STS 3000

Substation maintenance & commissioning test system for current and power transformers with the BUX 3000 optional module.

Capacitance / Tan Delta diagnostic system with the TD 5000 optional module.

www.isatest.com

STS 3000

Substation maintenance & commissioning test system for current and power transformers with the BUX 3000 optional module.

Capacitance/TanDelta diagnostic system with the TD 5000 optional module.

- Fully automatic
- Primary injection testing capabilities: up to 3000 A, with the optional module BUX 3000
- Variable output frequency: 15 - 500 Hz
- Power dissipation factor test with the optional module TD 5000 (voltage up to 12 kV)
- Large graphic display
- Advanced Test & Data Management Software for test set control, results storage and analysis
- USB interface and Ethernet interface for PC connection
- Compact and lightweight
- Patent pending technology for capacitance and Tan Delta measurement

A P P L I C A T I O N

The following table lists the tests that can be performed on CTs, VTs, PTs and ground grid.

N.	TEST	TEST DESCRIPTION
2	CT	Ratio, polarity and burden with high AC current*
8	CT	Rogowski coil transformers*
9	CT	Low power transformers*
10	CT	Tan Delta measurements**
16	VT	Tan Delta measurements **
19	PT	Excitation current**
21	PT	Tan Delta measurements**
23	CB	Tan Delta measurements**
24	CB, RELAY	Current threshold and timing*
28	OTHERS	Sequencer*

* *with the optional module BUX 3000.*

** *with the optional module TD 5000.*

Tests are performed in accordance with the following IEC standards: EN 60044-1; EN 60044-2; EN 60044-5; EN 60044-7; EN 60044-8; EN 60076-1, and also in accordance with ANSI/IEEE C57.13.1.

STS 3000 is foreseen to be used along with either TD 5000 or with BUX 3000.

• The high voltage (HV) generator TD 5000 performs the measurement of the tan Delta, capacitance and power factor of any device, at the frequency of the mains or in a wide frequency range.

• The extremely high current BUX 3000 option performs high current tests, with currents up to 3000 A.

SYSTEM DESCRIPTION

The STS family includes **3 models**: STS 5000, STS 4000 and STS 3000. STS 5000 includes: HV, high AC current and high DC current generation. STS 4000 is not equipped: with AC and DC high current outputs. STS 3000 is not equipped: with AC and DC high current outputs, AC and DC high and low voltage outputs. All models can be connected to the Tan Delta module TD 5000 and and to the very high current module BUX 3000.

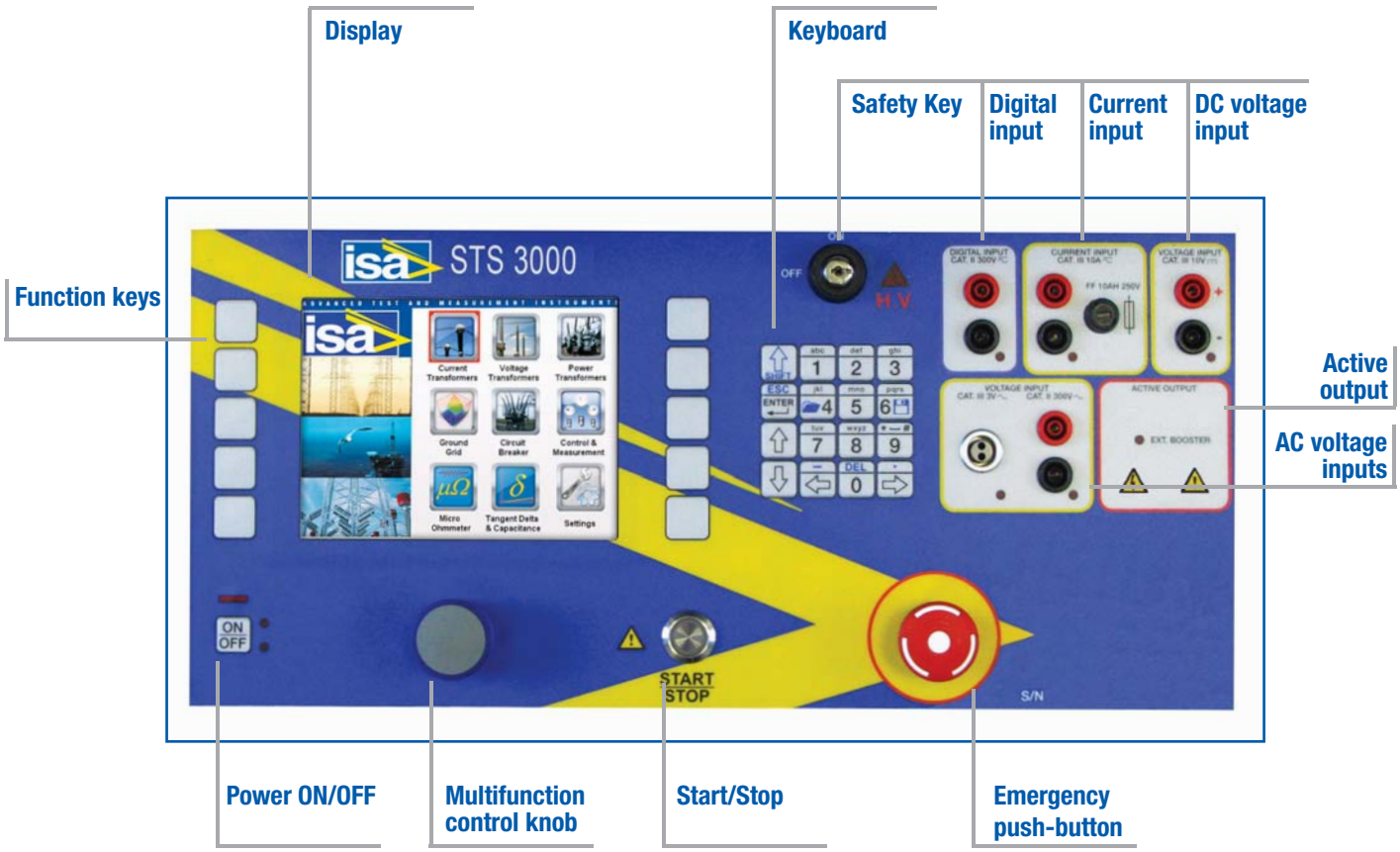
In the local control mode, the selected output is adjustable and metered on the large, graphic LCD display.
With the control knob and the LCD display, it is possible to enter the MENU mode, that allows to set many functions. Thanks to this, STS 3000 is a very powerful testing device, with manual and automatic testing capabilities, and with the possibility to transfer test results to a PC via USB, ETHERNET or Pen Drive.
In the PC control mode, the TDMS software allows performing the same tests as in the local mode, with the same control windows.
It allows also to download, display and analyse test results obtained in local mode.
TDMS operates with all Windows® versions.

