Accessories for Testing Large Motors & Generators

CTS-50 / CTS-100

COMPENSATING REACTOR

The compensating reactors are accessories for the CTS-12KSA/ACTS-12K Capacitance & Tan Delta Test Set. The use of one or more compensating reactors increases the capacitance that the internal power supply can excite to conduct measurements. As the measuring range of the CTS-12KSA / ACTS 12K exceeds the kVA rating of the internal power supply, one way of using the test set over its entire measuring range is to form a resonant circuit with the test sample. The use of one or more compensating reactors forms partial resonating circuit with the test specimen, thereby reducing the power supply requirement.

The use of one or more compensating reactors will allow the user to extend the practical measuring range of the CTS-12KSA/ACTS-12K to its full potential, 0.24µF (CTS - 12KSA) & 0.26 µF (ACTS -12K). The Bridge measuring range of CTS-12KSA / ACTS-12K can be extended, to 2.4 µF (CTS - 12KSA) 2.6 µF (ACTS - 12K). By the use of a Range Extension Transformer, the use of the appropriate number of compensating reactors can extend the 10kV measuring range to the desired level.

SPECIFICATIONS

With a rating of 200mA, the internal power source can excite a sample of 0.064 µF at 10 kV, 50 Hz. & 0.05 µF 10 kV, 60Hz. To excite larger samples, the reactors are used to supply the required charging current.

The smallest available reactor is one that will resonate a sample of 0.1µ F at 50Hz approximately. The other size available is 0.2µF. For resonating a test sample of 0.5µF, one would use, two 0.2µF and a 0.1µF reactors. For resonating with a 1.1µF test sample, one would use a 0.1µF, and five 0.2 µF reactors.

CTS-RE

RANGE EXTENSION TRANSFORMER

The Range Extension Transformer Model CTS-RE is an accessory for CTS-12KSA & ACTS-12K Capacitance & Tan Delta Test Sets. The CTS - RE extends the capacitance measuring range of the CTS-12KSA & ACTS-12K by a factor of ten (10), namely from 0.24 µF to 2.4 µF. (CTS-12KSA) 0.26µF to 2.6µF (ACTS-12K).

Although the Range Extension Transformer can be used on any of the ten ranges of the CTS-12KSA, to extend them by a factor of ten, it is designed to be used ONLY on the top of three ranges, namely converting the 0.06, 0.12 and 0.24 µF ranges to 0.6, 1.2 and 2.4 µF.

As the CTS-12KSA Test Sets have ranges of 240, 600, 1200, 2400, 6000 pF and 0.012, 0.024, 0.06, 0.12 and 0.24 µF, the use of the Range Extension adds 0.6, 1.2 and 2.4 µF ranges to the instrument.

The Range Extension Transformer is provided in the form of a toroid.

SPECIFICATIONS

Ratio	:	10 to 1.
Accuracy	:	*Capacitance :*
		± 0.2% of reading ± 1pF (UST)
		± 0.2% of reading ± 10pF (GST)
		Dissipation Factor (Tan Delta) :
		± 1 % of reading ± 0.05%
Dimensions	:	240x220x125 (LxBxH)
Weight	:	Approx. 5 Kgs.

The reactors are available in two ratings

- 104 Henries at 300 mA, for compensating 0.1µF,
- 52 Henries at 600 mA, for compensating 0.2 µF,

The bridge power source would normally be used to excite test samples in the range of 0 to 0.064 µF at 10 kV (0 to 0.05 µF at 12 kV),

With the 104 H (0.1 µF) compensating reactor the bridge power source can excite samples in the range of approx. 0.06-0.16 µF at 10 kV,

With the 52 H (0.2 µF) compensating reactor the bridge power source can excite samples in the range of approx. 0.15-0.26 µF,

With both the 102H (0.1µF) and 52H (0.2µF) reactors connected, the bridge power source can excite samples in the range of 0.25-0.36 µF approximately. Typical maximum capacitance of the test sample is about 1µF.

APPLICATION

The primary application for the inductors is to allow power factor test of motors, generators, and cables at higher voltage than would be possible with the CTS-12KSA/ACTS-12K internal power source alone.

Whenever a large capacitance needs to be tested, its capacitance must be measured in order to determine the amount of reactor compensation needed. This measurement can be done using the CTS-12KSA/ACTS-12K at a low voltage, typically in the 300-2500 voltages ranges. The maximum capacitance of the CTS-12KSA/ACTS-12K, 0.24 µF can be easily measured at a voltage of 1200 volts without overloading the power source. A capacitance of 1 µF can be measured using the CTS-12KSA/ACTS-12K and a range extender at a voltage of 300 volts.

Once the capacitance of the test Specimen is known, the value of the required compensating reactor can be determined from a graph or simple calculation. The required reactors can now be connected together with the test specimen to the CTS-12KSA/ACTS-12K and the measurement conducted in the normal manner and at the desired test voltage.

