case after the measurement is made.

Usage of High Voltage Probe
- To measure DC voltage from X1 to X100 k (1.5 µA).
- Up to DC 25 kV of CRT anode voltage can be measured by connecting optional HV-10T probe.

Usage of hFE Probe
- Be sure to use the same rated fuse. In case a fuse other than the same rate (see “SPECIFICATIONS”) is used, an error in indication occurs and/or circuit protection is made unable.

WARNING
- Do not measure the resistance in a circuit where a voltage is present.

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Maintenance
- Warranty and Provision
  Under Sanwa’s general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase.
  This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor.
  This warranty does not apply to fuses, disposables batteries, or any product or parts, which have been subject to one of the following causes:
  1. A failure due to improper handling or use that deviates the instruction manual.
  2. A failure due to inadequate repair or modification by people other than Sanwa service personnel.
  3. A failure due to causes not attributable to this product such as fire, flood, and other natural disaster.
  4. Non-operation due to a deterioration of the battery.
  5. A failure or damage due to transportation, relocation or dropping after the purchase.

Repair
- Please contact Sanwa authorized agent/distributor/service provider, listed in our website, in your country with your information.

SANWA web site
http://www.sanwa-meter.co.jp
E-mail: exp_sales@sanwa-meter.co.jp

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