The **ease of operation** has been the first goal of STS 3000. This is why the LCD display is so large and the dialogue in MENU mode is made easy.
STS 3000 includes three measurement inputs:
. DC voltage (10 V DC).
. AC voltage:
.. High range (300 V AC)
.. Low range (3 V AC)
. Current (10 A AC or DC).
All these inputs are independent among them and allow the measurement of CT or VT outputs or of another source.

In addition, a digital input (up to 300 V) is available: it can measure a resistance from 100 Ohm to 20 kOhm.

The instrument is housed in a transportable aluminium box, which is provided with removable cover and handles for ease of transportation. A transport trolley can also be supplied upon request.

STS 3000 - FRONT PANEL



STS 3000 - SIDE PANELS

External booster output

External devices input

Remote start

Safety warnings

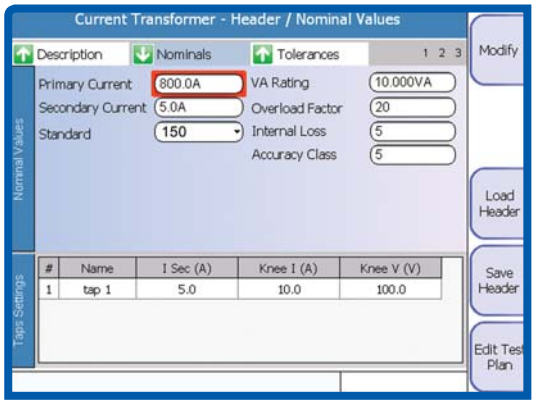
Interfaces

TEST PLAN EDITOR

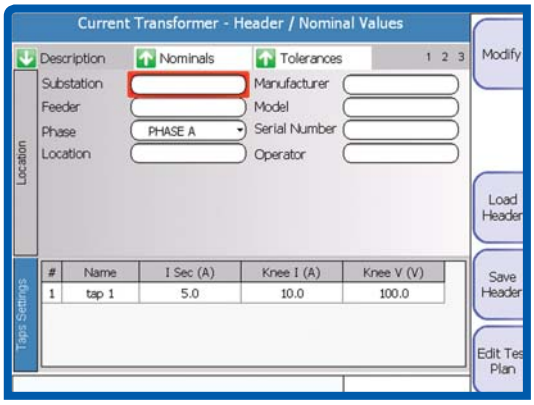
TEST PLAN EDITOR is an **innovative and advanced software module allowing the operator to define and plan a sequence of tests.** The operator defines the desired sequence of tests and sets the parameters of each test. TEST PLAN EDITOR creates a sequence of tests to be performed automatically. This feature is **available for primary and secondary injection.**

Test plans can be saved or recalled, like test results. **Up to 64 settings can be stored and recalled**. Settings are permanently stored in the memory and new settings can be written to the same address after confirmation. During the test, test results can be stored in the memory. At the end of test, settings and test results can be transmitted to a PC provided with TDMS. The software allows saving, exporting and analysing test results.

