TDMS is a powerful software package providing data management for acceptance and maintenance testing activities. Electrical apparatus data and test results are saved in the TDMS database for historical results analysis. The TDMS software organizes test data and results for all electrical apparatuses tested with ISA test sets and the related software.

The TDMS software controls and provides data acquisition from all ISA test sets:
- DRTS 66, DRTS 64, DRTS 34, DRTS 33, DRTS 6, DRTS 3+ - Relay and Energy meters test sets
- eKAM, T 3000, T 2000, T 1000+ and TD 1000+ - Primary and Secondary injection test sets
- STS 5000, STS 4000, STS 3000, TD 5000 and TDX 5000 - Current, voltage and power transformer test sets
- CBA 3000, CBA 2000 and CBA 1000 - Circuit Breaker analyzers
- BTS 200MKII - Battery load unit.

The TDMS software is also a powerful database. It allows creating an electrical network with substations, feeders and the majority of electrical apparatuses, such as:
- Relays
- Instrument transformers
- Power transformers
- Circuit Breakers
- Energy Meters
- Transducers
- Power Quality Meters
- Resistances.

The TDMS Test & Data Management Software is the integrated testing solution to perform any substation apparatus commissioning and maintenance.
**TDMS Report Editor**

TDMS has a built-in Report Editor that allows generating professional test reports for a single test object, for a group of tested devices or for an entire substation. It can create customized reports or use standard forms. The **TDMS Tests** report can be exported in MS Office (Word and Excel), PDF or RTF formats.

TDMS is the control platform to run all ISA test software. Test programs, calibration, firmware, software upgrade and languages are all managed by TDMS.
TDMS is a powerful software package to be used with all the automatic test systems manufactured by ISA.

TDMS allows testing:
- Protective relays in transmission, distribution and power generation
- Watt-hour meters
- Transducers
- Meters
- Power quality meters.

TDMS runs on Windows XP, Windows Vista, Windows 7, 8 (both 32 and 64 bit versions) and 10.

Windows, Word and Excel are trademarks of MICROSOFT Inc.
RELAY APPLICATION DESCRIPTION

The TDMS software platform allows the user to select easily and quickly the most appropriate software package for the required application.

TDMS test software uses an open architecture easily expandable with additional software modules at any time.

The TDMS Package can be used to test any protective relays in:
- Power Generation Plants
- Distribution network
- Transmission network
- Industries.

Manual control: test it as you like it

The manual control module has the following main characteristics:
- Intuitive graphical user interface
- Virtual Front Panel control
- Graphical Vector control
- Ramp Test: sequence of tests with the ability of ramping any parameter up or down at the same time
- Threshold test: automatic determination of a threshold (current, voltage, frequency, phase angle)
- Rate of change (gradient) tests of frequency, voltage, current, phase-angle and V dc (Dx/Dt)
- The Harmonic generation module allows creating any waveform distortion
- The Report Manager allows test report customization to user requirements; results are exported in Windows formats.

Playback Waveform: reproduction of transient signals and waveform generation

- Playing back transient signal from digital fault recorders and numerical relays
- Analysis of relay operating time
- Graphical view and replay of analog and binary signals
- Impedance locus display
- Scale, cut, copy and paste of analog signals
- Supported file formats: COMTRADE, Excel
- Test reports for printing or exporting in Windows .TXT or WMF formats.
**Test Plan Editor**

The Relay Test Plan Editor gives the user the possibility to create and run different test plans for different test applications. The Test Plan Editor allows creating a test plan using predefined macro functions available for any type of relays. This feature is particularly useful for testing multifunction relays. The Test Plan can be associated to any relay in the TMDS list of programs. Before executing the test, it is possible to define relay setting and characteristics. The Test Plan can be run two ways: the entire test plan can be executed, or the user can select the macros to be executed on the relay, according to his needs. Finally the Test Plan can be printed and saved automatically into the TDMS database.

**AUTOMATIC RELAYS TESTING IN POWER TRANSMISSION, GENERATION & DISTRIBUTION**

We explain now the automatic programs available in TDMS for the testing of protection relays. The following are the main characteristics common to all programs:

- Extremely easy to use
- Intuitive graphical user interface
- Click and test operation
- Definition of a sequence of tests
- Graphical definition of the nominal characteristic
- Automatic test and computing of deviation from the nominal values
- Report Manager allows test report customization to user requirements; results are exported in Windows formats
- Graphical definition of the nominal characteristic
- Automatic test and computing of deviation from the nominal values
- Automatic Pass-Fail assessment.

TDMS Software includes the following testing modules:

- **Sequencer**
  The sequencer module is a software for determining the relays operating time and the logical sequence of the event.

- **Overcurrent** for automatic testing of Over-Current (50 - 51 - 50N - 51N) and Directional Overcurrent (67 - 67N) relays, including all the standard curves IEC, IEEE and I2T.

