



# PW41i Protective Relay Test Set

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## PW41i Protective Relay Test Set



PW41i is a reliable protective relay test set with high current output (3x40A) and high voltage output (3x300V). It is with built-in local system so that the testings could be done easily by the relay test set itself. PW41i is a favorable and economical testing solution for commissioning work in distribution grid.

### Features

- High current and power output, output 3x40A with maximum power up to 400VA/phase
- Shortcut keys to simplify operation
- 8 binary inputs, 4 binary outputs
- Auxiliary DC power supply 110V, ADJ(0-300V, software controlled), 220V switchover
- The local software system is designed based on Windows system, which is easy and convenient for operation and upgrade. It supports using templates for various relay testings, for example, G59.

### Applications

#### ✓ Relay test

Distance protection relay  
Directional relay  
Current relay  
Voltage relay  
Frequency relay, etc.

#### ✓ Calibration

0.5 Class energy meter  
Disturbance recorder  
Indicating meters, etc.



#### ✓ Automatic device

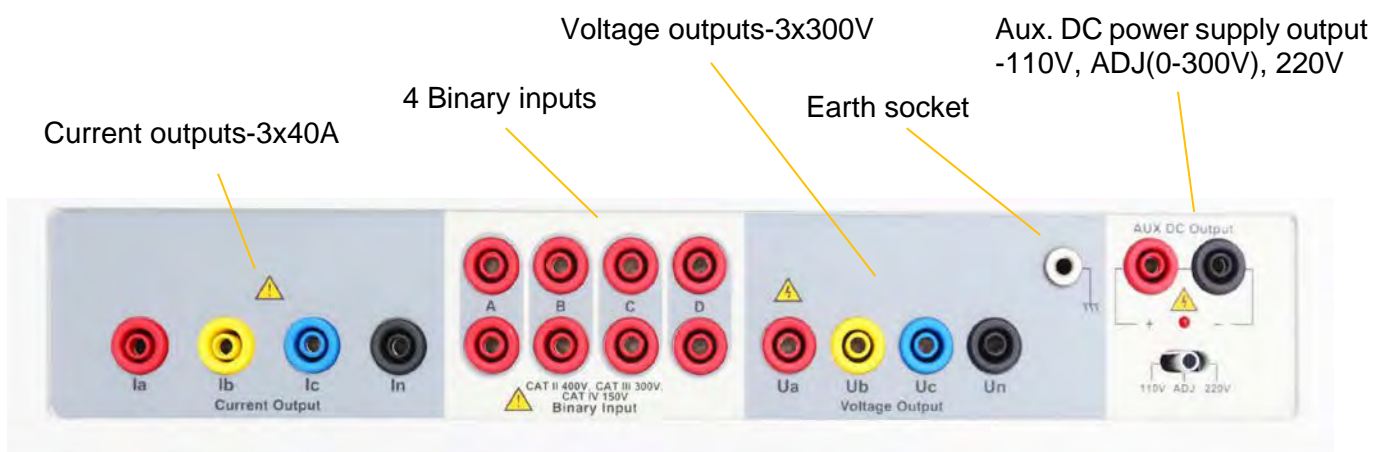
Synchronizer  
Auto-reclosing

#### ✓ Power system simulation

Transient, permanent state fault simulation  
Playback of COMTRADE format file

### PW41i Panels

#### ▪ Top Panel



# PW41i Protective Relay Test Set

## PW41i Panels

### ▪ Front Panel

Local software

Shortcut keys

Start, Fault trigger, Stop Keys

Indication lamp

Mouse



Keyboard

2 USB ports

### ▪ Rear Panel

4 binary inputs

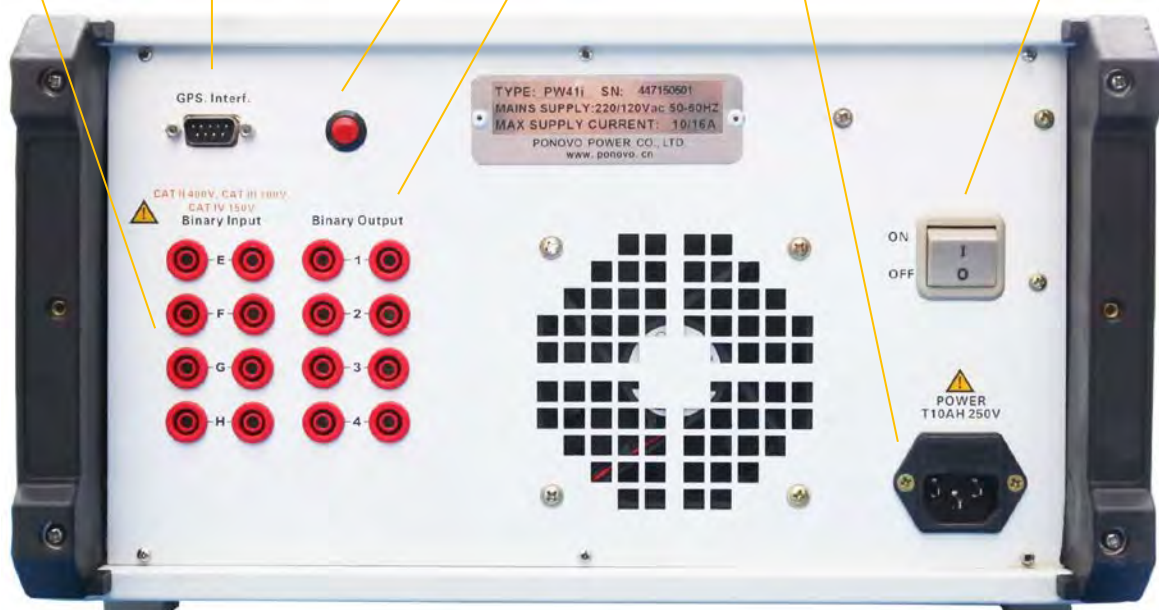
GPS Interface

IP Reset button

Power supply connector

