



## PW636i-F Digital Relay Test Kit

PONOVO POWER CO., LTD.  
[www.ponovo.net](http://www.ponovo.net)





## PW636i-F Digital Relay Test Kit

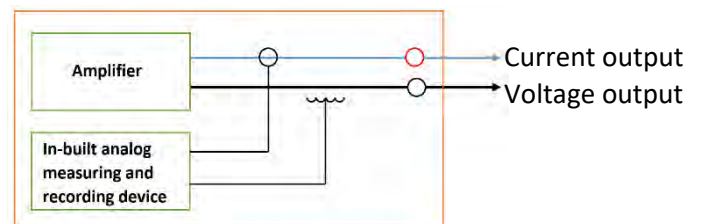
PW636i-F (6×32A, 4×300V, 8 fiber optic ports) is the new generation of PW series relay test set which can be used both as a conventional relay test kit and IEC61850 testing tools. Other test works, such as transducer, energy meter, indication meter, etc., can also be done easily. It's the ideal test device for all power utilities, power plants, relay manufactures, panel manufactures, research institutes, universities, testing companies, etc.

### Product Features

- In-built monitoring and recording
- Large output power
- High accuracy
- Support GOOSE/SV based test, supporting IEC 61850 first edition parts 6, 7-2, 8-1 and 9-2, Second edition parts 6, 7-1, 7-2, 7-3, 7-4, 8-1, and 9-2, Sampled Value messages 9-2LE and IEC 61869-9
- Support PTP/IEEE1588/IEC 61850-9-3 time synchronization
- Current booster interface for testing high burden relay
- Support importing setting value of relays via XRIO/RIO/PONOVO's Powertest default set files automatically

#### ➤ In-Built Analog Monitoring & Recording Unit

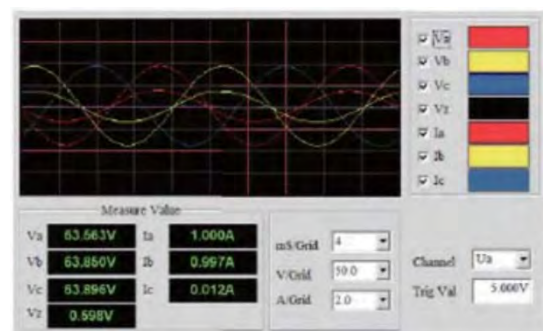
- ❖ This in-built analog monitoring and recording unit samples the actual current/voltage outputs and real-time output waveform can be displayed in the software.
- ❖ This makes it easy to check the correctness of wiring before the test and observe the output during the test process.



Principle

#### ➤ Real-Time Outputs Display

- ❖ Real-time output waveform display helps the fast troubleshooting of wiring and test circuitry before test actual started.
- ❖ User can also use this provision to analyze the external signals, such as phase angle, power, harmonic, etc.



#### ➤ IEC 61850 Function

- ❖ PW636i-F provides SV, GOOSE, analog, binary input from relay is received and interpreted by relay test equipment.



## Application

PW636i-F is not only has current and voltage outputs for all kinds of conventional relay testings, but also has 8 switchable optical fiber/Ethernet ports to support digital relay protection tests based on IEC61850. It can send and receive SV, simulate MU to send SV to relay which the dispersion is better than  $\pm 80\text{ns}$ , receive SV, realizing self-loop test. It can publish and subscribe GOOSE message, many different kinds control/block messages, simulate the abnormal message (jitter, frame loss, flying spot, wrong sequence, data anomalies, packet retransmission, channel invalid, out of step, etc.), receive and send IEEE1588(PTP) message, provide flexibility to configure both SV&GOOSE ports independently and measure received fiber optical power.

### ▪ Relay test

- Distance protection
- Differential protection
- Directional relay
- Time-inversed current relay
- Auto-reclosing, etc.

### ▪ Measuring and control device

- Synchronizer
- Transducer
- Energy meter
- df/dt, etc.

### ▪ System simulation

- Transient, steady-state fault simulation
- Playback of COMTRADE format file

### ▪ Calibration

- 0.5 Class energy meter
- Disturbance recorder
- Indicating meters, etc.



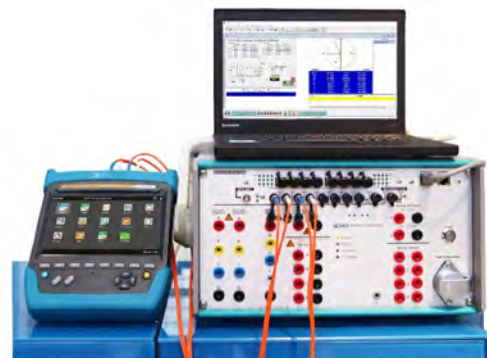
PW636i-F test traditional protective relay (Analog + Binary)



PW636i-F test (Analog + GOOSE) relay



PW636i-F test digital protective relay (SMV+GOOSE)

