



<p>Leakage Clamp Tester for Arrester ALCL-40L</p>
<p>Instruction Manual</p>

Thank you very much for selecting our ALCL-40L Leakage Clamp Tester for Arrester .

This model is complex instrument and employs a very reliable mechanical/electronic design. Before you use your new instrument, read this instruction manual completely and familiarize yourself thoroughly with all functions. With proper use and care, your tester will give you years of satisfactory service.

**Multi Measuring Instruments Co., Ltd.**

Akihabara murai-Bldg. 7F,  
1-26 Kanda Sakuma-cho,  
Chiyoda-ku, Tokyo, 101-0025 Japan  
Tel: 81-3-3251-7013  
Fax: 81-3-3253-4278

————— CONTENTS —————

1. General.....	1
2. Safety summary.....	2
3. Specification.....	4
4. Name of parts.....	6
5. Measurement.....	8
5-1. Replacement of batteries.....	8
5-2. Motor operation.....	9
5-3. Measuring method.....	9
5-4. Stopper.....	10
6. Maintenance.....	12
7. Warranty.....	13

## 1. General

ALCL-40L is a specially designed clamp tester for the leakage and harmonics current measurements of grounding line of oxide surge arrester. It measures very low leakage current, fundamental harmonics current and 3rd harmonics current with the least influence from the external magnetic field to warn that an arrester is damaged or deteriorated. The motor driving mechanics for the opening and closing of CT sensor is used for safe operation.

## 2. Safety summary

This instrument has been manufactured and inspected in our factory before shipment.

If used for its intended purpose, safety of the user and of the instrument is assured. The device may only be operated by **properly trained personnel** who are capable of recognizing the dangers associated with the measurement of electrical current and voltage.

Read the operating instructions completely and carefully before using the instrument, and follow all instructions written herein.

Meaning of symbols on the instrument:



Warning and Caution concerning a source of danger  
(Read the manual with special care before use.)

### CAUTION

- Do not use or storage the instrument under the direct sunshine, high humidity and temperature, as it may cause the insulation defect of the instrument.
- Do not use the instrument nearby the appliance or machine which generate the strong magnetic field, as it may cause the measuring error of instrument.
- Do not apply the mechanical **vibration or shock** to the any parts of CT sensor.
- During transportation, always set CT switch to "NEUTRAL" position.
- This instrument is not water or dust-proof structure. Do not use this instrument in the dusty environment or in the rain, as it may cause the serious accident or defect of the instrument.

 **Warning**

- Before operating this instrument, familiarize yourself with all instructions outlined in this manual.
- The instrument must only be used by suitably trained competent persons.
- Always check to make sure that the function switch is set to the proper position.
- When making measurements, use CAUTION as dangerous voltages may be present in normally safe areas.
- When making measurements, do not touch any conductive parts of the equipment under test. For safe operation, the use of rubber insulation glove is recommended.
- The instrument should not be used if any part of the instrument is damaged. The CT sensor must be good order with no broken or cracked insulation.
- To avoid electrical shock, use CAUTION when working above 60V DC or 25V AC rms. Such voltages pose a shock hazard.
- Do not disassemble the CT sensor or instrument.
- Do not remove the stopper in normal operation, it may cause the serious problem of the instrument.

**POSSIBLE ELECTRICAL SHOCK**

- If excessive current is applied to the CT sensor, the instrument will be heated and damaged. Use the instrument within the rated current.
- This instrument is designed to measure the grounding line of arrester, do not measure the live power line.
- Do not use the instrument, if any part of the CT sensor is damaged.
- Do not measure the uninsulated conductor.

**3. SPECIFICATIONS**

**CT Sensor**

- CT max. opening size :  $\phi 37\text{mm}$
- Opening/closing of the jaw : Motor operation
- Withstanding voltage : AC 2300V, 1 minute (between the core of CT and CT outer case)

**Measuring and display unit**

- Measuring function : Leakage current, harmonic current (Fundamental & 3rd harmonics)
- A/D conversion : Dual slope integration mode
- Measuring range : AC 0-300  $\mu\text{A}$ /3mA/30mA (3range manual)
- Input frequency : 45-60Hz (Fundamental frequency)
- AC conversion : AC coupled true rms responding
- Display : LCD, max. 3200 count
- Sampling : 2 times/sec.
- Over indication : "OL" mark on LCD
- Low battery indication : "⎓" mark on LCD
- Data hold indication : "DH" mark on LCD
- Auto power off function : Approx.10 minutes later after power on
- Power supply : AA size alkaline battery x 4
- Limitation of circuit voltage : Less than AC500Vrms
- Operating temperature : 0-40°C, less than 80%RH (Without condensation)
- Storage temperature : -10~60°C, less than 70%RH (Without condensation)
- Dimensions : 160(W)x950(L)x84(D)(When retracted)  
: 160(W)x2680(L)x84(D)(When stretched)
- Weight : Approx.2.6kgs