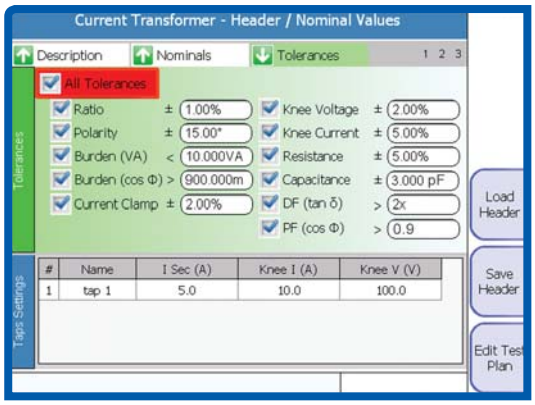
EXAMPLES OF TEST PLAN EDITOR FOR CT TESTS



Nominal values window: from these nominal data, the program computes the nominal saturation knee.



Tests header window: reference data for the test.



Tolerances window allows setting the tolerances for each of the available tests.

Test selection window: it allows selecting the test to be performed.

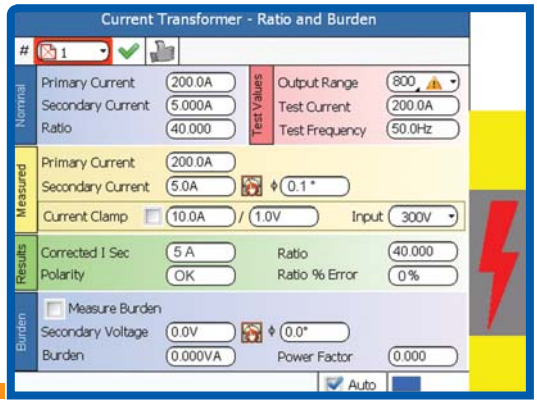
At the end of the programming, starting the first test will execute the complete sequence. During the test, test results are stored in the memory. The test set minimizes the test duration, in order to avoid over-heating the components.
The same feature is available when controlling the test set via PC and TDMS.

TEST OF CURRENT TRANSFORMER

• CT RATIO, POLARITY AND BURDEN CURRENT METHOD

with the BUX 3000 optional module

The ratio measurement is performed applying high current, coming from the BUX 3000 module, to the CT primary and measuring the CT secondary current. The burden can be by-passed, or left in series for the measurement. In this instance, the voltage drop is measured. The secondary current can be measured by a clamp. Input parameters are: the nominal primary and secondary current, from which the program computes the nominal ratio and the nominal test current. The display shows: • The actual primary current; • The corresponding secondary current; • The value of the secondary current with the nominal primary current; • Actual ratio and ratio error; • Phase shift and polarity. When the burden is tested, the following parameters are displayed:• The voltage drop across the burden; • For the burden: VA rating at the nominal current, angle and power factor.



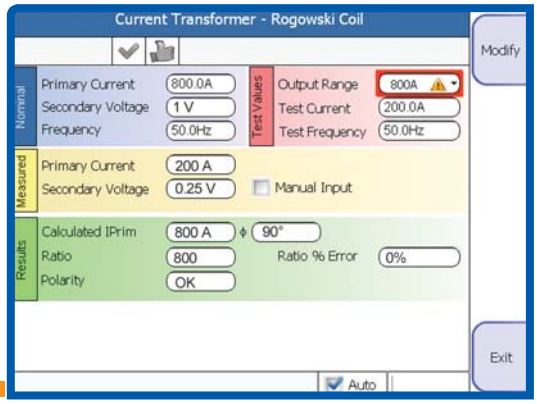
TEST OF CURRENT TRANSFORMER

• ROGOWSKI COIL

with the BUX 3000 optional module

The test is performed connecting the high AC current source to the primary side, and connecting the CT secondary side to the low-voltage measurement. Input parameters are: the nominal primary current and the nominal secondary voltage, from which the program computes the nominal ratio, the current range, the test current and the test frequency. The display shows:

• The range current and the test current; • The actual test current, the secondary voltage and the value of the primary current with the nominal secondary voltage; • Actual ratio and ratio error; • Phase shift and polarity.



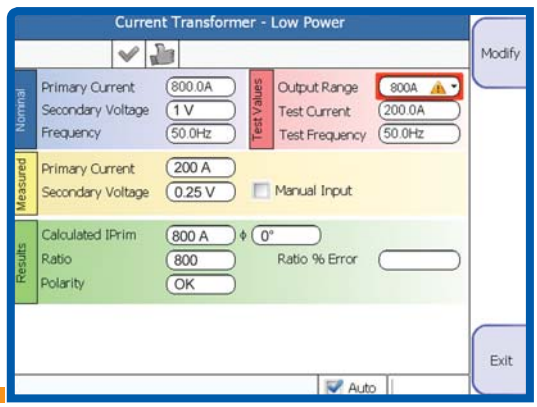
TEST OF CURRENT TRANSFORMER

• LOW POWER

with the BUX 3000 optional module

The test is performed connecting the high AC current source to the primary side, and connecting the CT secondary side to the low-voltage measurement. Input parameters are: the nominal primary current and the nominal secondary voltage, from which the program computes the nominal ratio, the current range, the test current and the test frequency. The display shows:

• The range current and the test current; • The actual test current, the secondary voltage and the value of the primary current with the nominal secondary voltage; • Actual ratio and ratio error; • Phase shift and polarity.