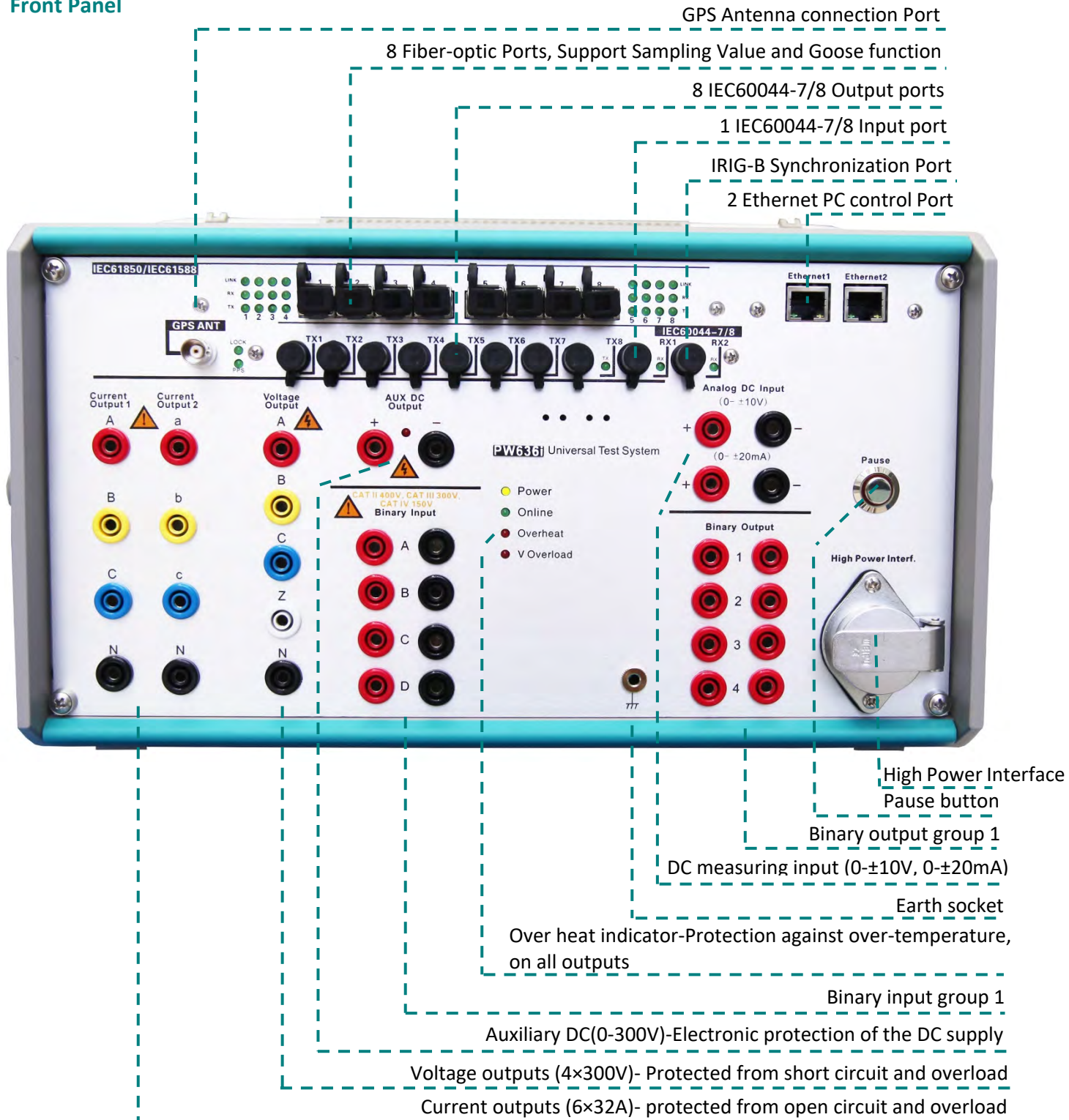


PW636i-F sends IEC61850-9-2 to PNS630

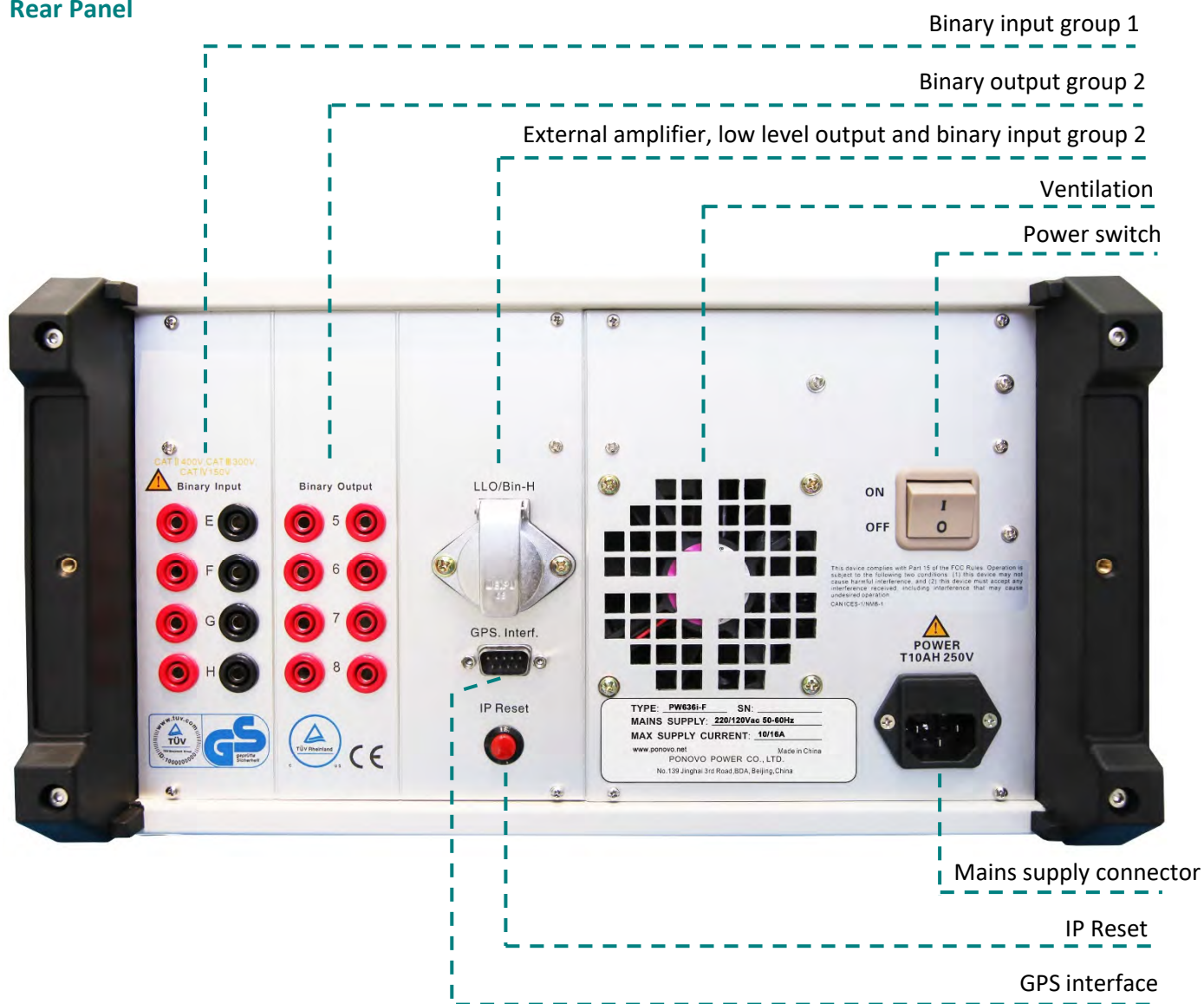
## PW636i-F Panels

PW636i-F is designed with fuse on the mains supply and electronic protection for overload on the current (open circuit) or voltage outputs (short circuit), with immediate isolation of the output and alarm indication. Also diagnostic message for the setting of wrong data, mistakes on the input etc. There's also electronic protection in case of counter-feed of voltage output, if any incorrectness happens, the alarm light shall flash. And Overheat LED indicator shall flash for protection against over-temperature, on all outputs.

### ■ Front Panel



## ▪ Rear Panel



## Test functions according to IEEE relay code

IEEE. NO.	DEVICE	IEEE. NO.	DEVICE
2	Time Delay Starting or Closing Relay	61	Density switch or sensor
21	Distance Relay	62	Time-Delay Stopping or Opening Relay
24	Volts per Hertz Relay	64	Ground Detector Relay
25	Synchronizing or Synchronism-Check Device	67/67N	AC Directional Overcurrent Relay
27/27N	Undervoltage Relay	68	Blocking or "out of step" Relay
30	Annunciator Relay	74	Alarm Relay
32	Directional Power Relay	76	DC Overcurrent Relay
36	Polarity or Polarizing Voltage Devices	78	Phase-Angle Measuring Relay
37	Undercurrent or Underpower Relay	79	AC-Reclosing Relay
40	Field (over/under excitation) Relay	81/81U/O/R	Frequency Relay
46	Reverse phase or Phase-Balance Current Relay	82	DC load-measuring reclosing relay
47	Phase-sequence or phase-balance voltage relay	85	Carrier or pilot-receiver relay
50/50N	Instantaneous Overcurrent Relay	86	Lock-out relay
51/51N	AC Time Overcurrent Relay	87	Differential Protective Relay
52	AC Circuit Breaker	91	Voltage Directional Relay
53	Field Excitation Relay	92	Voltage and Power Directional Relay
55	Power Factor Relay	94	Trip Relay
56	Field Application Relay	Other Functions (Optional)	High burden relay
58	Rectification failure relay		Lower Level outputs
59/59N	Overvoltage Relay		Transducer
60	Voltage or Current Balance Relay		Energy meter



## PowerTest For PW636i-F Digital Relay Test Kit Software



**PowerTest For PW636i-F** is specially designed for PW636i-F digital relay test kit. The application equipment includes intelligent equipment (merging unit, protection relays and intelligent terminals, etc.) and power system automatic equipment.

**PowerTest For PW636i-F** is a relay test software that includes different test packages, the **Basic** package, **Protection** package, **Advanced** package, **Special** package, **IEC61850** package, **New Modules**, which packages includes different testing module, that can be used for all kinds of relay testing, and it also has the special package for more testing application, such as transducer, energy meter, etc.

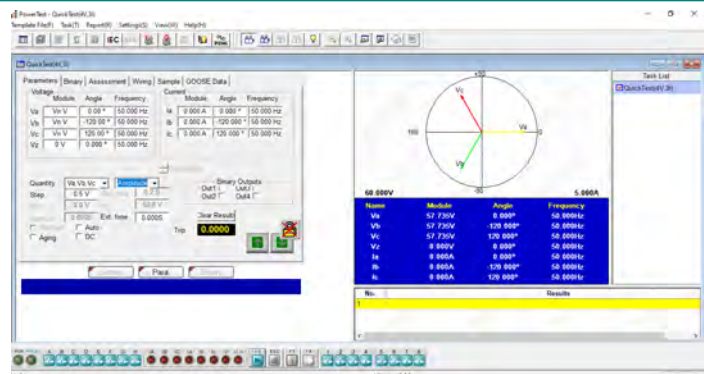
### ➤ Basic Package

In the **Basic** package, there are different Quick Test modules, Time module, State Sequence, Ramp, Harmonic, CB Operation modules.



