

# RELTEST 1000

Three Phase  
Relay Test Set



## Three Phase Relay Test Set

- Advanced multifunctional relay test set, specially designed for distribution, smart grid and renewable energy plants
- Local control, via keyboard and colored display
- Remote control with the Advanced Test & Data Management Software
- Three independent AC voltage outputs adjustable from 0 to 400 V
- Fourth independent AC voltage output adjustable from 0 to 130 V
- One current output, from 0 to 15 A, switchable on 3 phase sockets
- One independent current output, adjustable from 0 to 1.5 A
- Frequency generator: 40 - 400 Hz
- Battery simulator
- Two separate timer inputs
- Four auxiliary relay outputs
- Optional IEC 61850-8 communication interface
- Optional six low level outputs
- USB interface
- Internal memory for test results storage and saving
- Automatic test report
- Light and easy to carry

## Application

RELTEST 1000 can test all the following relays

RELAY TYPE	IEEE NO
Distance relay	21
Synchronizing device	25
Under/over-voltage relay	27/59
Directional Power relay	32
Instantaneous over-current relay	50
Inverse time over-current relay	51
Directional over-current relay	67
Automatic reclosing relay	79
Frequency relay	81

The use of RELTEST is extremely easy: once connections are performed, the operator can select the desired test by a menu. Tests can be performed locally or by PC control. Test results are automatically saved and then downloaded in the PC using the software TDMS, provided with the test equipment, for final storage and printing.

## Technical Specifications

### Three Voltage Outputs

- Three AC voltage outputs, separately adjustable. Output range (phase voltage): from 0 V to 100 V AC or to 400 V AC
- Connection: 4 safety sockets (3 phases and a common neutral)
- Possibility to set the amplitude of the outputs independently for each output, continuously
- Accuracy:  $\pm 0.5\%$  of the output,  $\pm 0.2\%$  of the range.
- Distorsion: 0.1%
- Angles between the voltages: adjustable from  $0^\circ$  to  $360^\circ$
- Resolution:  $0.5^\circ$ ; accuracy:  $1^\circ$
- Voltage outputs have the neutral in common and are isolated from mains and ground
- Power available for each phase: 20 VA continuously, at the maximum voltage

- Possibility to set independently the pre-fault and the fault output amplitudes

### Fourth Voltage Generator

The test equipment is provided with a fourth voltage output, with the neutral in common with the three phase voltages, adjustable separately from the phase voltages.

- Voltage ranges: 13 V or 130 V AC
- Possibility to set the output amplitude from zero to the maximum value, continuously
- Connection: 2 safety sockets
- Accuracy:  $\pm 0.5\%$  of the output,  $\pm 0.2\%$  of the range.
- Resolution: 6 mV on the 13 V range, 60 mV on the 130 V range
- Distorsion: 0.1%
- Angle: adjustable from  $0^\circ$  to  $360^\circ$
- Resolution:  $0.5^\circ$ ; accuracy:  $1^\circ$
- The output is isolated from mains and ground
- Available power: 6 VA continuously, at 130 V
- Possibility to set independently the pre-fault and the fault output amplitudes

### Current Outputs

RELTEST 1000 is equipped with two current outputs, one switchable on the three phase sockets and an independent one. Currents can be generated one at a time.

### Main Current Generator

The main current output has the neutral isolated from the voltage outputs and can be switched on the 3 phase sockets.

- Current range: 15 A AC
- Connection: 4 safety sockets, marked IN, I1, I2 and I3
- Output selection: automatic, according to the selected fault
- Possibility to set the output amplitude from zero to the maximum value, continuously
- Resolution: 7 mA
- Accuracy:  $\pm 0.5\%$  of the output,  $\pm 0.2\%$  of the range
- Distorsion: 0.5%
- Angle adjustable between  $0^\circ$  and  $360^\circ$
- Resolution:  $0.5^\circ$ ; accuracy:  $1^\circ$

- The output is isolated from mains and ground
- Available power: 25 VA continuously, at 15 A

### Second Current Generator

The test equipment is provided with an additional current output. Currents can be generated one at a time. The neutral is in common with the neutral of the phase current.

- Current ranges: 0.15 A and 1.5 A AC
- Connection: 2 safety sockets
- Possibility to set the output amplitude from zero to the maximum value, continuously
- Accuracy:  $\pm 0.5\%$  of the output,  $\pm 0.2\%$  of the range
- Resolution: 0.1 mA on the 0.15 A range, 1 mA on the 1.5 A range
- Distorsion: 0.5%
- Angle: adjustable from  $0^\circ$  to  $360^\circ$
- Resolution:  $0.5^\circ$ ; accuracy:  $1^\circ$
- The output is isolated from mains and ground
- Available power: 2 VA continuously, at 1.5 A

### Output Frequency

- Frequency range: adjustable from 40 Hz to 400 Hz
- Possibility to set separately the outputs frequency before and during the fault
- Possibility to have two different frequencies on two outputs (for synchronising relay test)
- Accuracy:  $\pm 0.1$  mHz
- Resolution: 1 mHz
- Rate of change programmable between  $\pm 0.1$  Hz/s and  $\pm 999$  Hz/s

### Battery Simulator

Unregulated DC generator: it follows the mains.