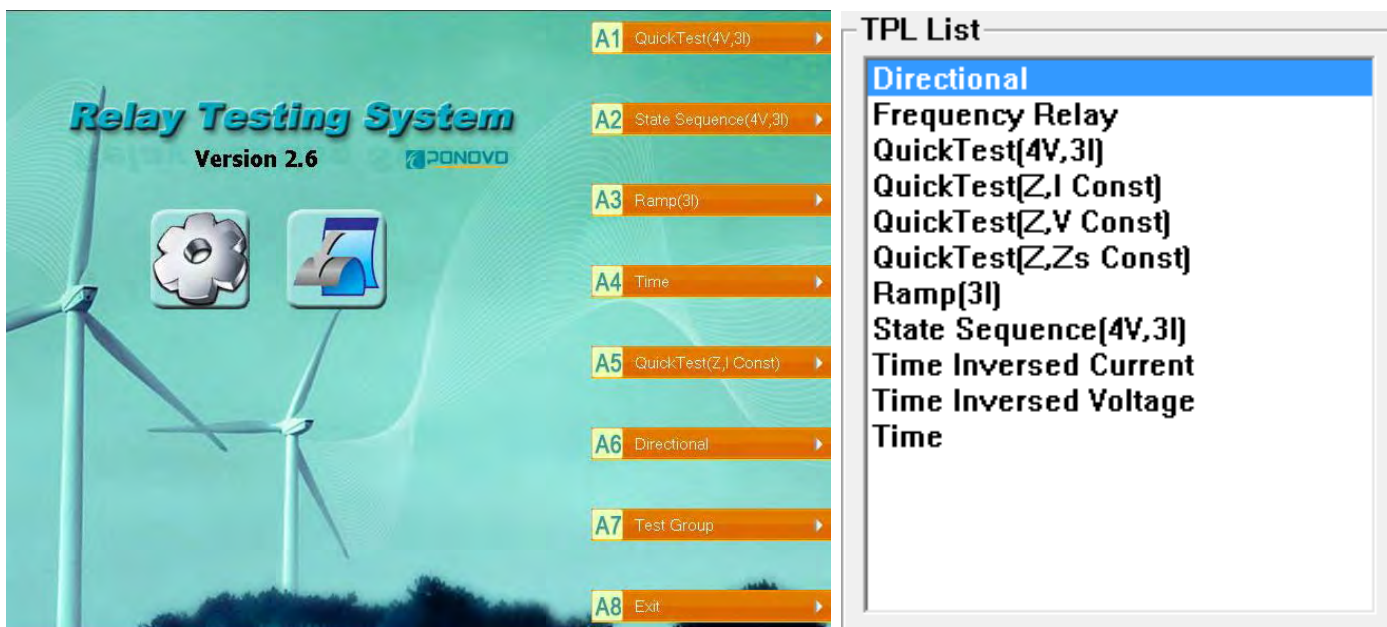
4 binary outputs

Power supply switch



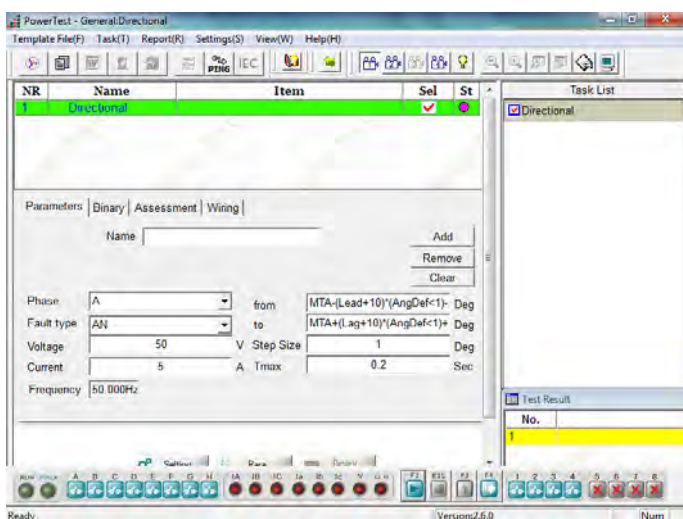
## PW41i Local Relay Test Software

PW41i is a type of relay tester controlled locally. A color screen and local control system make PW41i portable and easy to use. The local software embedded in PW41i is called **PowerTestCut**. There are 11 test modules in the software: Directional, Frequency Relay, QuickTest, Ramp, State Sequence, Time Inversed Current, Time Inversed Voltage, and Time.



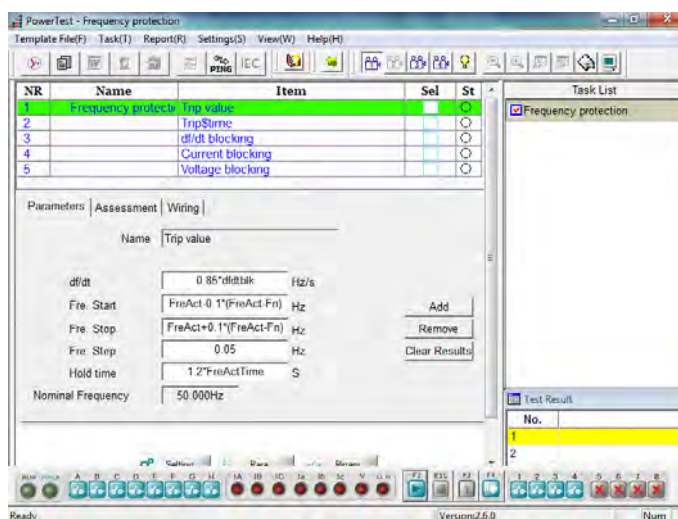
### ➤ Directional

- ❖ Can search maximum torque 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



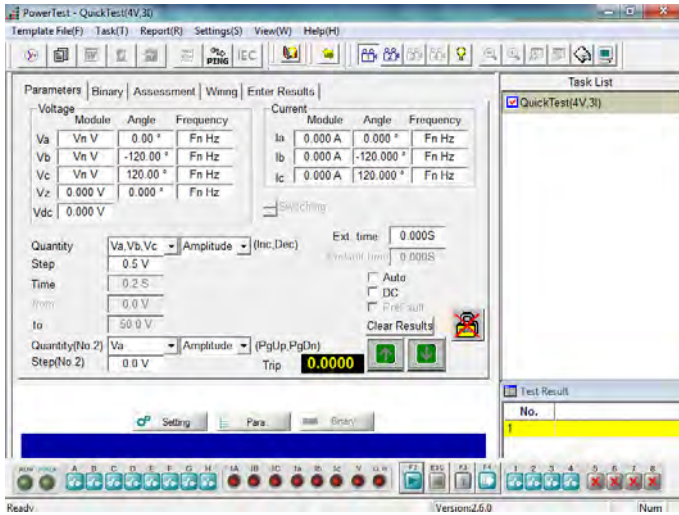
### ➤ Frequency Relay

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



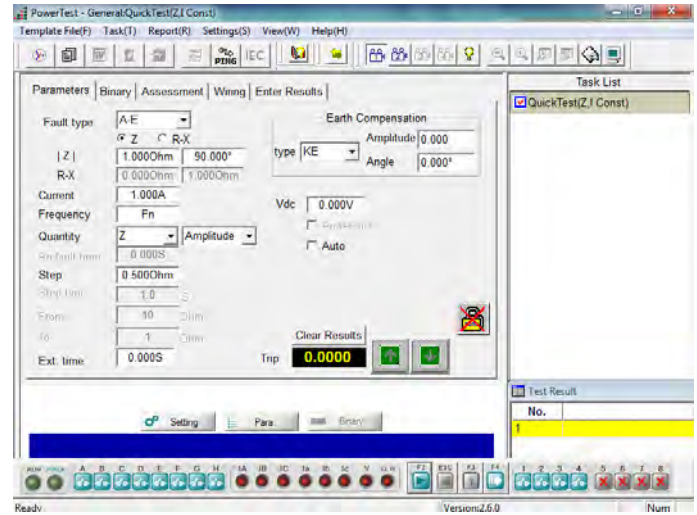
## ➤ QuickTest (4V, 3I)