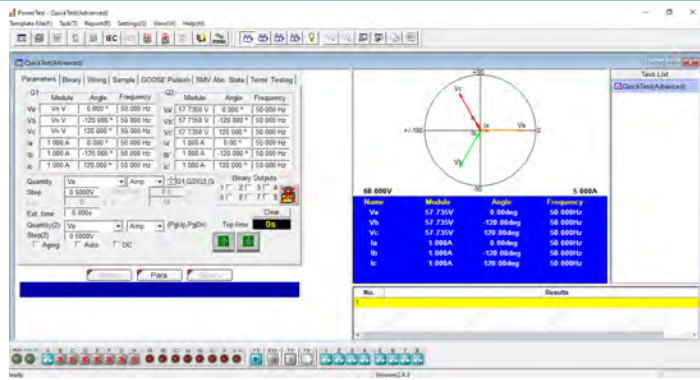
### QuickTest (4V, 3I)

- ❖ 4 voltage and 3 current sources available for test relay
- ❖ Amplitude, phase angle and frequency of voltage and current sources can be controlled independently
- ❖ Test can be in manual or auto mode



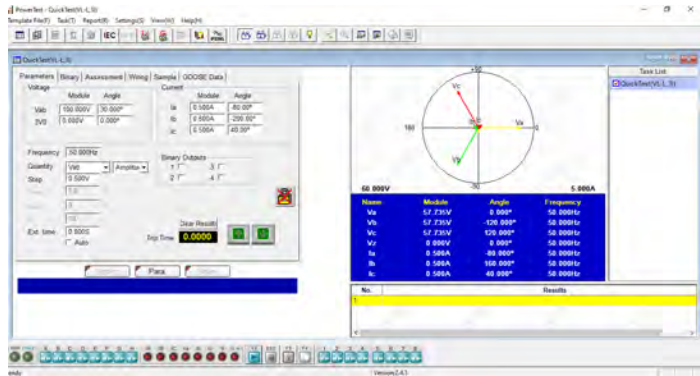
## QuickTest (Advanced)

- ❖ 12 voltage and 12 current sources available for test relay
- ❖ Amplitude and phase angle of voltage and current sources can be controlled independently
- ❖ Test can be in manual or auto mode



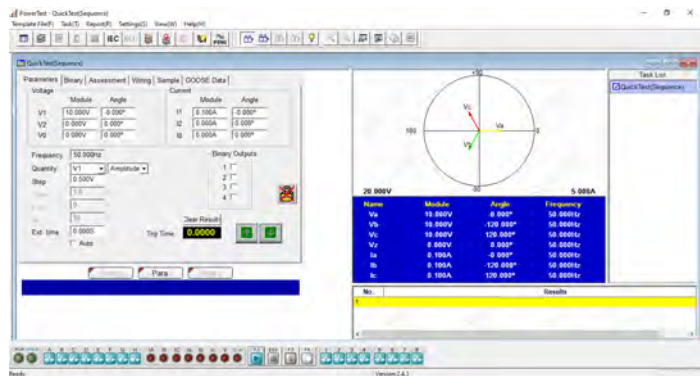
## QuickTest (VL-L, 3I)

- ❖ Easy to control the phase-phase voltage, 3V0 (zero sequence voltage) and 3 currents
- ❖ Amplitude, phase angle and frequency of current sources and phase-phase voltage, zero sequence voltage can be controlled independently
- ❖ Test can be in manual or auto mode



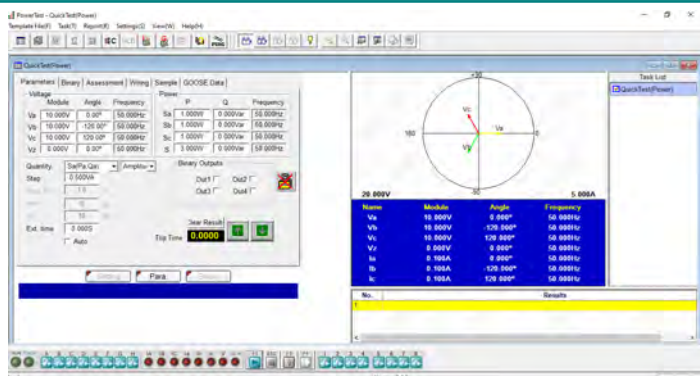
## QuickTest (Sequence)

- ❖ Easy to control the sequence components (positive sequence, negative sequence and zero sequence) for voltage and current
- ❖ Amplitude and phase angle of the sequence components of voltage and current can be controlled independently
- ❖ Test can be in manual or auto mode



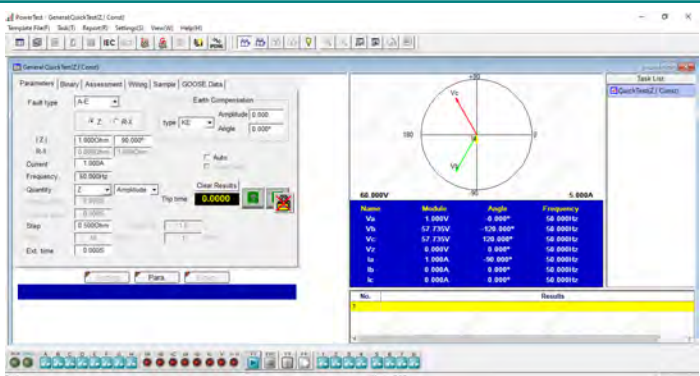
## QuickTest (Power)

- ❖ Easy to control the output of power, including active power, reactive power and apparent power
- ❖ Amplitude of active power, reactive power and apparent power can be controlled independently
- ❖ Test can be in manual or auto mode



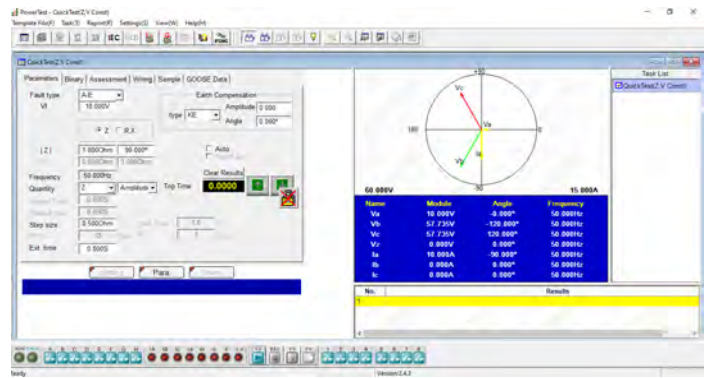
## QuickTest (Z, I Const)

- ❖ Easy to test impedance relay with constant current
- ❖ Set the fault impedance and fault current, obtain the amplitude and phase angle of each phase voltage and current according to the fault type
- ❖ Can manually or automatic search the relay operation value



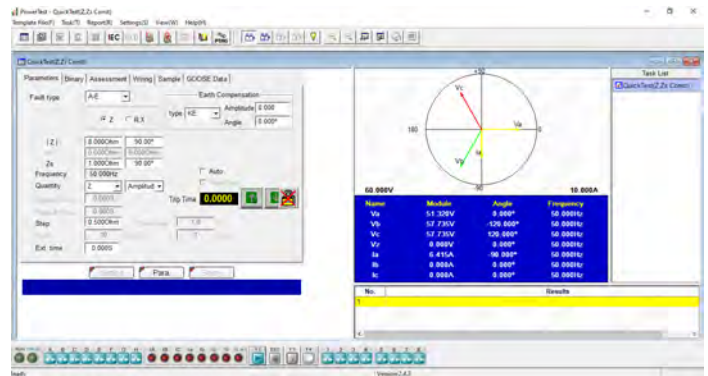
## QuickTest (Z, V Const)

- ❖ Easy to test impedance relay with constant voltage
- ❖ Set the fault impedance and fault voltage, obtain the amplitude and phase angle of each phase voltage and current according to the fault type
- ❖ Can manually or automatic search the relay operation value



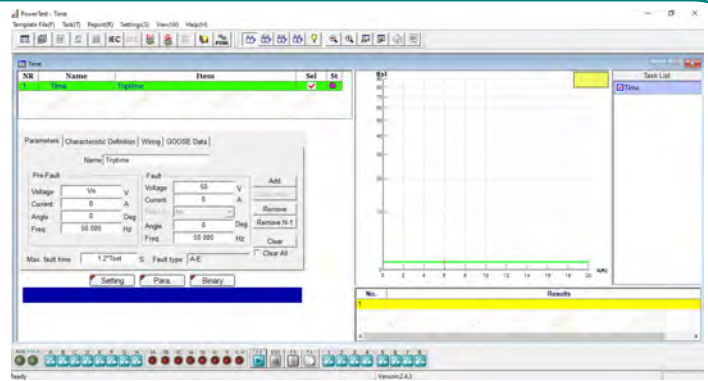
## QuickTest (Z, Zs Const)

- ❖ Easy to test impedance relay with constant system impedance
- ❖ Set the fault impedance and system impedance, obtain the amplitude and phase angle of each phase voltage and current according to the fault type
- ❖ Can manually or automatic search the relay operation value



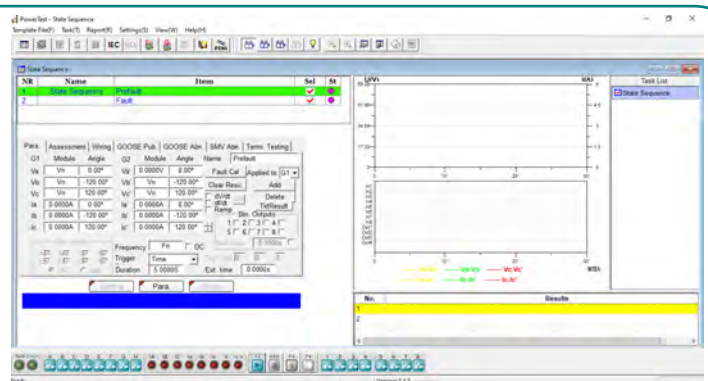
## Time

- ❖ Time module is used to test trip delay time of protection relay
- ❖ Various value can be set separately, such as Pre-fault voltage, Pre-fault current, Pre-fault time, Fault voltage, Fault current, fault time, fault type, binary input/output, characteristic definition, etc.



