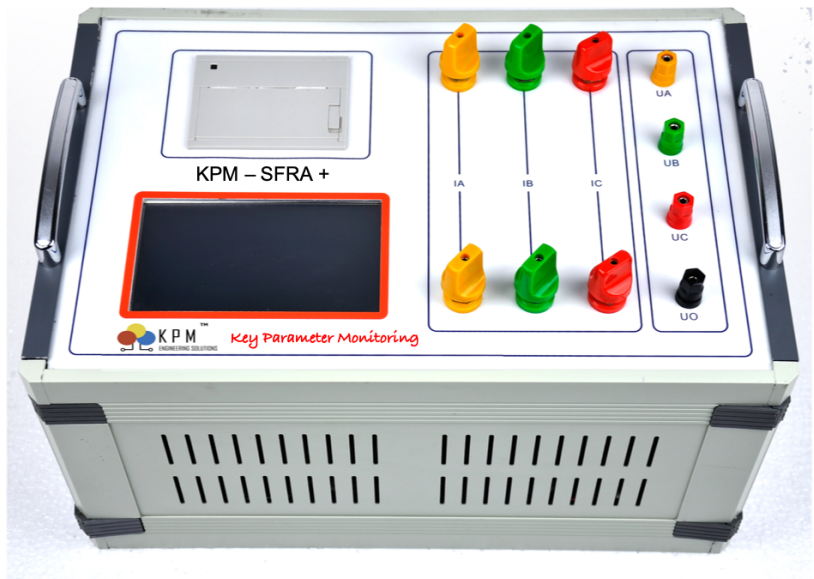


# KPM (Sweep Frequency Response Analyzer) – KPM SFRA+



## KPM- SFRA+

### *With power of SFRA & Short Ckt. Impedance diagnostics*

Sweep Frequency Response Analysis Test or in short SFRA Test can detect efficiently, displacement of transformer core, deformation and displacement of winding, faulty core grounds, collapse of partial winding, broken or loosen clamp connections, short circuited turns, open winding conditions etc.

#### How SFRA works

Transformers consist of multiple complex networks of capacitances and resistors that can generate a unique signature when tested at discrete frequencies and plotted as a curve. The distance between conductors of the transformer forms a capacitance. Any movement of the conductors or windings will change this capacitance. This capacitance being a part of complex L (inductance), R (Resistance) and C (Capacitance) network, any change in this capacitance will be reflected in the curve or signature.

An initial SFRA test is carried out to obtain the signature of the transformer frequency response by injecting various discrete frequencies. This reference is then used for future comparisons.

A change in winding position, degradation in the insulation, etc. will result in change in capacitance or inductance thereby affecting the measured curves. Tests are carried out periodically or during major external events like short circuits and results compared against the initial signature to test for any problems. Voltage transfer function  $U_o/U_i (f)$  SFRA test reveals if the transformers mechanical or electrical integrity has been compromised.

#### SFRA analysis can detect problems in transformers such as:

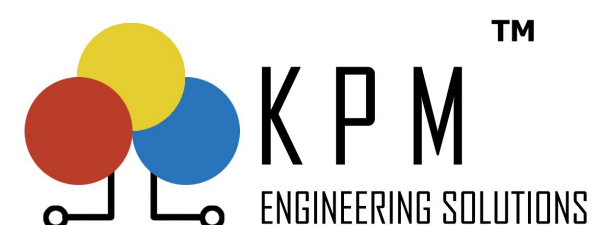
- winding deformation – axial & radial, like hoop buckling, tilting, spiraling
- displacements between high and low voltage windings
- partial winding collapse
- shorted or open turns
- faulty grounding of core or screens
- core movement
- broken clamping structures
- problematic internal connections

#### Key Points:

- **All in one unit or SFRA and Short Ckt Impedance testing**
- **Light weight & portable with integrated handle**
- **Inbuilt Display**
- **Rugged Design**
- **Integrated thermal printer**

#### . Uses

- To obtain initial signature of healthy transformer for future comparisons
- Periodic checks as part of regular maintenance
- Immediately after a major external event like short circuit transportation or relocation of transformer
- Earthquakes
- Pre-commissioning check



# KPM (Sweep Frequency Response Analyzer) – KPM SFRA+

## Features :

1. Using the advanced technical of DDS;
2. Using the high speed and advanced microprocessor to design;
3. Using AD chip of 16 bits;
4. With seven inch LCD touch screen of which the brightness can be adjusted;
5. With thermal printer of which the print thick can be adjusted;
6. It could store one hundred and twenty groups of FRA data, fifty groups of SCI data and thirty groups of SCI data, which could be read to current screen or upload to the PC;
7. With PC software using which we could upload data ,test, analyze data, print data, or create word document;
8. Using USB2.0 to connect to the device;