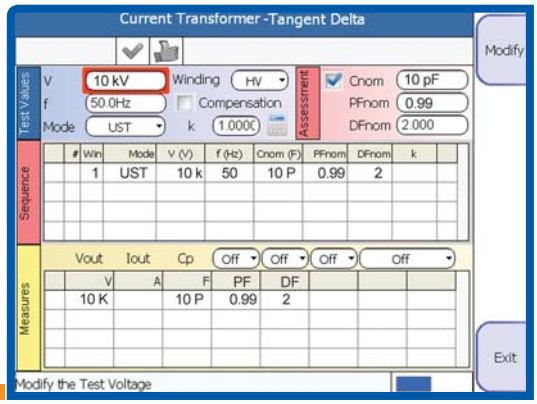
TEST OF CURRENT TRANSFORMER

- **POWER FACTOR, CAPACITANCE AND TAN DELTA**

with the TD 5000 optional module

The test is performed using the TD 5000 optional module, and then connecting the high AC voltage source to test target. Input parameters are: Winding, test voltage and frequency, test mode, and the nominal capacitance, PF, DF.
The display shows the following data:

- Test voltage, current and frequency;
- Capacitance, Tan Delta and power factor;
- Power data: active, reactive and apparent;
- Impedance: module, argument and components.



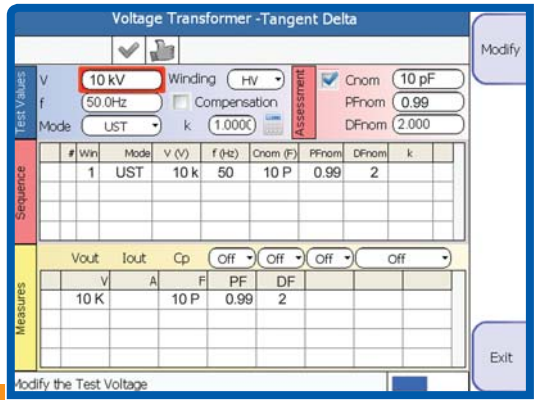
TEST OF VOLTAGE TRANSFORMER

- **POWER FACTOR, CAPACITANCE AND TAN DELTA**

with the TD 5000 optional module

The test is performed using the TD 5000 optional module, and then connecting the high AC voltage source to the test target.
Input parameters are: Winding, test voltage and frequency, test mode and the nominal capacitance, PF, DF.
The display shows the following data:

- Test voltage, current and frequency;
- Capacitance, Tan Delta and power factor;
- Power data: active, reactive and apparent;
- Impedance: module, argument and components.



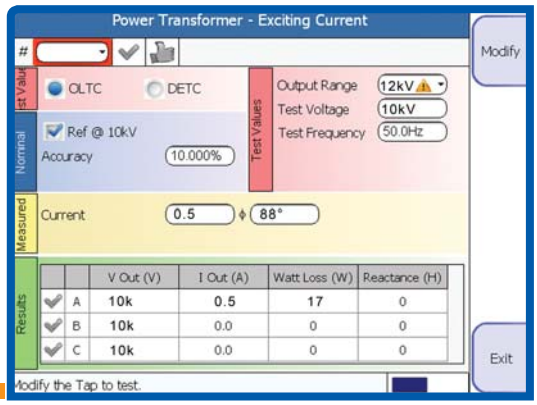
TEST OF POWER TRANSFORMER

- **EXCITING CURRENT**

with the TD 5000 optional module

The test is performed using the TD 5000 optional module, and then connecting the high AC voltage source to the test target.
Input parameters are: the tap number, the type of Tap changer, the test voltage and the frequency. The test set applies the high voltage and measures the output current during the test.
The display shows:

- The test voltage;
- The current and the phase shift;
- The power losses;
- The reactance.



TEST OF POWER TRANSFORMER

- **POWER FACTOR, CAPACITANCE AND TAN DELTA**

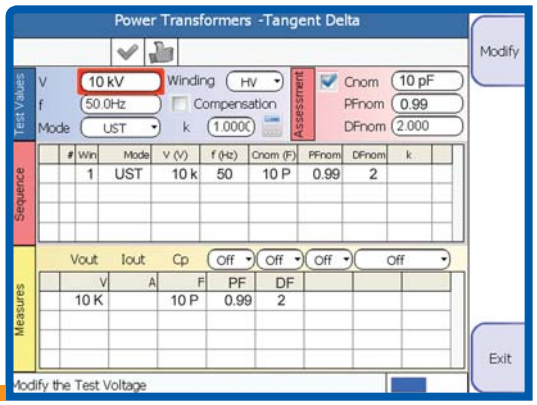
with the TD 5000 optional module

The test is performed using the TD 5000 optional module, and then connecting the high AC voltage source to test target.

Input parameters are: Winding, test voltage and frequency, test mode and the nominal capacitance, PF, DF.