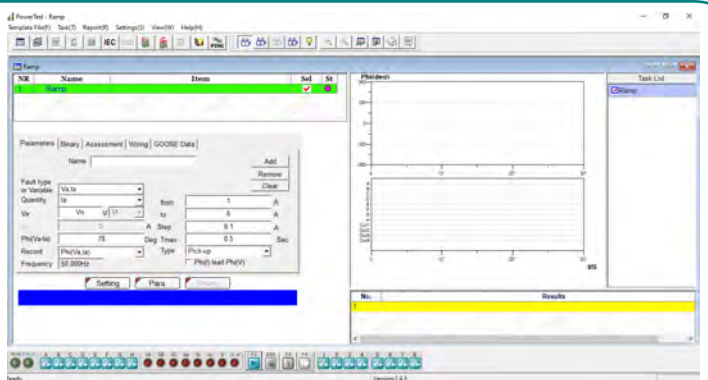
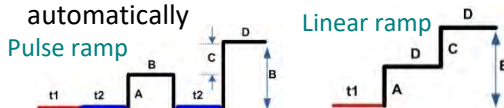
## State Sequence

- ❖ Used to define multiple continuous state sequences for special test applications, such as generate a series of states to test the tripping time and close time
- ❖ can be done Goose Abnormal and SMV abnormal
- ❖ Trigger condition in each state can be set separately



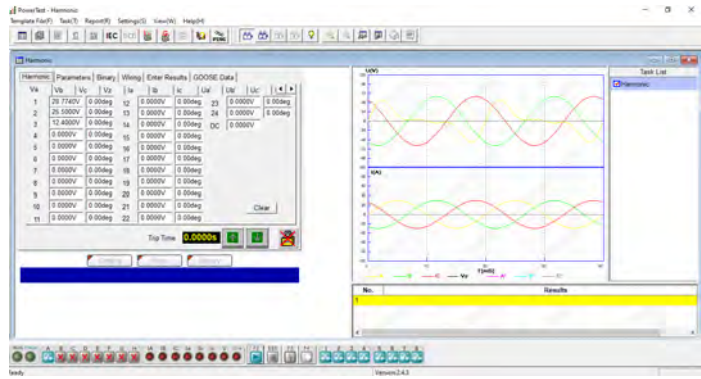
## Ramp

- ❖ Specially designed to realize RAMP for different test applications, such as pick up/drop off value checking, directional relay testing, maximum torque angle checking etc.
- ❖ Both pulse ramp and linear ramp available
- ❖ Can search the relay operation value automatically



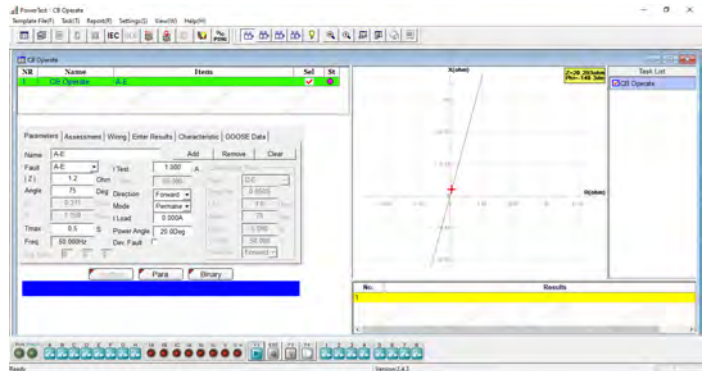
## Harmonic

- ❖ Can generate harmonics for all voltage and current outputs
- ❖ Can check the 2<sup>nd</sup> /3<sup>rd</sup> / 4<sup>th</sup> /5<sup>th</sup> harmonic restraint of current differential
- ❖ Can check the harmonic measurement of the relay up to 31<sup>st</sup> harmonic
- ❖ Can set the harmonic for each channel separately



## CB Operate

- ❖ Can check different types of line protection system, including over current, distance, etc.
- ❖ Can check the whole relay system, including auto-reclosing and circuit breaker simulate
- ❖ Can set different fault type
- ❖ Can do end-to-end test with GPS control mode



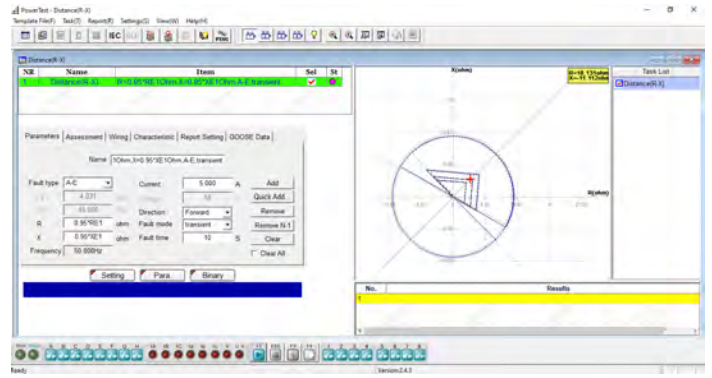
## ➤ Protection Package

In protection package, there are more testing modules for relay's characteristics testings, such as Distance, Directional, Auto-Reclosing, Differential, Time Inversed Current, Time Inversed Voltage, Frequency Relay test modules, etc.



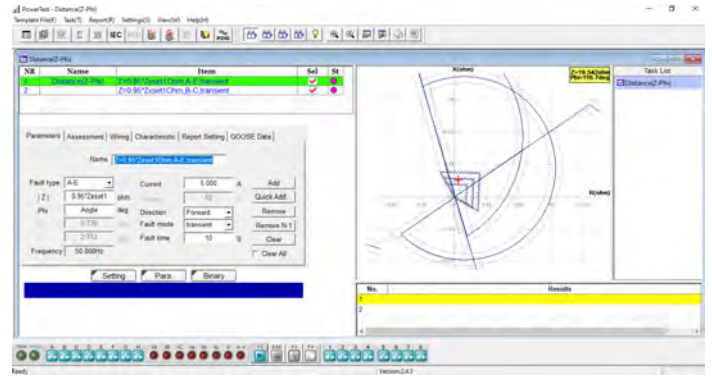
## Distance (R-X)

- ❖ Can test impedance relay with R-X setting in different ways
- ❖ Input impedance characteristic to Z plain
- ❖ Associate the characteristic with relay settings
- ❖ Select test point directly on Z plain or in setting box
- ❖ Zone verification
- ❖ Z-T test
- ❖ Edit new characteristic



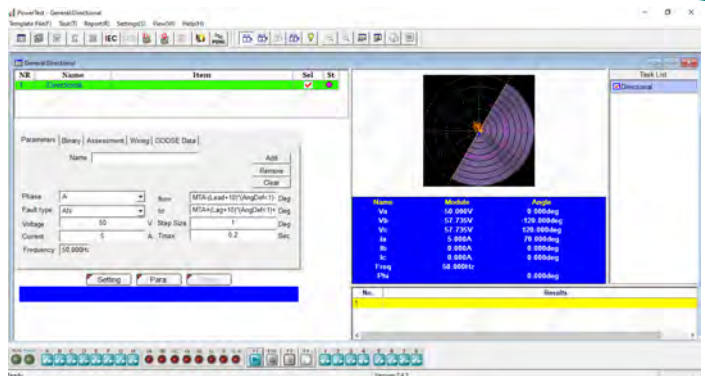
## Distance (Z-Phi)

- ❖ Can test impedance relay with Z-Phi setting in different ways
- ❖ Input impedance characteristic to Z plain
- ❖ Associate the characteristic with relay settings
- ❖ Select test point directly on Z plain or in setting box
- ❖ Zone verification
- ❖ Z-T test
- ❖ Edit new characteristic



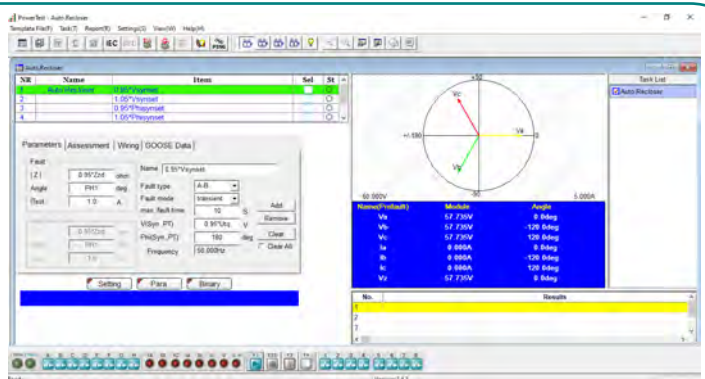
## Directional

- ❖ Can test maximum trip angle and two boundary angles (Lead and lag angles)
- ❖ Can set angle define, V lead I or I lead V
- ❖ Can set fault type, single phase, phase-phase or three phase fault



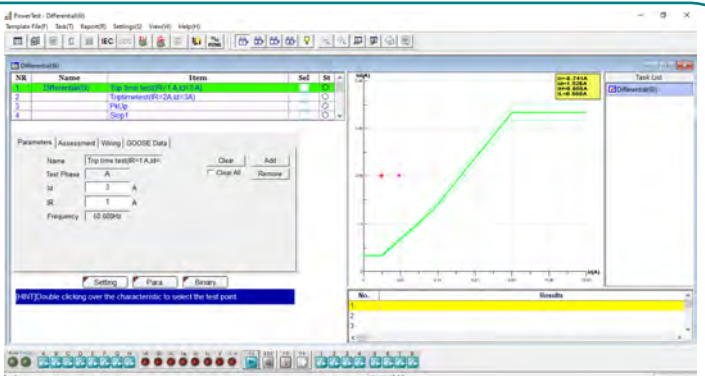
## Auto-Reclosing

- ❖ Can test auto-recloser along with line protection
- ❖ Realize relay automatic reclosing with checking the difference between two systems, checking the synchronization setting, reclose set time checking and automatic evaluating of testing results.