Most of the measurements using compensating reactors involve motors and generators. Measurements on such test samples typically require the determination of "tip-up." Tip-up" is referred to as the increase in Dissipation Factor with an increase in test voltage. To determine tip-up, the test on motors and generators would be taken at rated, ½ rated and ¼ rated voltages. "Tip-up" would be calculated by subtracting the DF measured at ½ test voltage from the DF measured at rated voltage; a second and equally valid tip-up would be determined by subtracting the DF measured at ¼rated test voltages from the DF measured at rated test voltage.

SPECIFICATION

CTS-100 Reactor

Inductance : 104 Henries ±5%, 3kVA at 10kV, 50 Hz Q<40.

CTS-50 Reactor

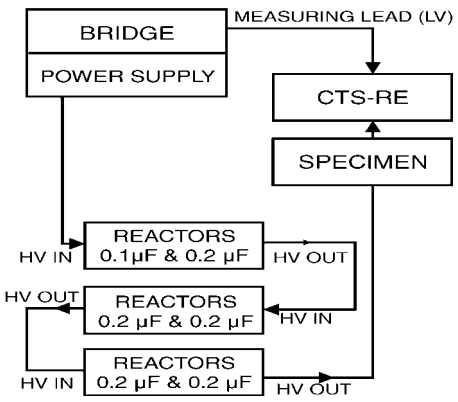
Inductance : 52 Henries ± 5%, 6kVA at 10kV, 50 Hz, Q<20.
Dimensions : 410mmx340mmx265mm (LxHxB)
Weight : Appox. 40 Kgs.
Temperature Range : -10 to 50 deg C
Humidity : Ambient to 90%, RH

The set of 6 reactors are supplied in 3 boxes as below :
Box 1 : One Reactor Model CTS – 100 (0.1µF) & one Reactor Model CTS-50 (0.2µF)
Boxes 2 & 3 : Two Reactors of (0.2µF) CTS - 50 in each box.
Provision is also provided in the boxes to select either one or both of these reactors in the test set-up. The first reactor that has to be connected should always be a 0.1µF. All the reactor boxes are labeled indicating the values of the Compensating Reactors present in them. A set of interconnecting cables are also provided.

10kV CAPACITANCE MEASURING RANGE-GENERATOR/MOTOR TESTING

EQUIPMENT	ACCESSORY	TEST VOLTAGE	MAX CAPACITANCE (50HZ)	MAX. CAPACITANCE (60HZ)
CTS - 12KSA	–	10 KV 2.4KV	0.06 µF 0.24 µF	0.05 µF 0.2 µF
ACTS - 12K	–	10 KV 2.4KV	0.06 µF 0.26 µF	0.05 µF 0.2 µF
CTS - 12KSA ACTS - 12K	CTS-RE	10 KV 2.4KV	0.06 µF 1.2 µF	0.05 µF 1.0 µF
CTS - 12KSA ACTS - 12K	CTS-RE + CTS-100 (1 NO OF 0.1µF)+ CTS-50 (1 NO OF 0.2µF)	10 KV	0.36 µF	0.3 µF
CTS - 12KSA ACTS - 12K	CTS-RE + CTS-100 (1 NO OF 0.1µF) + CTS-50 (5 NO OF 0.2 µF)	10 KV	1.1 µF	1.0 µF

BLOCK DIAGRAM OF ACTS-12K/CTS-12KSA WITH CTS-RE AND COMPENSATING REACTORS



OTHER PRODUCTS

■ Manual & Automatic Transformer Ratio Meters. ■ Manual & Automatic Transformer Winding Resistance & On Load Tap Changer Test Set. ■ Digital Micro Ohm Meter with builtin 100A DC Source. ■ Automatic CT/VT Test Sets & System. ■ Automatic & Semi-Automatic HV Capacitance & Tan Delta Test Sets. ■ Manual & Automatic Tan Delta & Resistivity Test sets for Transformer Oil. ■ Manual & Automatic Portable LV Capacitance & Tan Delta Test Sets. ■ Relaying Current Transformer Analyser.

ELTEL INDUSTRIES
311 EMBASSY CENTRE, CRESCENT ROAD, BANGALORE-560 001, INDIA
TEL. : 91-80-22255467, 22205686, 22284253, 22284298 FAX : 91-80-22252733
E-mail: marketing@eltelindustries.com Web site: http//www.eltelindustries.com
Works : Plot No. 39, KIADB Industrial Area, Veerapura, Doddaballapur, Bangalore – 561 203, INDIA
TEL : 91-80-7630350, 7630366, 7630367, 7630368 FAX : 91-80-7630351
CHENNAI: 044-24312849, 24339075 ■ KOLKATA: 033-24765536, FAX : 24752394 ■ MUMBAI: 022-25398358, FAX : 253839360
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