

## LA FAULT DETECTOR SURGE ARRESTER LEAKER

### Application:

1. Quick Health Check of Metal-Oxide Surge Arrester by Measuring 3rd Harmonic
2. Leakage current Tester as per IEC 60099-5

**Model : ALCL-40/ALCL-40H**



Specially designed for Distribution and Railway Metal Oxide surge arrester at height.



Model ALCL-40H

### GENERAL

This model ALCL-40/40H mainly measures very small leakage current and its 3rd Harmonic current of grounding line connected with Arrester, etc. The CT which is applied to this model is hardly affected by external magnetic field and therefore, model ALCL-40 can measure leakage current very accurately in high magnetic and electric field.

### SPECIFICATIONS

- 1) CT Sensor  
Inside Diameter of CT : 37mm  
Structure : Apart from Measuring Part
- 2) Measuring Part  
Measuring Function : Leakage Current, Harmonic Current(Dominant & Third Wave)  
Measuring Method : CT Clamp-on Method  
Measuring Range : 0-300 $\mu$ A/3mA/30mA (3range manual)  
Input Frequency : 45-60Hz (Dominant Wave Frequency)  
AC Conversion : RMS Detection Method  
A/D Conversion : Double Integration Method  
Display : 3200 count max.,LCD  
Sampling Rate : 2 times/second  
Over Indication : "OL" on the display  
Low Battery Indication : "B" sign on the display  
Data Hold Function : "DH" sign on the display  
Auto Power Off : Approx.10 minutes after power on  
Other Function : Manually CT open/close (ALCL-40,ALCL-40H)  
Wave Form Signal Output(ALCL-40H)
- 3) General Specs.  
Power Supply : 9V Alkaline Battery (6LR61)  $\times$  1

Operating Circuit Voltage : Less than 500V AC  
Operating Temperature : 0~40°C, less than 80%RH, w/o condensation  
Storage Temperature : -10~60°C, less than 70%RH, w/o condensation

- 4) Accuracy  
4-1 AC Current

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

AC Conversion : RMS Detection Method  
Crest Factor : <3 (0~50% of the range)  
<2 (50~100% of the range)

- 4-2 Harmonic Current(Dominant Current, 3rd Harmonic Current)  
Detection Method : Automatic Tuned Filter  
Min. Dominant Current Input : more than 3% of each range  
Accuracy : (1% $\pm$ 5digit) $\pm$ (Basic current Accuracy of ACA) – (Error by neighbouring harmonics)

\* In case that the harmonic current is more than 4% of the dominant wave  
Tolerance influenced by adjacent frequency : 1.5%

- 5) Dimension & Weight

ALCL-40H {CT Part : 135(W) $\times$ 166(H) $\times$ 61(D)mm, Approx. 1000g  
Display Part : 95(W) $\times$ 160(H) $\times$ 334(D)mm, Approx. 260g

# THE MOST PRECISE LEAKAGE CURRENT CLAMP TESTER IN THE WORLD

Generally, it is said that the metal oxide surge arresters in high voltage lines should be replaced within 15 years after the start of use under the normal conditions:

Of course, the duration of arresters would be shortened by various causes like as direct surge attack, internal abnormal voltage, vibration & shock to outer pole component, etc. and the regular & adequate inspections are required in order to avoid serious accidents in high voltage distribution networks.

In European standard IEC60099-5 Section 6 "Diagnostic indicators of metal-oxide surge arresters", the following inspection methods are introduced:

\*Fault Indicators \*Disconnectors \*Surge Counters \*Monitoring Spark Gaps \*Temperature Measurements  
\*Insulation Resistance Measurements \*Leakage Current Measurements (Capacitive, Resistive, Harmonics, etc.)

Among various methods, the leakage current measurements (except for resistive) are only effective, as others are mostly unreliable under the very severe field conditions and some are impracticable due to impossibility of power line off for inspections.

ALCL-40H/ALCL-40L are adapted to "B1" method of IEC60099-5 Section 6.

## ACTUAL MEASURING FIELDS



Transformer Substation



Railway Station



Power Line

The most important factor for measuring leakage current is how to detect the real & accurate values (less than 1mA) free from influences of strong magnetic & electric fields in the actual measuring places as above.

Models ALCL-40H/ALCL-40L have quite unique & sophisticated CT which enables to measure very low range current with minimum resolution of 0.1µA, defensing such outer electric noises.

For example, the comparison list for ordinary & ALCL CT is as followings:

Range	ALCL-40/-40L	Ordinary Model
Accuracy	1.2%	±5%±10%
Minimum Resolution	0.1µA	10µA
Influence of Outer Magnetic Fields	Less than 10µA (400A turn/15cm)	Less than 1mA (20A turn/5cm)

The operation of such field measuring instruments must be rather simple and easier. so that the inspection & maintenance can be made more frequently and the measured data compared correctly, which will lead to find out the problems of surge arresters adequately.

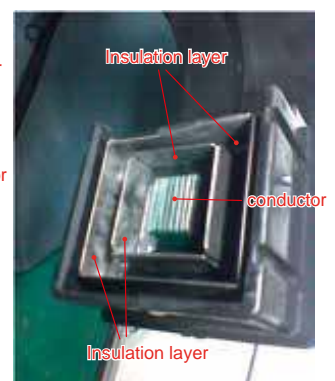
## CT CORE STRUCTURE COMPARISON

Ordinary

ALCL-40



Plane clamp head is easily to become dirty. Magnetic can not coherent with single isolation layer easily.



Clamp head coherent mutually. Magnetic line is easily to be Conducted. Double-deck isolation & insulation will not be interfered easily.



## TAURUS POWERTRONICS PVT LIMITED

Corporate Off.: No. 26, "Mahadimane", 12th Main, 1st Block, Rajajinagar, Bengaluru - 560 010. INDIA, Tel : + 91 80 23012301  
Email : info@tauruspowertronics.com, care@tauruspowertronics.com, Tollfree : 1800 425 2112, WhatsApp : +91 73496 44344  
Sales & Service Off.: No. 648/54, KLE College 2nd Block, Rajajinagar, Bengaluru - 560 010. INDIA, Tel : + 91 80 2352 2136/74

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