The display shows the following data:

- Test voltage, current and frequency;
- Capacitance, Tan Delta and power factor;
- Power data: active, reactive and apparent;
- Impedance: module, argument and components.

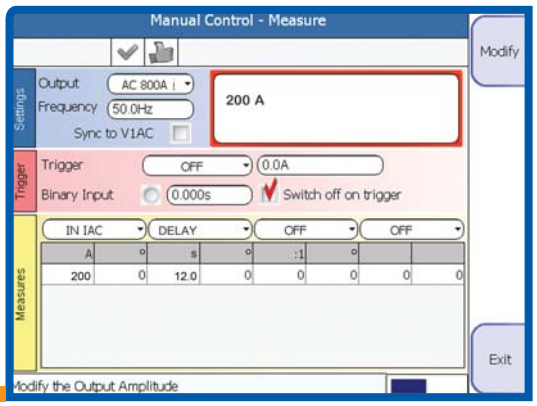


CB AND RELAY TESTS

- **CB; PRIMARY AND SECONDARY RELAY TESTS**

with the BUX 3000 optional module

The selection allows ramping or injecting the test parameter and measuring the relay threshold and trip delay of a MV CB or of a relay. It is also possible to measure external voltages and currents. Input parameters are: current range, output current, output voltage and frequency. It is possible to enable the time measurement on the digital input or on the fall of the applied current (MV CB tests) and to set the type of digital input (wet or dry). The display shows the following data: • Test current or test voltage; • Trip delay; • External voltage and current measurements.



CIRCUIT BREAKER TESTING

- **POWER FACTOR, CAPACITANCE AND TAN DELTA**

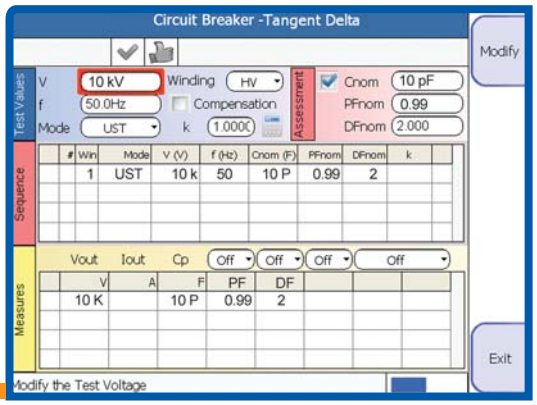
with the TD 5000 optional module

The test is performed using the TD 5000 optional module and then connecting the high AC voltage source to test target.

Input parameters are: Winding, test voltage and frequency, test mode and the nominal capacitance, PF, DF.

The display shows the following data:

- Test voltage, current and frequency;
- Capacitance, Tan Delta and power factor;
- Power data: active, reactive and apparent;
- Impedance: module, argument and components.



OTHER FUNCTIONS

• **SEQUENCER**

with the BUX 3000 optional module

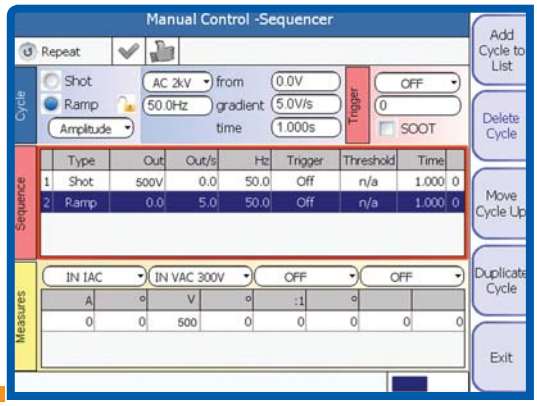
The selection allows programming any series of ramp or step generation of any of the available outputs.

Input parameters are: type of test (shot or ramp), selected output, output value or rate of change, cycle duration, frequency and trigger enable.

The display shows the following data:

• Test parameters for each cycle;

• Corresponding test results.



• **TDMS SOFTWARE**

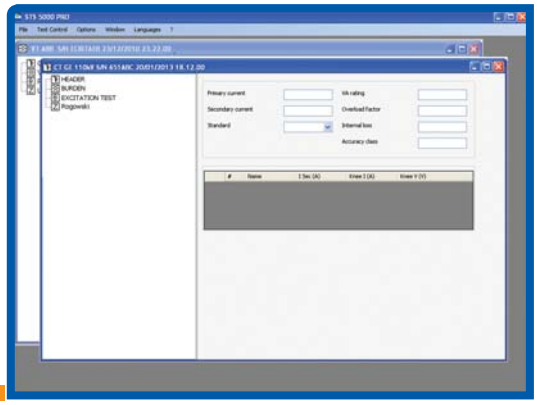
The software allows:

• setting-up test plans;

• executing test;

• saving test results;

using the same window of the local control. It allows also saving set-up and results created locally. TDMS is also a powerful report editor that allows to create professional test reports that can be exported in Access format.