- **Differential relays module**, for automatic testing of:
  - transformer differential (87T) and generator differential (87G) relays with 3 and 6 currents
  - End-to-End test for line differential (87L) relays with GPS (Global Positioning System) synchronization, using two DRTS XX test sets.

- **Synchrocheck module-25**, for automatic testing of synchrocheck (25) relays, with 3 or 6 voltages control.

- **Swing Pro module**: for testing power swing blocking and out of step function.
The Distance Relays-21 Module is a powerful software that allows users to perform the fully automatic testing of any distance relay, regardless of type or manufacturer, in HV and EHV Transmission networks.

Main characteristics:
- Graphic user friendly interface
- Interactive Graphic editor of the nominal characteristic
- Automatic test and computing of deviation from the nominal values
- Sequencer Editor for creating test sequences, by entering fault impedances or entering currents/voltages and phase-angle quantities
- The Report Manager allows test report customization according to user requirements; results are exported in Windows formats.

Distance Relay-21 has the following testing features:
- Simulation of all types of faults: single phase, two phase, two phase to ground, three phase
- Click and test directly on the R-X diagram of any distance relay nominal characteristic
- Automatic test of a given nominal characteristic
- Automatic search of an unknown characteristic
- End to End test by means of two synchronized ISA test sets
- Power Swing Blocking test
- Auto-recloser test
- Developing fault test
- Switch-on-to-fault test
- Fuse failure simulation
- Direct import of the setting files from main relay manufacturers using any file format
- Import SET files from our old automatic test programs for distance relays written with X.TEST editor.
Enhanced features
Other important features have been included to enhance the automatic test, like:

- Possibility to set different earth factors for each zone: this is important since more and more relays have this feature
- Possibility to set the earth factor as RE/RL and XE/XL
- Possibility to test the characteristic in terms of loop resistance and fault reactance (better known as Arc resistance compensation).

Distance relay libraries
A large number of special test programs for the main relay manufacturers is included in our Distance Relays Test Program Library.

Test programs for old electromechanical, solid state and numerical relays from AREVA, ASEA, ABB, ALSTOM, BBC, GE, GEC Alsthom, Mitsubishi, SEL, SIEMENS, Toshiba and VAltech are included (please ask for the detailed list of test programs). These programs ask the relay settings, draw the nominal curve and test it automatically with the Distance Relay-21 program.

ISA also implemented the possibility to upload the relay setting file of main manufacturers (ABB, SEL, Alstom, Siemens, Toshiba, GE), generally available in XML, CSV, XRI0 and txt format, directly and automatically into TDMS relay libraries, including a wide range of protection relays.

This new function thus allows considerable time saving as nominal characteristics are automatically created.

Advanced Editor
The Advanced Editor module allows creating any possible test plan for relay testing, using 24 commands only. Advanced Editor permits to use all parameters which are generated and controlled by all ISA relay test sets. The key difference with respect to the existing SEQUENCER or the Editor of Macro software is that with EDITOR it is possible to define any parameter as a variable, which will be defined later on as a function of the relay setting and to use logic commands such as if-then-else and so on.

Testing Energy Meters, Transducers and PQ Meters
This package is designed for the automatic test and calibration of:

- Energy meters
- Transducers
- Measuring instruments

The Measurement Software Package consists of three test programs:

Energy meters
It allows automatic testing and calibration of energy meters according to the international standard IEC521.

- Test of class 1, 0.5, 0.2 or 0.1 energy meters
- Test without or with a standard meter
- Energy meter accuracy test - Load test
- Creep test
- No-Load test
- Automatic percentage of error computation.

Results
- Results are saved in graphical and tabular form for later use
- Test reports for printing or export in Windows .TXT or .WMF format.
Transducers

It has been designed for testing measuring transducers:
- Voltage, Current, Frequency and all types of all Power transducers.

The software automatically computes the errors of transducers.

Results
- Results are saved in graphical and tabular form for later use
- Test reports for printing or export in Windows .TXT or .WMF formats.

Power quality meters

It allows the automatic testing of power quality meters, according to the international standard IEC61000-4-30.

Tested Parameters are:
- Change in power frequency
- Changes in supply voltage (dips, swells, rapid voltage changes...)
- Presence of flickers
- Voltage and current harmonics/interharmonics
- Voltage unbalance
- Transient voltages
- and others.
Transcope Software Module

This software module is an option for DRTS 66. The option is to be specified at order.

With this option the 10 binary inputs of DRTS 66 can be configured as 10 analog voltage inputs. Transcope has the following features:

- Three phase voltage and current (with external clamp or shunts), phase angle, wattmeter, frequency and harmonic meter
- Oscilloscope
- Analog Transient recorder
- Sequence of event recorder.

The Transcope functions can be used during any other test function of the DRTS 66.

- Measurement features:
  - Current and voltage: RMS values
  - Phase angles between inputs
  - Frequency
  - Active, reactive and apparent power
  - Energy
  - Harmonic content. Measurements of the Total Harmonic Distortion, and of the distortion of all harmonic components up to the 40th.

