



PRESENTATION

The ISA test sets training course provides engineers the opportunity to learn how to use ISA test sets and the related software to effectively test relays and transformers.

The course is addressed to engineers with beginning and intermediate levels of expertise. Participants will use the ISA test sets types: DRTS 66, T 1000 PLUS, CBA 1000, CBA 2000, BSG option, T 3000, BU 2000 option, BTS 200, and will be driven to the solution of actual testing problems on protections, transformers and CB's.

1-Day, 3-Day and 5-Day courses are available.

TRAINER

Our trainer has a long international experience in training and testing of electrical apparatus

LANGUAGE: English

LOCATION: ISA Training Center – Via Prati Bassi 22 - Taino (VA)- ITALY

TRAINING SUMMARY

1. THREE-DAY COURSE ON RELAY TESTING, USING DRTS 66 WITH THE LOCAL CONTROL AND TDMS SOFTWARE (3 DAYS)

- **Local test set control:**
 - . Manual control;
 - . Distance relay tests;
 - . Overcurrent relay tests;
 - . Exercises.
- **TDMS software and automatic relay test set DRTS 66:**
 - . ISA WEB site: TDMS software upgrade; firmware upgrade;
 - . Test programs handling;
 - . Data base: create structure, test results;
 - . Manual control program study and test exercise;
 - . Exercises with different relay types.
- **Distance relay tests:**
 - . Study of the distance relay test program;
 - . Basic and advanced tests;
 - . IEC61850 supervision;
 - . Distance relay test exercise.
- **Other automated relay tests:**
 - . Differential relays;
 - . Overcurrent relays;
 - . Exercises.



2. ONE-DAY COURSE ON CIRCUIT BREAKER TESTING

- **CBA 1000 AND CBA 2000 TEST SETS**
 - . Test set functions;
 - . CB simulator: timing, movement, resistance;
 - . Exercise test on an MT CB;
 - . Test results program;
 - . BSG 1000 option: study and exercise.

3. ONE-DAY COURSE ON RELAYS, TRANSFORMERS AND BATTERY TESTING

- **T 1000 PLUS MANUAL RELAY TEST SET**
 - . Test set control menu;
 - . Various relays exercise;
 - . Test results handling.
- **T 2000 AND T 3000 TRANSFORMER TEST SETS**
 - . Test set functions;
 - . Exercise on CT's and VT's;
 - . Test results program;
 - . BU 2000 option: study and exercise.
- **BTS 200 BATTERIES TEST SET:**
 - . Test set functions study;
 - . Exercise: battery discharge simulations;
 - . Test result program.

TRAINING DETAILS

1. THREE - DAY COURSE ON RELAY TESTING

1.1. DAY 1- INTRODUCTORY

- **Welcome, course organization.**
- **DRTS 66 key features.**
- **DRTS 66 local control:**
 - . Manual control: trip, delta, ramp, dragging tests.
 - . Distance relay tests: shot, Z-t, verify.
 - . Over-current relay tests: shot, auto I-t, verify.
- **TDMS software: introduction & data base**
 - . Service programs: UPGRADE, CALIBRATION, FAULT RECOVERY
 - . Fault reproduction;
 - . Data base: add and modify structure;
 - . Data base: add components;
 - . Data base: test results, test plans, recordings;
 - . Data base: import test results;
 - . Data base: print test result.



- **TDMS: manual control of DRTS 66**

- . Menu options: file, options;
- . The I/O set-up panel;
- . The pre-fault panel;
- . The fault panel;
- . Type of tests;
- . Test results.

1.2. DAY 2 – DISTANCE RELAYS TESTING

- **Exercise on the use of the MANUAL control, on the following protection relays:**

- . MAX I time dependent, 3 curves (CEE RMS7991)
 - .. Relay study: Connections, nominal curve, relay setting;
 - .. Delta test to find the nominal curve;
 - .. Delta threshold to find the thresholds;
 - .. Test results analysis, print result.
- . Reverse power (CEE WTG7131)
 - .. Relay study: Connections, nominal curve, relay setting;
 - .. Characteristic curve on the P-Q plane with I and phase delta thresholds;
 - .. Test results analysis, print result.
- . Frequency high – low thresholds (CEE HDG7020)
 - .. Relay study: Connections, nominal curve, relay setting;
 - .. Max and min frequency delta thresholds;
 - .. Test results analysis, print result.