STS 3000 SPECIFICATION

HIGH POWER OUTPUT TO THE EXTERNAL MODULES

The output feeds the external modules type TD 5000 or BUX 3000. Output characteristics are the followings.
· Output not isolated from the mains supply.
· Output voltage: adjustable from 0 to 220 V AC.
· Output power; supply 230 V: 1500 VA steady, 4000 VA during 5 minutes; 5000 VA during 25 s.
· Output power; supply 110 V: 1360 VA steady, 2500 VA during 1 minute; 3150 VA during 25 s.
This output goes to a safety connector.

Output frequency

. AC output frequency range: 15 to 500 Hz.
. Frequency resolution: 10 mHz; accuracy 10 ppM.

EXTERNAL INPUT MEASUREMENTS

Current and Voltage

It is possible to meter the current and the voltage of an external generator. Three metering groups are available:
• AC or DC current, up to 10 A.
• AC voltage, with two connections:
o High range, up to 300 V AC.
o Low range, up to 3 V AC.
• DC voltage, up to 10 V DC.
The selected input is shown in the front panel by a LED.

Resolution and accuracy

INPUT	RANGE	ACCURACY ± % reading ± % range
AC CURRENT	1 A; 10 A	±0.05 ±0.05
DC CURRENT	1 A; 10 A	± 0.03 ±0.08
HIGH AC VOLTAGE	300 mV; 3 V;	±0.15 ±0.05
	30 V; 300 V	±0.05 ±0.05
LOW AC VOLTAGE	30 mV	±0.1 ±0.25
	300 mV	±0.08 ±0.08
	3 V	±0.03 ±0.08
DC VOLTAGE	10 mV; 100 mV	±0.05 ±0.15
	1 V: 10 V	±0.03 ±0.08

Timer

The test set allows testing protection relays. In this mode of operation, the test current or voltage can be ramped or stepped. As the output changes, a timer is started; the timer stops as the Digital In input senses that the relay has tripped or the output in cut (MV CB tests).
Characteristics of the Digital In input:
• The input may be selected as Normal Open, Normal Closed.
• Type of input: either dry or under voltage. Maximum input: 300 V AC or DC.
• Voltage thresholds: 5 V, 24 V, 48 V or > 80 V.
• Timer resolution: 1 ms.
• Timer accuracy, digital input: ± 0.001% of the measurement ± 0.1 ms, for input lasting more than 1 ms.
• Maximum measured time: 9,999 s.

Phase angle

The test set measures the phase angle between the two AC selected parameters which are used during the test.

MEASUREMENT	RANGE	RESOLUTION	ACCURACY
PHASE	0 - 360	0.01°	±0.1°

For the resistance test, the following applies:

SOURCE	RANGE	ACCURACY
DC V METER	100 Ohm to	0.6%
	20 kOhm	0.5%

DISPLAY

The large graphic display has the following characteristics:
• Pixels: 640 x 480, coloured.
• LCD type: TFT.
• View area: 132 x 99 mm.
• Backlight.

LOCAL TEST CONTROL

Local test control: by the START / STOP pushbutton. After test selection, pressing it, the output is generated, according to the type of test. During ON, if a manual control test is selected, the operator adjusts the output at the desired value.
Test saving:
• Automatic save.
• After operator confirmation.

OTHER CHARACTERISTICS

Communication interfaces

• Slave USB and ETHERNET for the PC connection.
• USB port for the USB key.
• USB port for optional keyboard or mouse.
Interfaces to external modules:
• Commands to TD 5000 and STCS.
• Alarms to a flashing light.
• Remote start input.

Mains supply

100-230 V ± 15%; 50-60 Hz.

Maximum supply current: 16 A.

Dimensions: 450 (W) x 400 (H) x 230 (D) mm.

Weight: 17 kg.

STANDARD ACCESSORIES

STANDARD (OPTIONAL) CONNECTION CABLES

NOTE: standard cables can also be ordered separately.

One mains supply cable, 2 m long.
One grounding cable, 6 m long.
One interface cable for the USB port.
One ETHERNET interface cable.
One USB pen drive.
One mating connector for the Remote Start input connector.
One mating connector for the Safety Warnings connector.
One cable for the 3 V measurement connection, shielded, 6 m long *(9 m long optionally)*.
One cable for the 10 V measurement connection, shielded, 2.5 sq. mm, 6 m long *(9 m long optionally)*.
Four crocodiles for measurements connections (two red and two black).
One connection cables transport case.

TRANSPORT CASE

The transit case allows delivering STS 3000 with no concern about shocks up to a fall of 1 m. This case is supplied with handles and wheels.

OPTIONAL ACCESSORIES

BUX 3000 - VERY HIGH CURRENT BOOSTER

The very high current booster option allows performing high-current primary tests, with currents up to 3000 A.
The option is made of a module, which incorporates:
• A power transformer, which generates a low-voltage, high-current output.
• A metering CT, which measures the output current, and sends the metering to STS 3000.

Option features:

TEST CURRENT A	OUTPUT POWER VA	TEST DURATION s
1000	900	INFINITE
2000	2400	300
3000	4800	60

• Weight: 16 kg.
• Dimensions: external diameter 190 mm; height 120 mm.
BUX 3000 is supplied with the high current cable, made of 4 cables, 95 sq. mm, 1.2 m long, with high current clamps and 2 connection cables: one with the power supply, 20 m long; the other one, 20 m long, with the output current measurement. In addition, the option is provided with 2 metering cables for the connection of the CT secondary.