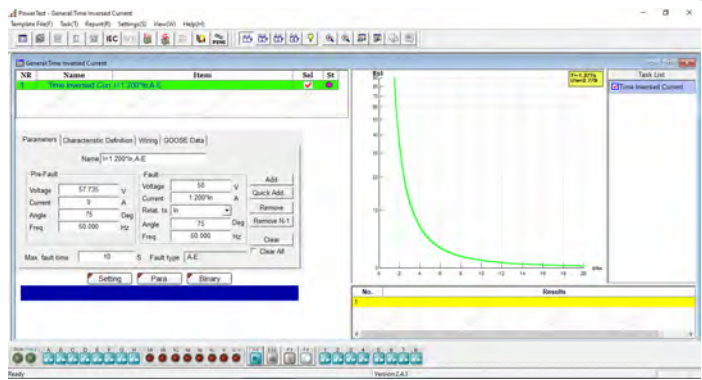
## Differential (6I)

- ❖ Suitable for 6 output current channels' relay tester, such as transformer, generator and bus bar etc. differential protection equipment test
- ❖ Realize the two sides 3 phase/phase-phase/single phase test between relay tester and relay equipment.
- ❖ Can search the percentage restraint curve, harmonic restraint, trip time



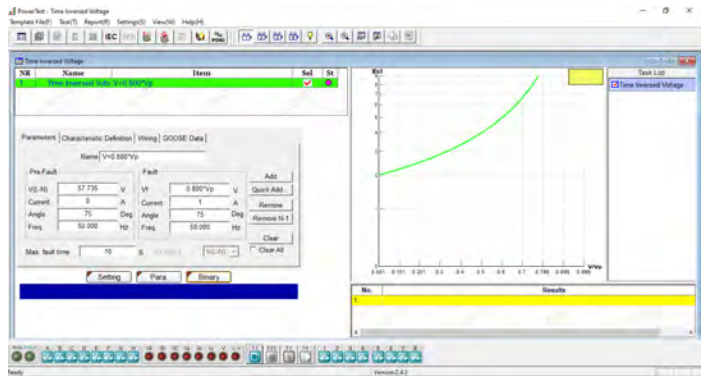
## Time Inversed Current

- ❖ Used to test time inversed current relay
- ❖ Can test normal current relay with or without time delay
- ❖ Can test directional current relay with or without time delay
- ❖ Can test the inversed current relay with user defined curve
- ❖ Can import the IEC and IEEE standard curve



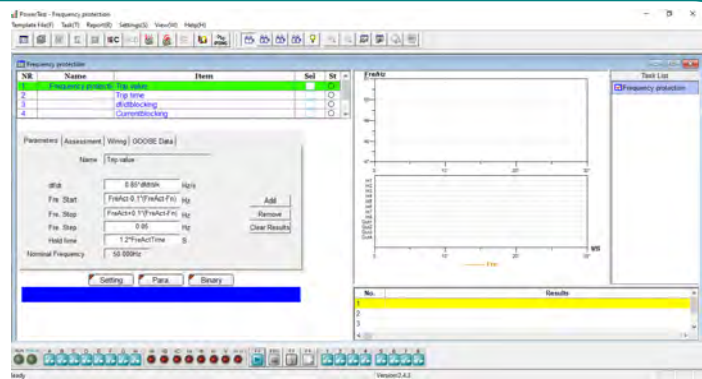
## Time Inversed Voltage

- ❖ Used to test time inversed voltage relay
- ❖ Include testing directional, time definite and with time delay voltage relay
- ❖ Can simulate three phase, phase-earth fault, and phase-phase fault



## Frequency Relay

- ❖ Can test frequency protection relay, such as over frequency, under frequency, df/dt trip, df/dt blocking
- ❖ Including pick up frequency, trip time, df/dt setting value, voltage blocking value and current blocking value test

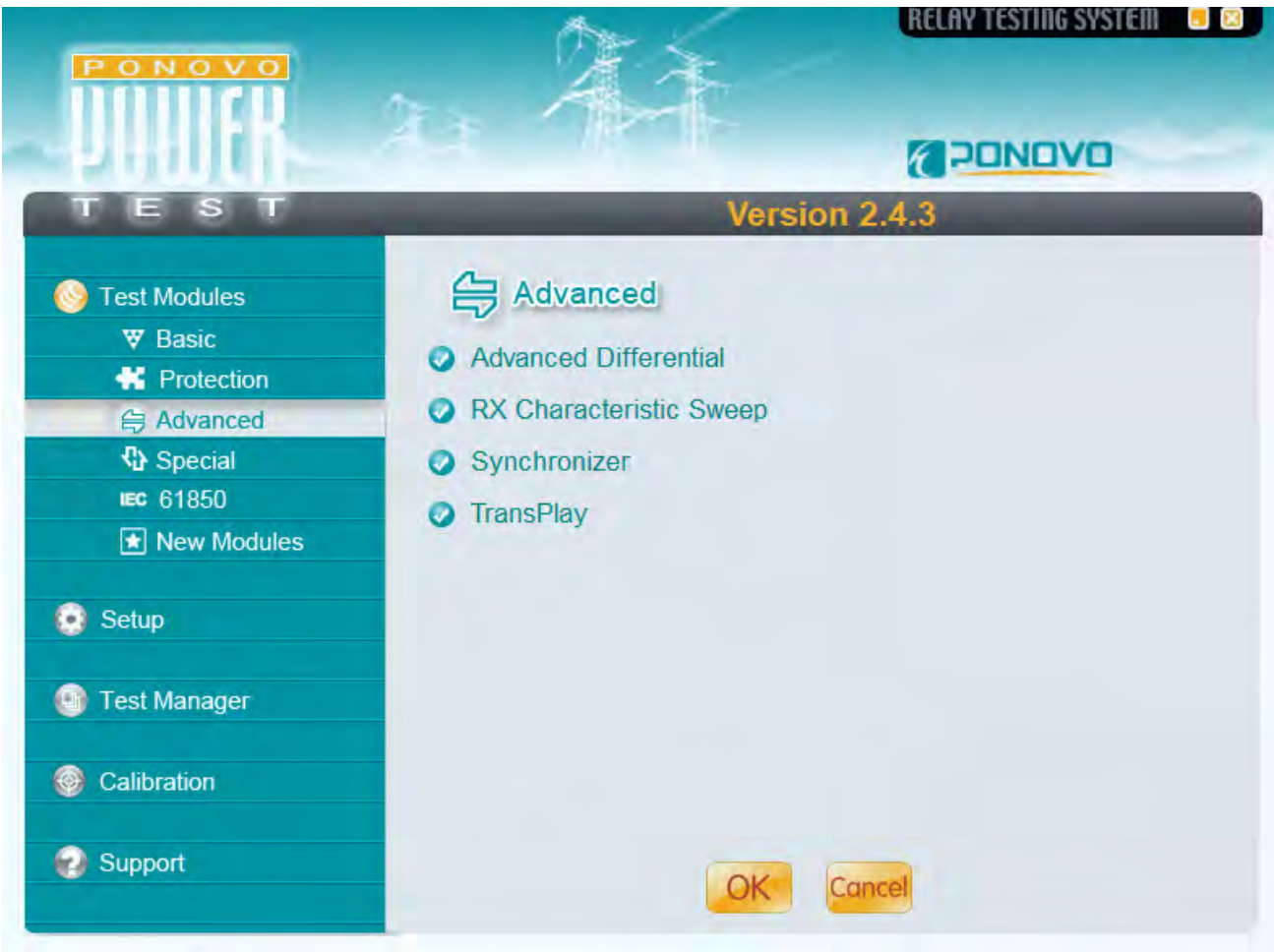


## PONOVO Activities in Worldwide



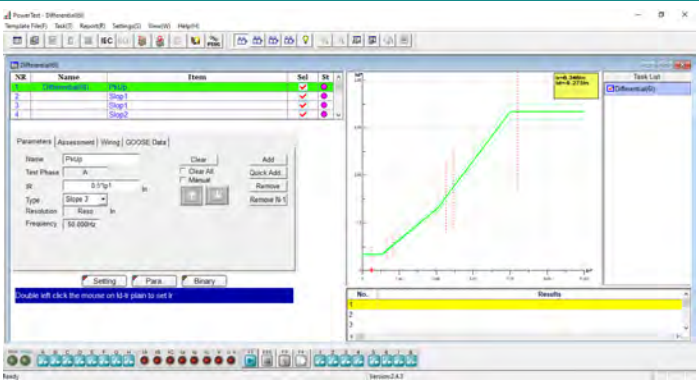
## ➤ Advanced Package

In the advanced package, the centralization testing the RX Characteristic Sweep, testing for distance relay, Advanced Differential, TransPlay, Synchronization, etc.