## Specifications

Sweep frequency response :

- 1 , Two different sweep modes : Linear sweep ,Section sweep ;

Linear sweep :

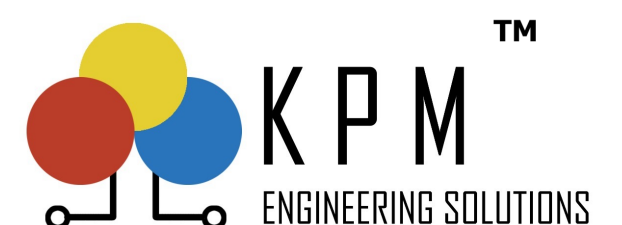
10HZ-1MHZ	interval 0.5KHZ	2000 dots
100HZ-2MHZ	interval 0.5KHZ	2000 dots
10HZ-1MHZ	interval 0.25KHZ	4000 dots (PC available)
100KHZ-2MHZ	interval 0.25KHZ	4000 dots (PC available)

Frequency , interval , and scan dots can be set (PC available)

Section sweep :

10HZ-100HZ	interval 1HZ	90 dots
100HZ-1KHZ	interval 5HZ	180 dots
1KHZ -10KHZ	interval 50HZ	180 dots
10KHZ-100KHZ	interval 0.2KHZ	450 dots
100KHZ -300KHZ	interval 0.5KHZ	400 dots
300KHZ - 1000KHZ	interval 1KHZ	700 dots

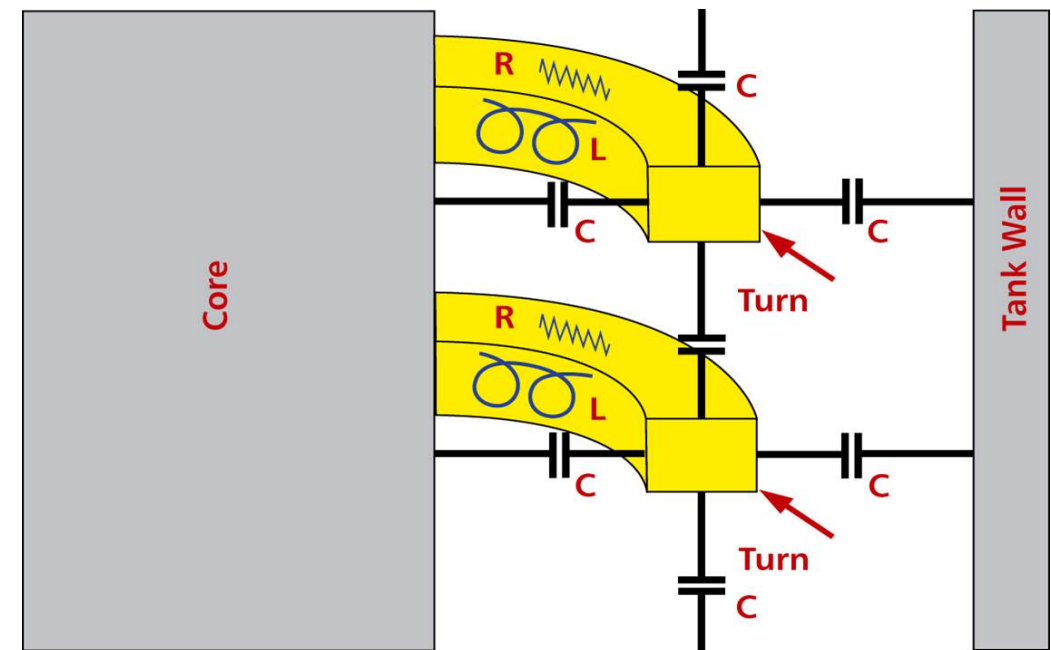
- 2 , Test range : (-100dB) - (+20dB)
- 3 , Test accuracy : (-80dB) - (+20dB) 0.2dB (-100dB) - (-80dB) 1.0dB ;
- 4 , Frequency accuracy : < 0.01% ;
- 5 , Signal input impedance : > 1M  $\Omega$  ;
- 6 , Signal output impedance : 50  $\Omega$  ;
- 7 , In-phase test repetition rate : 99.5% ;