CAP-CAL CALIBRATOR MODULE

Purpose of the calibrator is to check the correctness of TD 5000 measuremenat and, if necessary, to calibrate it.
The calibrator includes an extremely high accuracy high voltage capacitor, which comes with a certificate issued by INRIM, the Italian primary laboratory.

REMOTE SAFETY SWITCH

If it is desired to start the test remotely from the test set, the optional switch allows to do it, up to the distance of 20 m, which is the length of the cable provided.

DIGITAL THERMO HYGROMETER

A number of tests performed by STS, such as coil resistance, Tan Delta are influenced by temperature and humidity. The option allows measuring these parameters and to input them into the test settings.
Meter characteristics:
. Temperature range:- 10°C to 60°C.
. Temperature measurement accuracy: ± 0.4°C.
. Humidity measurement range: 5 % to 95% RH.
. Accuracy of humidity measurement: ± 2.5% RH, over the whole range.
. Dimensions:141 x 71 x 27 mm.
. Weight: 150 g.

WARNING STROBE LIGHT

The warning strobe light alerts when the test is completed, or when there are alarms. The light is self-powered, and turns on (flashes) upon the test set command. A siren is also included.

TRANSPORT CASES

Transport cases for STS 4000, TD 5000 and BUX 3000 are available; all of them allow transporting the device with non concern about shocks or falls up to 1 m. The case is complete with handles and wheels.

FOLDABLE TROLLEY

The trolley eases the transport of STS 3000, especially when the optional TD 5000 has to be used too. The trolley is designed to host both instruments and also the high-voltage cable for TD 5000.

PROTECTIONS

- If the test set is not connected to the ground, the test set does not allow for power generation, and warns the operator with a diagnostic message and a fixed LED light.
- Fuses on: the mains supply, the low-power current and voltage outputs and the current meter input.
- At power-on, a diagnostic sequence controls the test set. In case of problems, the operator is alerted by a message.
- Emergency pushbutton: if pressed, all outputs are removed.
- The high-voltage output has the following protections: confirmation key; the HV is generated only if selected.
- Thermal sensors.
- If maximum current limits and time duration of power transformer generators are trespassed, the generation is interrupted, and the operator is warned by an alarm message.

APPLICABLE STANDARDS

The test set conforms to the EEC directives regarding Electromagnetic Compatibility and Low-Voltage instruments.
A) Electromagnetic Compatibility: Directive no. 2004/108/EC. Applicable Standard : EN61326-1:2006

B) Low Voltage Directive: Directive n. 2006/95/EC.
Applicable standards:
. CEI EN 61010-1:2001. In particular:
. Input/output protection: IP 2X - IEC69529; IP 4X for HV output.
. Operating temperature: -10° to 55 °C; storage: -20 °C to 70 °C.
. Relative humidity: 5-95% without condensing.

ORDERING INFORMATION

CODE	MODULE
10175	STS 5000 - supplied with TDMS software, standard test cable kit and transport case
20175	STS 4000 - supplied with TDMS software, standard test cable kit and transport case
30175	STS 3000 - supplied with TDMS software, standard test cable kit and transport case
11175	TD 5000 module for the high-voltage test of Tan Delta for transformers and bushings, supplied with test cables, transport case and trolley
50175	BUX 3000 - External Advanced Booster up to 3000 A supplied with transport case
40175	CAP-CAL Calibration module
42175	Remote safety switch
44175	Digital thermo hygrometer
43175	Warning strobe light
17175	Heavy duty plastic transport case for STS 3000
51175	Heavy duty plastic transport case for BUX 3000
19175	Heavy duty plastic transport case for TD 5000
18175	Trolley for STS family test sets and TD 5000
35175	Cable test kit with case for STS 3000
36175	Optional long cable test kit for STS 3000
14175	Cable test kit for TD 5000

TD 5000

Capacitance and Tan Delta diagnostic system for high-voltage apparatus

- **Optional module for STS 5000, STS 4000 and STS 3000 test sets**
- **Tan Delta, capacitance, dissipation factor measurements and for exciting current test**
- **Output voltage up to 12 kV**
- **Variable output frequency: 15 - 500 Hz**
- **Test & Data Management Software**
- **Compact and lightweight**
- **Patent pending technology**

A P P L I C A T I O N

The following table lists the tests that can be performed on power transformers and high-voltage apparatus:
- tan Delta (or dissipation factor DF): from 0 to more than 100%.
- Capacitance: from 1 pF to 3 µF.
- Power factor : from 0 to 100%.
- Excitation current test: 5 A AC.

General characteristics

The high-voltage generator TD 5000 performs the measurement of the Tan Delta, of the dissipation factor and of the capacitance of a transformer or of a bushing, at the frequency of the mains or in a wide frequency range. The measurement is performed by the module, which is equipped with a patent pending technology.