**AC Current**

Accuracy (23°C±5°C, less than 80%RH)

Range	Resolution	Accuracy(45~65Hz)	Max. input Current
300 $\mu\text{A}$	100nA(0.1 $\mu\text{A}$ )	±1.2%±8digit	40A rms
3mA	1 $\mu\text{A}$ (0.001mA)		
30mA	10 $\mu\text{A}$ (0.01mA)		

- Crest factor : <3 (0-50% of the range)  
<2 (50-100% of the range)

### Harmonic Current Measurement (Fundamental & 3rd harmonics)

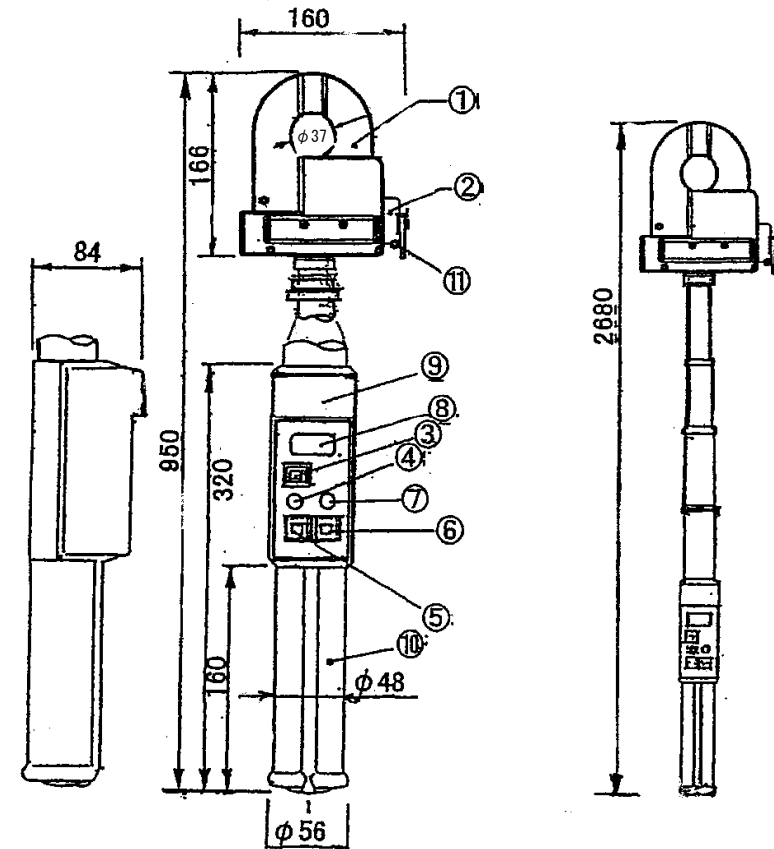
Measuring method : PLL method  
 Minimum fundamental current input : More than 3% of full scale in each range  
 ※ Accuracy : (1%±5digit)±(Basic accuracy of ACA)  
 -(Error by neighboring harmonics)

※ Accuracy specified: More than 4% harmonics are necessary against fundamental harmonics

### Accessories

CT cover case.....1  
 Instruction manual.....1

### 4. Name of parts



- ① CT sensor : Current detection sensor.
- ② Motor : Driving motor for opening and closing of CT sensor.
- ③ CT switch : CT OPEN ; Press this switch upward to open the CT sensor.  
 (CT OPEN/NEUTRAL/CT CLOSED)  
 NEUTRAL ; Set this switch to "NEUTRAL" position to stop the driving motor.  
 CT CLOSED; Press this switch downward to close CT sensor.

- ④ Power on/off switch : Push this switch once, power will be turned on and push again for power off.  
(Power will be tured off automatically 10 minutes later after power on.)
- ⑤ Range switch : Manual range selection switch for 300  $\mu$  A, 3mA & 30mA range.
- ⑥ Mode switch : Selection switch for the leakage current (RMS), fundamental harmonics current (1st H) or 3rd harmonic current (3rd H) range.
- ⑦ Data hold switch : Push this switch once, "DH" mark will be displayed on LCD and the displayed value will be held. Push gain to release the data hold function.
- ⑧ Display : LCD display for measured value and battery condition.
- ⑨ Battery cover : To replace the batteries, remove the battery cover.
- ⑩ Grip : Grip part for handle.
- ⑪ Stopper : When the motor is broken with the conductor clamped, pull out this stopper to release it. **However, this is for emergency only. Do not remove the stopper in normal operation.**

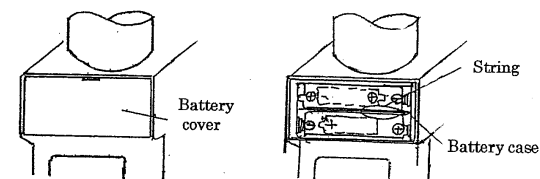
**⚠ CAUTION**

The removing of stopper is allowed to use **only for emergency**. Do not touch this stopper in normal operation, as CT may not be fixed again after pulling out the stopper.