- **TDMS: basic distance relays testing;**
- **TDMS: advanced distance relays testing;**
- **Exercise on the following distance relays:**

- . SIEMENS 7SL27;
- . SCHWEITZER SEL 321;
- . ABB REL670;
- . ABB REL 511;
- . PROTECTA DV7036;
- . DACO DAM385.

On the above relays the following tests will be executed:

- . Relay study: Connections, nominal curve, relay setting;
- . Programming the setting;
- . Click and test;
- . Z vs. t diagram;
- . Automatic characteristic curve verification;
- . Characteristic curve search.

- **IEC61850 Standard:**

- . Short introduction;
- . Exercise with ABB REL670.



1.3. DAY 3 – OTHER RELAYS TESTING

- **Other exercises with distance relays.**
- **TDMS: differential relay test program;**
- **Exercise on differential relays with DRTS 66:**
 - . PROTECTA DTD-EP;
 - . SCHWEITZER: SEL-387
 - . Tests executed:
 - .. Relay study: Connections, nominal curve, relay setting;
 - .. Characteristic curve verification;
 - .. Second harmonic lockout;
 - .. Out of zone test.
- **TDMS: Overcurrent OC5051.**
 - . Reference document: MSE20037: OC-5051
 - . TDMS: exercise on overcurrent relay with DRTS 66 (RMS7991 CEE):
 - .. Automatic test for the verification of the nominal curve;
 - .. Threshold test;
 - .. Test results analysis and printout.
- **TDMS: TEST PLAN EDITOR.**
 - . Presentation of test plan features: why test plans; edit a test plan; save and link the test plan to TDMS data base; macros;
 - . Exercise: create a test plan to test different curves;
 - .. Test execution;
 - .. Test result analysis.
- **TDMS: SEQUENCER.**
 - . Presentation of the program
 - . Exercise on the HV recloser type DV945

2. ONE - DAY COURSE ON CIRCUIT BREAKERS TESTING

- **CBA 1000 AND CBA 2000 STUDY.**
 - . Architecture
 - . CB simulator
 - . **CBA 1000 and CBA 2000 practice:**
 - .. With the simulator
 - .. Test set control with CBAPro;
 - .. Data acquisition and analysis on PC
 - .. Tests on the ABB CB
 - .. BSG 1000 option presentation
 - .. BSG test on the ABB CB



- **Tests executed:**
 - .. All test sequences: O, C, OC, CO, OCO;
 - .. Transducer setting;
 - .. Transducer calibration;
 - .. Datum points;
 - .. Slow motion, first trip and line sync simulation

3. ONE - DAY COURSE ON RELAYS, TRANSFORMERS AND BATTERY TESTING

- **T 1000 PLUS STUDY:**

- . Local control menu.

- . **T 1000 PLUS practice:**

- .. MAX I t dip (CEE RMS7991)
- .. Reverse power (CEE WTG7131)
- .. Frequency (CEE HDG7020)
- .. SIEMENS 7SL27 STARTER

Tests executed:

- .. Trip time: I vs. t curve;
- .. Delta test;
- .. Delta threshold;
- .. Threshold;
- .. Results export to PC;
- .. Result curve.

- **T 2000 AND T 3000 STUDY.**

- . Local control menu.

- . **T 3000 practice:**

- .. CT saturation curve
- .. CT ratio, burden, V mode
- .. VT ratio, protection
- .. PT: LTC test

- . **BU 2000 presentation**

- . High current tests with BU 2000

- **BTS 200 STUDY.**

- . Test set specification;

- . The control menu;

- . Test exercise: set-up, data acquisition and analysis;

- . PC control.