- Voltage values at 230 V: 110, 48, 24 V DC  $\pm 15\%$ .
  - Power: 30W, 22W, 11W. Connection: 2 safety sockets.
- The output is isolated from mains, ground and all other outputs.

### Trigger Inputs

- Two trigger inputs, marked C1 and C2, isolated and programmable independently.
- Inputs can be selected independently as dry or wet, up to 400 V DC
- With the voltage input, trigger thresholds are programmable at 24 V or 80 V
- Connection: 4 safety sockets, 2 for C1 and 2 for C2. Inputs are isolated between them, from mains, ground and other outputs

### Timer

The electronic digital timer has a fully automatic start and stop, both for make and break of the input, that can be either a clean (dry) contact or a contact under voltage (wet).

Accuracy:  $\pm 100$  ppM  $\pm 1$  ms.

### Auxiliary Outputs

- 4 auxiliary contacts, capable to simulate all logic commands to the relay
  - Possibility to time the contacts closure with respect to test start.
- Delay range: from 0 to 999.99 s
- Contact range: 5 A at 250 V AC; 0.2 A at 120 V DC

### Graphic Display and Local Control

- Large colour graphic display, type TFT, backlighted, 320 x 240 pixels
- Keyboard: 12 keys, 5 function keys and one digital encoder

### Local and PC Control

The test equipment local control is performed by the multifunctional knob, keyboard and display.

The control menu allows to set the type of fault. Then the test is launched, including two type of tests: treshold measurement and time measurement. Test results are shown on the display, and can be saved and retrieved. With the PC connection, the user has available TDMS - Test and Data Management Software.

### Protections

- Autodiagnostic at power-on
- Electronic protection on voltage outputs and a fuse on the auxiliary outputs
- Thermal protection against over-heating
- Trigger input protection against selection error

### Interface and Software

- PC interface: USB
- Internal memory: more than 500 test results
- TDMS Software for the test result management, storage and saving

### Power Supply and Dimensions

- Mains supply: 195 to 264 VAC 50/60Hz
- Weight: 13 kg
- Dimensions: 46 (W) x 35 (H) x 17 (D) cm

### Accessories

Accessories supplied with the test equipment:

- Power supply cable and USB cable
- Connection cables to the relays
  - N. 6 red cables, 2.5 mm<sup>2</sup> section, 2 m long, terminated with 4 mm safety banana plugs
  - N. 1 yellow cable, 2.5 mm<sup>2</sup> section, 2 m long, terminated with 4 mm safety banana plugs
  - N. 1 blue cable, 2.5 mm<sup>2</sup> section, 2 m long, terminated with 4 mm safety banana plugs
  - N. 6 black cables, 2.5 mm<sup>2</sup> section, 2 m long, terminated with 4 mm safety banana plugs
- N. 10 adaptors
- Grounding cable, 2 m long, yellow/green, with clamp
- Spare fuses
- TDMS Software and operator manuals

### Optional Accessories

#### IEC 61850-8 Communication Interface

This option allows the management and handling of IEC61850-8 messages. The option is supplied with RJ45 Ethernet crossed cable for the connection to the relay under test.

#### Six low Level Generators

Optionally RELTEST can be equipped with six outputs for relays connected to sensors.

Main characteristics are:

- Outputs: 6, 3 phase currents and 3 phase voltages, on 3 RJ connectors available on the front panel
- Voltage range: 0 to 7.07 V AC
- Current range: 0 to 7.07 V AC
- Max current: 5 mA
- Accuracy: 0.1% of the range

- Distorsion: 0.1%
- Output frequency: from 0 to 500 Hz

## Low Level Generators Cables Set

### Thytronic Thysensor Model for Relays NA-60 and NV10P

Set made of 3 cables, 2 m long, terminated with RJ45 connectors. Each cable carries one voltage and one current.

### ABB REF542PLUS & REF601 Model

Two sets made of 2 adaptors. The first one has 6 cables, 2 m long, with BNC connectors: 3 I, 3 V. The second one has 3 cables, 2 m long, with RJ45 connectors, for the current and voltage.

### ABB Ekip UP model

Set made of 3 cables, 1.4 m long, for the connection to the current sensors input terminals

## Heavy Duty Transport Case

Heavy duty transport case (Discovery type) with wheels, cover and handle.

## Applicable Standard

Electromagnetic compatibility:

Directive 2004/108/EC. Applicable Standard : EN61326-1 + A1 + A2

Low voltage:

Directive 2006/95/EC (CE conform). Applicable standard:

CEI EN 61010-1

Operating temperature: 0 - 50°C

Storage: -20°C to 70°C

Relative humidity : 5 - 95%, not condensing

## Ordering Information

CODE	MODULE
20174	RELTEST supplied with TDMS software and standard set of testing cables - 230V
90174	IEC 61850-8 interface
91174	Low level signal outputs
16174	Set of testing cables for Thytronic Thysensor relays
17174	Set of testing cables for ABB relays model REF
18174	Low power cable set for ABB Ekip UP model
85174	Heavy duty transport case