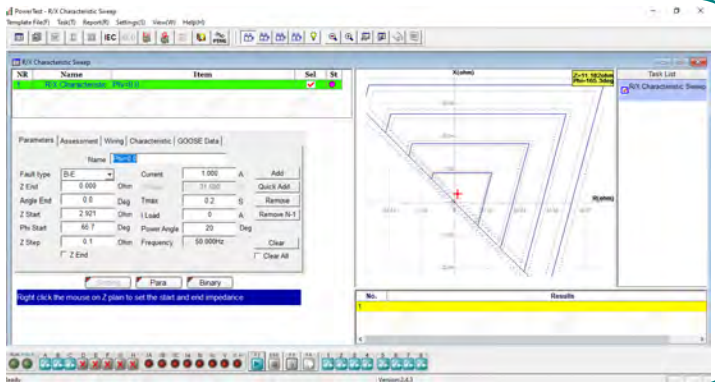
### Advanced Differential (6I)

- ❖ Can search the percentage restraint curve, harmonic restraint, trip time
- ❖ Can automatic to calculate the matching factor via the transformer parameter and CT/PT parameter
- ❖ Can test single phase, phase-phase, three-phase fault



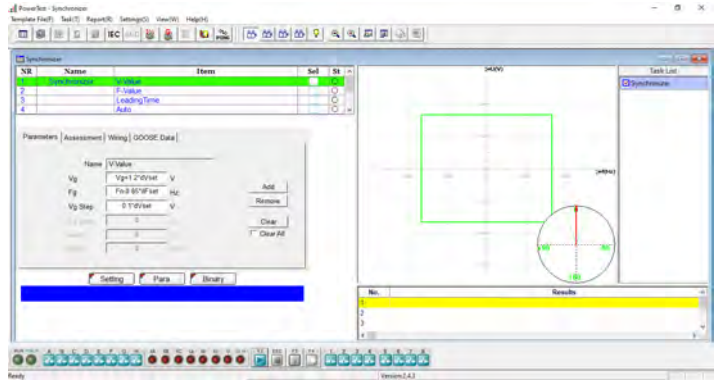
### RX Characteristic Sweep

- ❖ Can search the characteristic boundary of the impedance relay
- ❖ Can find the boundary at different angles



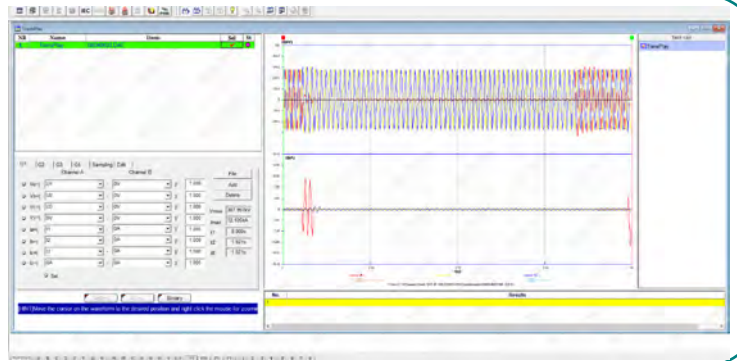
## Synchronizer

- ❖ Can check synchronizing relay
- ❖ Can check voltage difference
- ❖ Can check frequency difference
- ❖ Can check leading time and leading angle
- ❖ Can check pulse width for frequency adjustment
- ❖ Can check pulse width for voltage adjustment
- ❖ Can check auto-adjusting function with both voltage and frequency varying



## TransPlay

- ❖ Can play back the COMTRADE format file, including CFG, which describe signal names, sampling frequencies, etc. and DAT which contains the sampling values for each channel.
- ❖ Can edit the COMTRADE data



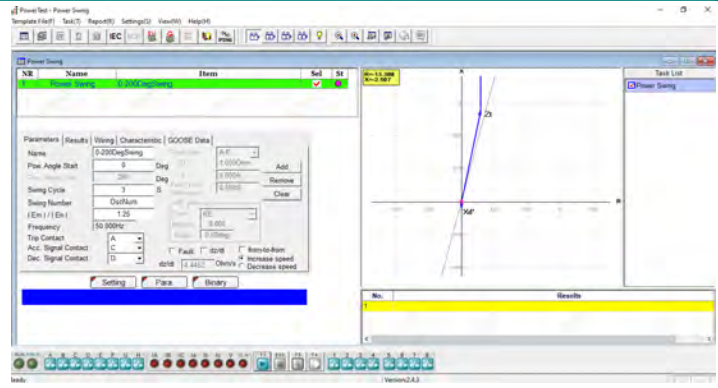
## ➤ Special Package

In the special package, there is Power Swing Simulation module.



## Power Swing Simulation

- ❖ Can really simulate the oscillations in power flow reference the power parameter
- ❖ Can simulate Out-of-Step and Stable swing
- ❖ Can simulate increase and decrease swing
- ❖ Can be a tool for relay test engineer to observe the relay behavior during dynamic power swing process.



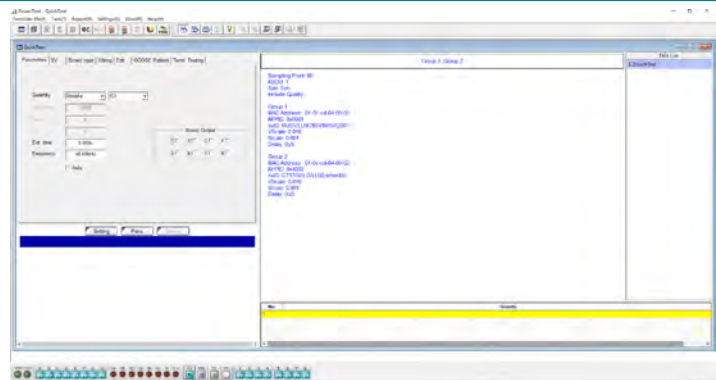
## ➤ IEC 61850 Package

In the IEC 61850 package, there are QuickTest(IEC), State Sequence(IEC), SOE and GOOSE.



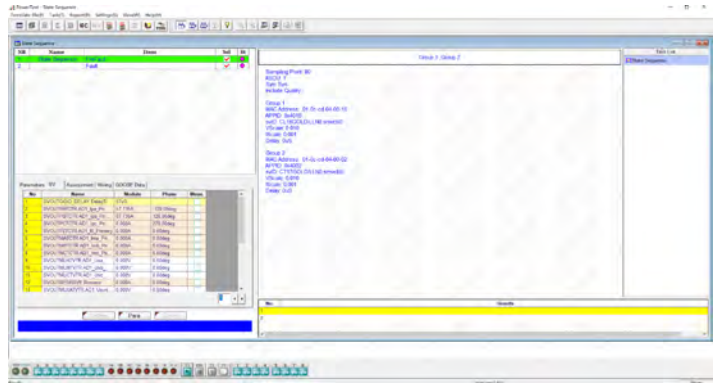
## QuickTest (IEC)

- ❖ Specially design for fiber optic relay testing system
- ❖ Can output the amplitude and phase of every channel in SMV message in static state or ramp to get different relays' trip value, time and characteristics.