## 5. Measurement

### 5-1. Replacement of batteries

- ① Make sure that the power is turned off.
- ② Make sure that the CT switch is set to "NEUTRAL" position.
- ③ Remove the battery cover.
- ④ Pull the string, and take out the battery case.
- ⑤ Replace the batteries (1.5V AA size alkaline battery × 4) observing the correct polarity.
- ⑥ Install the battery case and cover as same as before.



(Pull the string and take out the battery case.)

**⚠ Warning**

**POSSIBLE ELECTRICAL SHOCK**

- Do not make measurements with the battery cover off.
- Disconnect the conductor under test before replacing the batteries.

**⚠ CAUTION**

- If the tester is not used for a long period of time, remove the batteries from the instrument to prevent the damage caused by battery liquid leakage.
- When replacing the batteries, do not mix the different type of batteries, or new and old batteries.

**NOTE:** When the batteries becomes exhausted or drops below the operating voltage, "E+" mark is displayed. It is necessary to change the batteries without any delay.

## 5-2. Motor operation

### ● Opening method of the CT sensor

Set 'CT switch' to "CT OPEN" position, the CT sensor will be opened by the motor driving. Make sure to stop the driving motor by setting 'CT switch' to "NEUTRAL" position when reached to the opening end.

### ● Stopping method of the driving motor

Set 'CT switch' to "NEUTRAL" position, the driving motor will be stopped. After clamping the conductor to be measured, always set 'CT switch' to "NEUTRAL" position.

### ● Closing method of the CT sensor

Set 'CT switch' to "CT CLOSE" position, the CT sensor will be closed by the motor driving.

When the CT sensor is closed completely, the motor will be stopped automatically by the limit switch equipped in the closing end.

After closing, do not apply any mechanical vibration or shock to the CT sensor, it may cause the chattering of the limit switch, but this is not abnormal.

After clamping the conductor to be measured, always set 'CT switch' to "NEUTRAL" position.

### ⚠ CAUTION

During opening or closing of CT sensor, never apply the mechanical vibration or shock to the CT sensor, it will cause the alignment problem of the CT sensor.

## 5-3. Measuring method

- ① Clamp the grounding conductor of the arrester to be measured.  
(Refer to '5-2 Motor operation' for opening and closing of the CT sensor.)
- ② Set 'Power on/off switch' to "ON" to power on the measuring circuit.

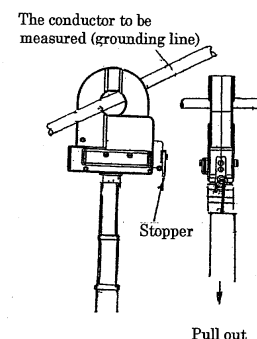
**NOTE:** This power switch is not related to the power on/off function of driving motor.

- ③ Set 'Mode switch' to "RMS" position and set 'Range switch' to the suitable range.
- ④ Read the displayed value.
- ⑤ If necessary, set 'Mode switch' to "1st H" or "3rd H" for the measurement of the fundamental harmonics current or 3rd Harmonics current.
- ⑥ After measurement, remove the CT sensor from the conductor under test.  
(Refer to '5-2 Motor operation' for opening and closing of the CT sensor.)
- ⑦ Verify 'CT switch' is set to "NEUTRAL" position.

### ⚠ CAUTION

- If excessive current is applied to the CT sensor, the instrument will be heated and damaged. Use the instrument within the rated current.
- This instrument is designed to measure the grounding line of arrester, do not measure the active power line.
- When setting the measuring range, always set 'Mode switch' to "RMS". Otherwise, it may cause the measuring error.
- The power will be turned off automatically 10 minutes later after power on.
- During measurements, do not apply any mechanical vibration or shock to the CT sensor.

## 5-4. Stopper



When the motor is broken with the conductor clamped, pull out the stopper as shown in the drawing. Open the CT sensor manually, and remove the CT sensor from the conductor under test.

 **Warning**

When removing the CT sensor from conductor, use CAUTION as dangerous voltage may be present.

 **CAUTION**

The removing of stopper is allowed to use **only for emergency**. Do not touch this stopper in normal operation, as CT may not be fixed again after pulling out the stopper.

## 6. Maintenance

When making requests for repair service, please bring the instrument directly to the dealer. If this is impossible, however, send the instrument directly to our sales office. When mailing this instrument, always pack it in its original or equivalent packing material and pack together with name, address, telephone number and the warranty documentation.

- To ensure speedy and reliable repair, always include information of the type of failure and cause.
- If required, always return accessories with the instrument.
- When contacting us, provide the model number and serial number of your instrument.

## **7. Warranty**

The instruments are subject to strict quality control. However, should the instrument function improperly during daily use, you are protected by our 12 months warranty (valid only with invoice). We will repair free of charge any defects in workmanship for our original defect. Any damage due to dropping, incorrect operations and use, or repair/modification made by unauthorized person are not covered by the warranty.