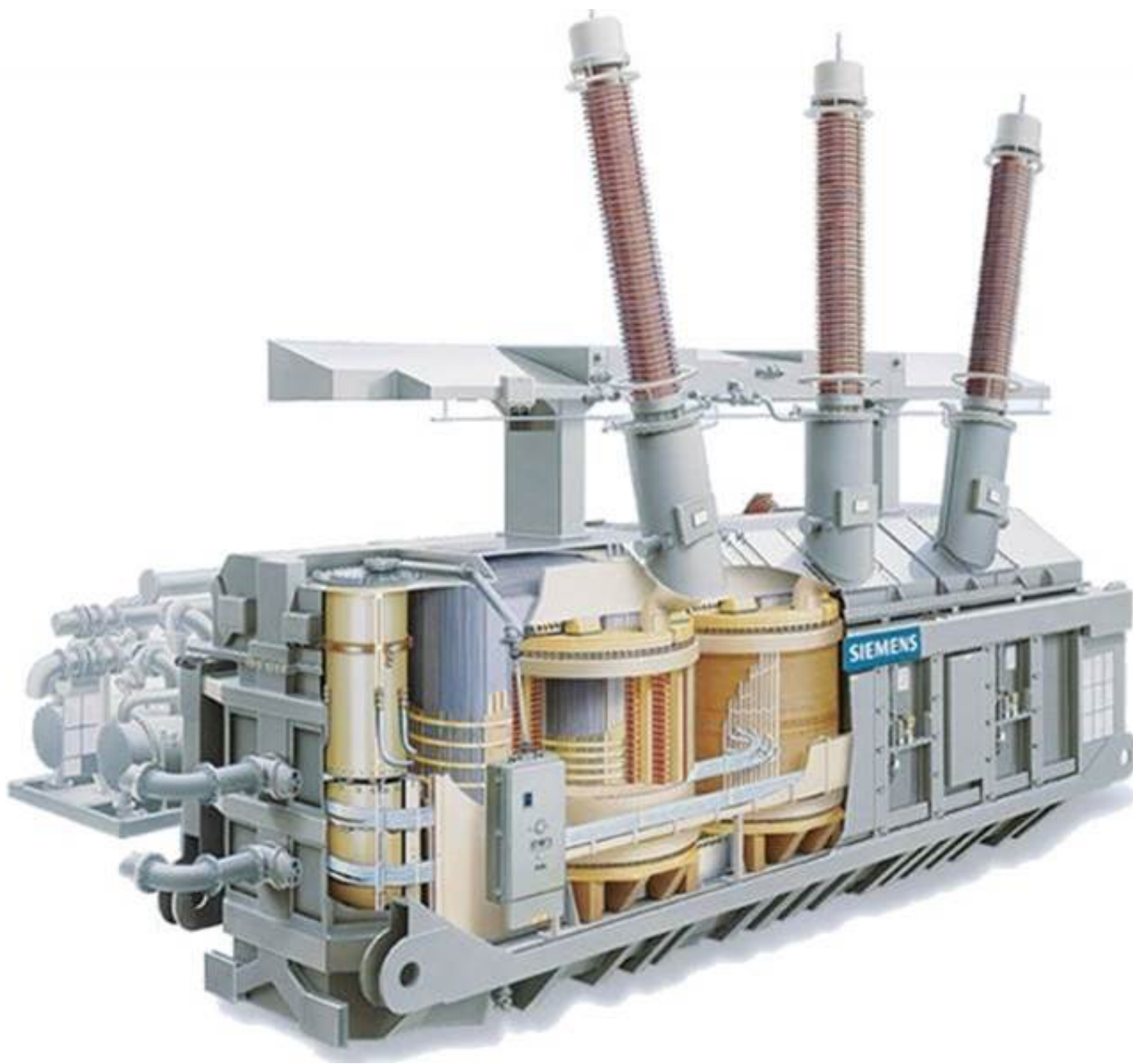
# KPM (Sweep Frequency Response Analyzer) – KPM SFRA+

## Short-circuit impedance and generator rotor AC impedance

- :
- 1 , AC impedance  $0 \sim 999.999 \Omega$   $0.2\% \pm 2$  digits
  - 2 , AC voltage  $0 \sim 600V$   $0.2\% \pm 2$  digits
  - 3 , AC ampere  $0 \sim 120A$   $0.2\% \pm 2$  digits
  - 4 , Active power  $\cos \phi > 0.1$   $0.5\% \pm 2$  digits  
 $\cos \phi < 0.1$   $1.0\% \pm 2$  digits  
Reactive power  $0.2\% \pm 2$  digits
  - 5 , Frequency  $45 \sim 65Hz$   $0.1\%$



Transformer : A complex combination of Resistance ( R ) , Inductance ( L ) & Capacitance ( C )



Any Movement inside Transformer changes the RLC equivalent which is Identified by KPM-SFRA+

## Contact Us

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