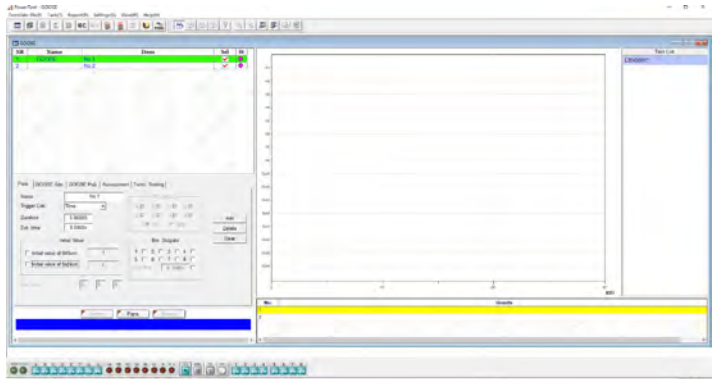
## State Sequence (IEC)

- ❖ User-defined for multiple state sequence tests
- ❖ For each independent state sequence, it is allowed to set amplitude, phase, and trigger condition in each SMV channel
- ❖ The trip time is measured and recorded by GOOSE



## SOE and GOOSE

- ❖ Used to test GOOSE, binary input resolution, GOOSE abnormal simulation, and etc.
- ❖ Continuously output several statuses, and in each status different abnormal messages can be set.
- ❖ On original state sequence, it removes the SMV output function, but edition GOOSE setting and add internal/ external cycle.



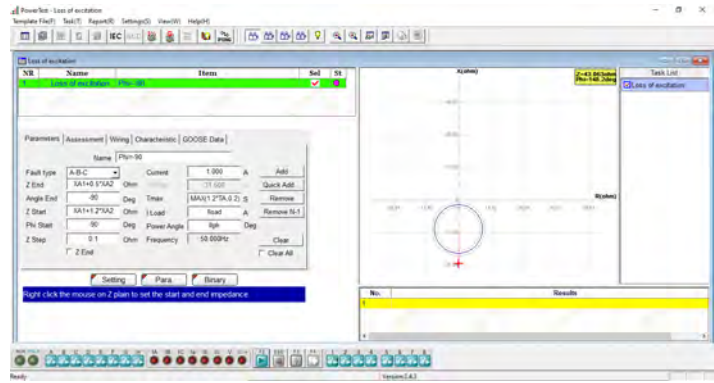
## ➤ New Modules Package

In the New Modules package, there are loss of excitation, QuickTest(harmonic) modules.



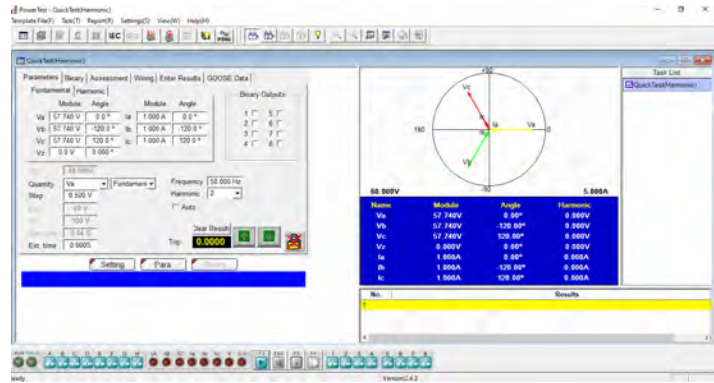
## Loss of excitation

- ❖ Can search for two different excitation loss characteristics
- ❖ During the test process a series of shots will be generated to search out the boundary along this shot line. Then next shot at a different angle will be generated. In this way we can then find out the boundary at different angles.



## QuickTest (Harmonic)

- ❖ Can automatically and manually superposition harmonics
- ❖ The fundamental and harmonic of voltage and current sources can be controlled independently

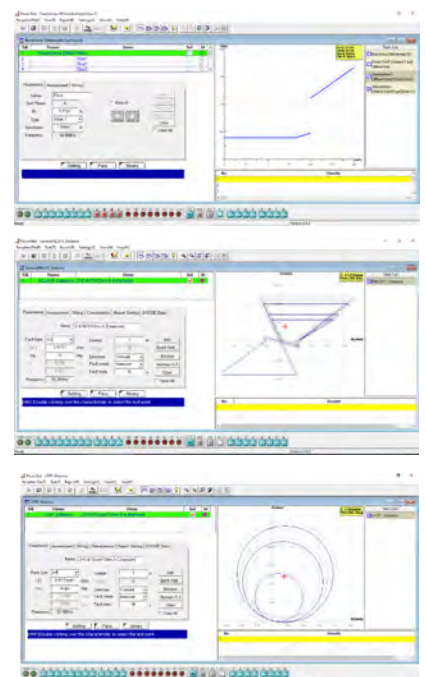
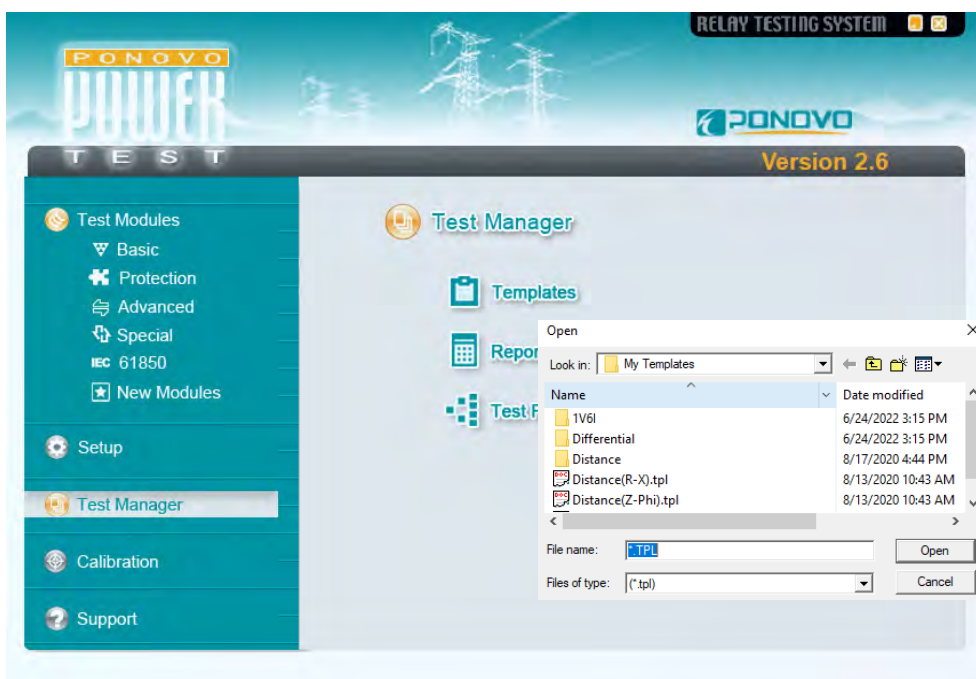


## PONOVO Template Service

Besides the above standard test modules, the relay templates are provided for the automatic testing purposes. Every relay template is created based on each relay model and its function from different relay manufacturers, and the setting names in the templates are the same as what they are in the relay, so it is easy for the engineer to conduct the site testing and simplify the works greatly. There are more than 500 different relay templates available for customers to download from the website for free.

The CSV/RIO/XIRO files can be imported into the templates by PowerTest.

The optional service such as offering the customized templates and reports is provided by PONOVO.



More Templates can be download from our website [www.ponovo.net](http://www.ponovo.net)



- CAG17
- CTIG
- CTIGM
- CTMFM
- CTMM
- CTNM
- CTT
- CTTM
- CTU
- DIFB
- MFVUM
- Micromho
- MVAPM
- MWTU
- Optimho
- P111
- P115
- P120
- P121
- P122
- P123
- P124
- P127
- P141
- P142
- P143
- P144
- P145
- P241
- P242
- P243
- P342
- P343
- P344
- P345
- P430
- P433
- P435
- P436
- P437
- P438
- P441
- P442
- P443
- P921
- P922
- P923
- P940
- P941
- P942
- P943
- PPX
- PVMM
- Quadromho
- SKE
- SKD
- VAGM22
- VAPM
- P632
- P633
- P634
- P642
- P643
- P645



- SEL300
- SEL351
- SEL587
- SEL311B
- SEL487B
- SEL487E
- SEL167
- SEL411
- SEL311C
- SEL311L
- SEL321
- SEL421
- SEL501
- SEL587



- 7RW600
- 7SA6XX
- 7SA511
- 7SA513
- 7SA518
- 7SA519
- 7SA522
- 7SD5
- 7SD52
- 7SD63
- 7SJ61
- 7SJ63
- 7SJ80
- 7SS52
- 7ST6
- 7UM61
- 7UM62
- 7UM512
- 7UM515



- LZ96
- REG100
- REL511
- REL531
- MSOC
- RAZFE
- REB670
- REC670
- REF542
- REG216
- REL300
- REL316
- REL350
- REL352
- REL356
- REL511
- REL512
- REL521
- REL531
- REL561
- REL650
- REL670



- PCS-902
- RCS-915
- RCS-931
- RCS-993
- RCS-902
- PCS-9611
- PCS-902H
- PCS-931D
- PCS-9611C



- SR489
- SR745
- F650
- SR750
- GT60
- D60
- DLPD
- G30
- L90
- GE345



- SEPAM 10
- SEPAM 80
- SEPAM 2000
- SEPAM S42
- T20



- MRA4
- MRDT4
- MRI4
- MRM
- MRN



- GRB100
- GRD110
- GRD140
- GRD150
- GRF100
- GRL100



- F\_PRO
- L\_PRO
- T\_PRO



- VAMP 255
- VAMP 265



- 326GD



- PCT210



## Optional Accessories

- PW-VP50 CT Polarity checker



2 units. Master machine injects pulse current to primary side of CT, slave machine receives and analysis the waveform of induced pulse current at the secondary side so as to judge the polarity is positive or negative automatically by the LED indicator on the kits.