- Oscilloscope feature: it is possible to select the trace to be viewed, and to view it on the DRTS 66 local display. The oscilloscope can be triggered on any trace.

- Recording feature: it is possible to use the test set as an analog transient recorder and as a digital sequence of event recorder.

- Extended triggering capability: positive and negative trigger thresholds and ROC thresholds on any of the voltage or current inputs.

IEC61850 Interface
Relay testing with Ethernet - based substation communication protocol

IEC 61850-8

By means of a dedicated hardware and the TDMS software, ISA DRTS 66 can expand its testing capabilities by handling IEC61850-8 GOOSE messages. The software uses GOOSE messages instead of physical contacts to verify the relay trip delay.

IEC 61850-9-2

The IEC 61850-9-2 option allows generating measurement messages on the system bus. The option and the associated software provide the following features:

- Injection of Sampled Values on the system bus, corresponding to CT and VT measurements
- Test of relays connected to the system bus, by the generation of Sampled Values and the monitoring of the relay tripping, as described above.

Programmer Software Package
XTEST_X ISA

The package provides an OCX application (ActiveX) that allows controlling any Automatic Relay Test Set with high level languages, such as Visual Basic, Visual C++ or any other software that supports the ActiveX technology.

This is particularly useful for integrating the test set control into an existing software, that includes the control of other instruments, such as meters, converters and so on.
The software performs various tasks, such as:
- Download stored measures, performed in the field, and saved in the instrument local memory
- Open and save results in the Access Database (.MDB) format.

For T 1000+ and T 3000 in relay test application mode:
- Real time display of the measures made by the instrument
- Possibility to draw the nominal characteristic of the relay under test
- Perform calculations on the results
- Display and print Cartesian or Polar graphs of all combination of measures.

For T 2000 and T 3000 in transformer test application mode:
- Display and print transformer results
- Compare different CT excitation curves on the same graph
- Upgrade the firmware of the instrument
- Save or load the calibration values
- Save or load instrument settings.
PADS - Power Apparatus Diagnostic Software is a powerful software application, optionally included in TDMS software, that allows the remote control of the different product family: STS 5000, STS 4000, STS 3000 (light), TD 5000, TDX 5000 and eKAM. The software performs various tasks, such as:

- Control the test set remotely from PC
- Create test plan
- Download stored test results via Ethernet cable
- Create and customize test reports
- Print test results
- Open and save results in TDMS database.

STS family and TD 5000 test sets

STS family test sets are designed to test current, voltage, power transformers, circuit breaker and ground grid. The module TD 5000, in connection with STS test sets, performs capacitance and Tan Delta measurement. Available tests are:

**Current Transformer Testing:**
- Ratio, Voltage mode
- Ratio, polarity and burden with high AC current
- Burden, secondary side
- Excitation curve
- Winding or burden resistance
- Voltage withstand
- Remote polarity check
- Rogowski coil transformers
- Low power transformers
- Tan Delta measurements.

**Voltage Transformer Testing:**
- Ratio, polarity
- Burden, secondary side
- Ratio, electronic transformers
- Voltage withstand
- Remote polarity check
- Tan Delta measurements.

**Power Transformer Testing:**
- Ratio per TAP
- Static and dynamic resistance of Tap Changer contacts
- No-load current
- Short-circuit impedance
- Tan Delta measurements.

**Circuit Breaker Testing:**
- High DC current micro-Ohmmeter test
- Tan Delta measurements.

**Circuit Breaker and Relay Testing:**
- Current threshold and timing.

**Ground Grid Testing:**
- Ground resistance and resistivity
- Step and touch voltages.
The TDMS - Circuit Breaker software module is a powerful application that provides connectivity with CBA 3000, CBA 2000 and CBA 1000 test sets for circuit breaker analysis. The software performs various tasks, such as:

- Full control of the Circuit Breaker analyzers CBA 3000/CBA 2000/CBA 1000
- Download pre-defined test plans to the CBA 3000/CBA 2000/CBA 1000 test sets
- Download test plans defined with CBA 3000/CBA 2000/CBA 1000 to TDMS.
- Download test results (timing test, coil current, transducers and microhmeter measures) stored on CBA 3000/CBA 2000/CBA 1000 local memory.
- Display channels waveforms
- Calculation on data received from CBA 3000/CBA 2000/CBA 1000
- Compare different curves on the same graph
- Enhanced measurement features for motion, speed and acceleration analysis
- Test plans and test results can be viewed, edited, saved and printed
- Test results can be exported in Word, Excel, RTF and PDF formats
- Save or Upload the calibration values.

The CBA 3000/CBA 2000/CBA 1000 test report allows:
- Setting the test sequence (time and motion test), static and dynamic resistance test, open-close and open-close-open command test
- Displaying test results in a single page, with table and graph, thus allowing a better and easier results interpretation.

ORDERING INFORMATION

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