

# 10KV, 12KV Surge Comparison Tester with Bar-to-Bar Test

## Model 7010KAT, 7012KAT

The latest Surge Comparison Tester with bar-to-bar test is most comprehensive tester to check the quality of armatures, field & pole coils.



### Test Armature with High Pulse Current

The latest KAT Series Surge Tester uses the bar-to-bar test method in order to eliminate the limitation of span test method to test the low impedance of the series wound armatures because the span test method is unable to deliver the necessary output current to obtain the appropriate voltage difference.

The Surge Tester therefore employs a single channel non-comparative technique for bar-to-bar test method to produce a higher Surge test current in order to produce the required bar-to-bar voltage differences across adjacent commutator bars. The peak voltage of the waveform is observed on the CRT as the test head is moved across the commutator of the armature. In case of shorted pair of bars the waveform will reduce in amplitude and distortion can also be seen. An additional 3½ digits display is available to display the peak surge test voltage applied and the potential drop over the adjacent commutator bars of the armature.

### Benefits

- User friendly front panel controls
- Bright sharp CRT display to analyze the faults easily.
- Higher current capabilities allow the detection of a TIG weld short through & riser high resistance joints.
- 3½ Digits LED Display to display the applied bar-to-bar surge test voltage and potential difference across adjacent commutator bars.
- Non-destructive bar-to-bar test by hand operated probe.
- Test leads insulated to 45KV rating.
- Leads energized warning indicator.
- 1phase/3phase and bar-to-bar Test Select Switch.
- Footswitch for hands free operation.
- Zero lock start for operator safety.

The latest KAT series Surge Tester is ideally suited for manufacturers of traction motors as it can test the 1φ, 3φ windings and insulation of DC armatures.

## Principle of Surge Comparison Tester

The Surge Comparison tester checks the strength of ground insulation that consists of enameled insulation. It detects the insulation failures such as turn-to-turn shorts, layer-to-layer shorts, coil-to-coil shorts, winding-to-winding shorts, and phase-to-phase shorts. Open circuit and ground detection are other benefits of surge testing.

The Surge tester uses the principle of impedance balance to test the quality of electrical windings. The Surge tester works as a capacitive-discharge system. A capacitor is charged with high voltage and then discharged into the winding, through a solid state assembly. This sequence is repeated thus stressing the insulation of the winding with high voltage pulses.

The resulting voltage decay pattern of two winding is then displayed on the CRT. The waveform pattern will be perfectly superimposed for good windings but in case of a defective winding a double wave pattern will appear on the screen as one wave pattern from the good winding plus the erratic pattern from the faulty winding.

Surge Test Voltage to be applied =  $\sqrt{2} \times (2 \times E + 1000)$   
where E is the operating voltage of the rotating machine

## Optional Features

- Open Input source Ground indicator
- PC Compatible to store, recall and print waveforms

## Applications

The Surge tester is ideally suited for manufacturers of traction motors as it can test the single phase, three phase windings and insulation of DC armatures.

### Surge Comparison Test (Dual Channel)

- 1φ & 3φ windings
- LT, HT Coils
- AC, DC motors
- Stators
- Transformer coils
- Solenoids & chokes

### Bar-to-Bar Test (Single Channel)

The bar-to-bar test is used to test the armatures of Large DC motors without over-stressing the group insulation. The fig. here shows the testing of DC armatures.



#### ● DC Armatures

To perform this test, the armature to be tested is positioned between centers so that it could be rotated. A fixture with adjustable brushes is used to contact the armature at three positions. Two segments with an equal number of bars are then compared and if the two segments are balanced and contain no faults, a single pattern will appear on the Surge Tester' CRT screen. Faults are located by noting the change in the pattern as the armature is rotated bar-to-bar. The important advantage surge testing offers when applied to armature is the ability to locate high resistance carbon shorts. These can be major problem and cannot be detected by the low voltage tests normally done. Because the Surge tester utilizes much higher levels, these faults can be determined and located in most of the cases.

Test Specifications	7010 KAT	7012KAT
<b>SURGE COMPARISON TEST</b>		
Max Surge Voltage:	10,000V	12,000V
Max Pulse Current:	660A	800A
Max Pulse Energy:	5.0J	5.88J
Display	CRT (100x80mm)	CRT (100x80mm)
CRT Vertical Sensitivity	■ 500V/DIV ■ 1000V/DIV ■ 2000V/DIV ■ 4000V/DIV	■ 500V/DIV ■ 1000V/DIV ■ 2000V/DIV ■ 4000V/DIV
Sweep:	Variable	Variable
Surge Frequency:	50Hz ± 3%	50Hz ± 3%
<b>BAR-TO-BAR TEST</b>		
Max Surge Voltage:	1000V	1000V
Max Pulse Current	1000A	1000A
Max Pulse Energy	2.5J	2.5J
Display	CRT (100x80mm)	CRT (100x80mm)
CRT Vertical Sensitivity	■ 125V/DIV ■ 250V/DIV	■ 125V/DIV ■ 250V/DIV
Additional 3½ Digits LED Display to show the Peak Surge test voltage applied & potential drop over the adjacent commutator bars of Armature		
Power Consumption:	330W	400W
Weight:	75lbs	75lbs
Physical Dimensions (W X H X D)	475 X 320 X 540 (mm)	475 X 320 X 540 (mm)

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