The measurement circuitry incorporates a reference high voltage capacitor, rated 200 pF, with a tan delta better than 0.005%, plus a reference resistor bridge, with accuracy better than 0.01%, and thermal drift less than 1 ppM/°C. The patented circuitry and the variable frequency output make test results immune from external noise.

Available test selections:
- Ungrounded: UST-A; UST-B; UST A+B;
- Grounded: GST; GSTg-A; GSTg-B; GSTg-A+B.

TD 5000 is powered and controlled by STS 5000, STS 4000 or STS 3000. Type of generator: HV generator with electronic control.

Generator characteristics

MAX VOLTAGE OUTPUT V	CURRENT OUTPUT A	MAX OUTPUT DURATION T Max	FREQUENCY Hz
12000	300 mA	120 s	15 to 500
12000	125 mA	> 1 hour	15 to 500

Output measurements

OUTPUT	RESOLUTION	TYPICAL ACCURACY ± % (rdg) ± % (rg)
12000 V AC	1 V	± 0,2% ± 0,5 V
5 A AC	1 mA	± 0,2% ± 1 mA
8 mA AC	1 µA	± 0,2% ± 0,1 µA

Connections: by two HV connectors, a ground socket and two measurement sockets

Test measurements

- **Capacitance:**
  - Measurement range 1, from 1 pF to 100 nF. Resolution: 6 digits. Accuracy: ± 0.03% of the value ± 0.1 pF.
  - Measurement range 2, from 10 nF to 3 µF. Resolution: 6 digits; accuracy: ± 0.1% of the value ± 10 pF.

- **Tan Delta or dissipation factor DF:**
  - Measurement range 1: from 0 to 10% (capacitive). Resolution: 5 digits; accuracy: 0.05% of the value ± 0.005 %.
  - Measurement range 2: from 0 to 100%. Resolution: 5 digits; accuracy: 0.3% of the value ± 0.01 %.
  - Measurement range 3: over 100%. Resolution: 5 digits; accuracy: 0.5% of the value ± 0.03 %.

- **Power factor PF (or cos(φ)):**
  - Measurement range 1: from 0 to 10% (capacitive). Resolution: 5 digits; accuracy: 0.05% of the value ± 0.005 %.
  - Measurement range 2: from 0 to 100%. Resolution: 5 digits; accuracy: 0.3% of the value ± 0.02 %.

- **Power**:
  - Measurement ranges: 10 kW, 100 kW, 1 MW. Resolution: 0.1 mW; accuracy, typical: 0.5% of the value ± 1 mW; guaranteed: 1% of the value ± 2 mW.

- **Inductance**:
  - Measurement range 1: from 100 H to 1 MH. Resolution: 1 H; accuracy, typical: 0.5% of the value ± 0.5 H; guaranteed: 1% of the value ± 1 H;
  - Measurement range 2: from 1 H to 10 kH. Resolution: 0.1 mH; accuracy, typical: 0.5% of the value ± 0.5 mH; guaranteed: 1% of the value ± 1 mH.

TD 5000 Dimensions: 440 (W) x 345 (H) x 210 (D) mm.
Weight: 25 kg.

Connection between STS 3000 and TD 5000

STANDARD ACCESSORIES

TESTING CABLES

The option comes complete with the following connection cables:

- Two connection cable to the EXT. DEVICES connector of STS 3000.
- Two connection cable to the BOOSTERS connector of STS 3000.
- One high-voltage connection cable, 20 m long, 25 kV, with earth screen, for the connection to the device under test. The cable is mounted on a wheel.
- Two shielded connection cables, 20 m long, for the connection to the metering points. Cables are mounted on wheels.

• Four grounding cables: one 6 m long, two 1 m long and one 2 m long..
• One clamp, 5 kV isolation, with a connector which mates with the HV cable.
• Two clamps, terminated with banana sockets, which allow connecting to the metering point.
• One connection cables transport case.

TRANSPORT CASE
The transit case allows delivering TD 5000 with no concern about shocks up to a fall of 1 m.

TRANSPORT TROLLEY
The trolley eases the transport of TD 5000 and is designed to host both instruments and also the high-voltage cable.

ORDERING INFORMATION

CODE	MODULE
11175	TD 5000 module for the high-voltage test of Tan Delta for power transformers and HV devices, supplied with testing cables, transport case and trolley
14175	Cable test kit for TD 5000
19175	Heavy duty plastic transport case for TD 5000

COMPARISON TABLE OF THE STS FAMILY

STS MODEL	HIGH CURRENT, AC & DC	HIGH VOLTAGE	LOW AC-DC OUTPUTS	OPTIONAL TAN DELTA TESTS WITH TD 5000	OPTIONAL HIGH AC CURRENT WITH BUX 3000
STS 5000 [1] 	✓	✓	✓	✓	✓
STS 4000 [1] 	NOT AVAILABLE	✓	✓	✓	✓
STS 3000 	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	✓	✓

[1] *For USA and Germany, only STS 3000 test set with optional module TD 5000 and/or BUX 3000 is available.*

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EN - STS 3000 & TD 5000
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