- GPS synchronization (PGPS02/PGPS04i)

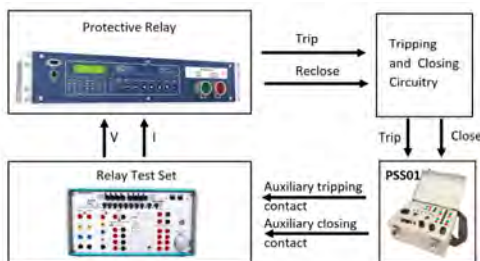


**PGPS02:** It provides GPS synchronization signal in PPS (pulse per second) or PPM (pulse per minute) for synchronized test. Trigger time can be set for end-to-end test application.



**PGPS04i:** The PGPS04i is a multi-functional time synchronization device that integrates with GPS time synchronization, IRIG-B (DC-TTL/DC-RS422/optical) outputs, IRIG-B (DC-TTL/DC-RS422/fiber) pulse input, 1PPS/1PPM (DC-TTL/DC-RS232 /fiber) pulse output, timing set of whole trigger points, real-time clock auto-generating and other relevant functions.

- Circuit breaker simulator (PSS01)



Working together with PONOVO relay testing device, PSS01 is to be used to simulate the circuit breaker operation for checking the relay scheme performance. Complicated software settings can be avoided by using this simple accessory.

- Scanning Head (PACB108)



The passive optical scanning head PACB108 detects the status of an LED, that is either an optical pulse output from an energy meter or the binary status of a protective relay or other similar optical source.

- Current Booster (Phpc01)



Phpc01 current booster is designed to supply high compliance voltage even at small current range, suitable for testing high burden electromagnetic current relays.



# PW636i-F

## Digital Relay Test kit



### Specifications

#### Voltage generators

##### Setting range

4-phase ac(L-N) 4×0~300V

1-phase ac(L-L) 1×0~600V

dc (L-N) 4×±0~300V

dc (L-L) 1×±0~600V

##### Power

4-phase ac(L-N) 4×75VA typ., at 300V  
4×50VA guar., at 300V

3-phase ac(L-N) 3×100VA typ., at 300V  
3×85VA guar., at 300V

1-phase ac(L-L) 1×200VA typ., at 600V  
1×170VA guar., at 600V

dc (L-N) 4×100W at 300 V

**Accuracy** error < 0.08% rd.+0.02% rg.  
guar. at 0~300V  
error < 0.03% rd.+0.01% rg.  
typ. at 0~300V

**Ranges** 300V

**Resolution** 10mV for 300Vac

**Distortion** < 0.05% typ., (< 0.1% guar.)

#### Current generators

##### Setting range

6-phase ac(L-N) 6×0~32A

3-phase ac(2L-N) 3×0~64A

1-phase ac(6L-N) 1×0~180A

dc (6L-N) 1×±0~180A

##### Power

6-phase ac(L-N) 6×450VA typ. at 32A  
6×400VA guar. at 32A

3-phase ac(2L-N) 3×800VA typ. at 64A  
3×700VA guar. at 64A

1-phase ac(6L-N) 1×1200VA typ. at 180A  
1×1000VA guar. at 180A

1-phase dc(6L-N) 1×1400W typ. at 180A  
1×1000W guar. at 180A

##### Max compliance voltage(L-N)(L-L)

21Vpk/42Vpk

#### Accuracy

error < 0.15% rd.+0.05% rg.  
guar., at 0~32A  
error < 0.05% rd.+0.02% rg.  
typ., at 0~32A

#### Ranges

32A

#### Resolution

1mA

#### Distortion

< 0.05% typ., (< 0.1% guar.)

#### General

##### Frequency

Sine signal DC, 0.001Hz~1000Hz

Transient signal DC~10.0 kHz

Accuracy ±0.3ppm

Resolution 0.001Hz

##### Phase

Angle range -360°~+360°

Accuracy <0.05° typ., <0.1° guar.  
at 50/60Hz

Resolution ±0.001°

#### Auxiliary dc supply

Voltage range 0~300V

Power 88W at 110V, 176W at 220V,  
90W at 300V

Accuracy error < 0.1% rg. typ.  
(<0.5% rg. guar.)

#### Power supply

Nominal input voltage 110~240Vac

Permissible tolerance 90~260Vac

Nominal frequency 50/60Hz

Permissible frequency 45~65Hz

#### Fiber-optic Communication Interface

Number 8

Interface type LC

Fiber-optic type 62.5/125μm(multimode fiber)

Wave length 850nm

Transmission distance >1km

Status indication LED

## Binary inputs group1

Number	8
Input characteristics	0~400Vdc/ac peak threshold or potential free
Sample rate	20kHz
Time resolution	50μs
Max. measuring time	Infinite
Debounce/Deglitch time	0~25ms
Counting function	< 3kHz at pulse width>150μs
Galvanic isolation	8 galvanically isolated

## Binary inputs group2

Number	4
Input characteristics	0~+5Vdc or dry contact
Sample rate	25kHz
Time resolution	40μs
Max. measuring time	Infinite
Debounce/Deglitch time	0~25ms
Max. counting frequency	25kHz
Pulse width	>3μs
Threshold voltage	2V
Voltage hysteresis	0.8V
Max. input voltage	+5V
Galvanic isolation	1 galvanically isolated

## Binary outputs, relay

Number	4 (front side)
Type	Potential free relay contacts, software controlled
Break capacity ac	Vmax: 300Vac /Imax: 8A /Pmax: 2000VA
Break capacity dc	Vmax: 300Vdc /Imax:8A /Pmax: 150W

## Binary outputs, semiconductor

Number	4 (rear side)
Type	semiconductor
Break capacity dc	Vmax: 300Vdc /Imax:0.5A /Pmax: 150W
Update rate	100μs
Imax	0.5A

## DC voltage measuring inputs

Measuring range	0~±10V
Accuracy	error <0.02% rg. typ. (<0.05% rg. guar.)
Input impedance	100KΩ

## DC current measuring input

Measuring range	0~±20mA
Accuracy	error <0.02% rg. typ. (<0.05% rg. guar.)
Input impedance	50Ω

## In-built monitoring and recording

Monitoring	currents and voltage outputs
Recording	analog outputs, binary inputs/outputs status
Mode	real time monitoring, no external wiring is required
Recording length	16s

## Low level outputs

Setting range	12×0~10Vpk
Max. output current	1mA
Accuracy	error < 0.025% typ. < 0.07% guar.at 1~10Vpk
Resolution	250μV
Distortion(THD+N)	< 0.05% typ. (< 0.1% guar.)
Connection	19 pin combination socket (rear side)

## IEC61850 Goose function

Interpretation hardware is in-built. Please contact the supplier for options to activate the IEC61850 software support Sampling Value and Goose function

## Environmental conditions

Operation temperature	0~+50°C
Storage temperature	-25~+70°C
Relative humidity	5~95% non-condensing
EMC(E&I)	EN/IEC 61326-1 EN/IEC 61000-3-2/3 EN/IEC61000-4-2/3/4/5/6/8/11/18
Environment	EN/IEC 60068-2-1/2/3/6/27
Safety	EN/IEC 61010-1/1-12/2-030 EN/IEC 60255-25/27
Others	FCC Part 15:Sub B ECS-001:2006 LVD EU

Developed and manufactured under an ISO 9001: 2015 registered system

## Others

PC connection	Ethernet,10M/100M
External amplifier interface	Circular connector
Current booster interface	Circular connector
GPS interface	DB9/TTL
GPS Antenna	1 port, built-in GPS
IEC60044-7/8 (FT3)	8 ports(output)+1(input)+1(IRIG-B)
Ground Socket(earth)	4mm banana socket, front side
Weight	23kg
Dimensions (W x H x D)	360mm ×208mm×467mm

## Professional Solution Provider For The Power World

*Since 2001, Ponovo Power has been focusing on providing professional solutions to over 5000 clients in the fields of intelligent testing and power quality control in China and abroad*



**PONOVO POWER CO., LTD.**

No.139 Jinghai Third Road, BDA, Beijing, China. 100176

Tel : +86 (10) 59089666

Fax: +86 (10) 59089999

[www.ponovo.net](http://www.ponovo.net)

[info@relaytest.com](mailto:info@relaytest.com)