- ❖ 4 voltage / 3 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



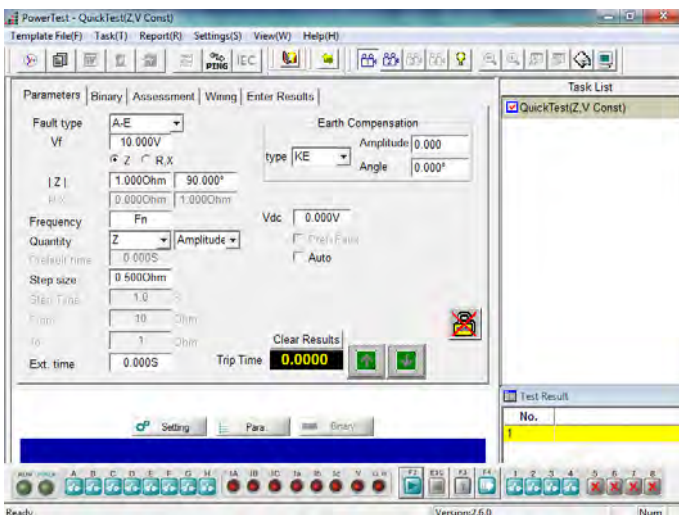
## ➤ QuickTest (Z, I Const)

- ❖ 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



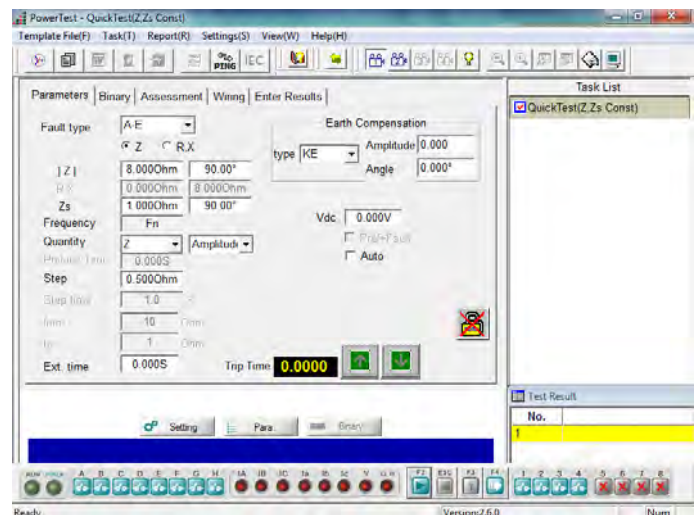
## ➤ QuickTest (Z, V Const)

- ❖ 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



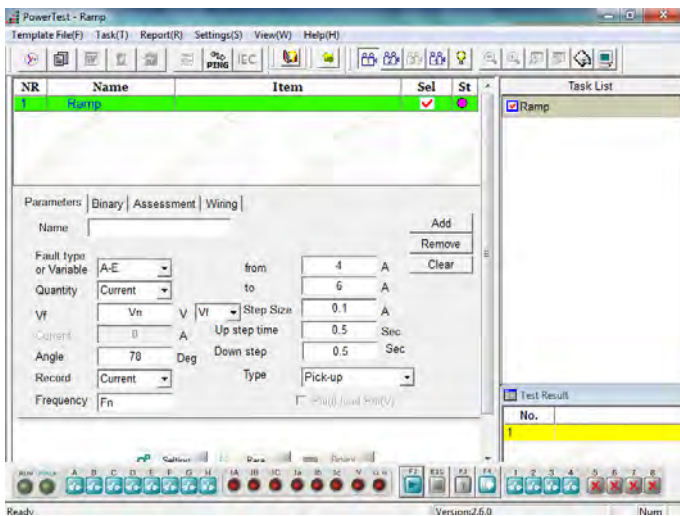
## ➤ QuickTest (Z, Zs Const)

- ❖ 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



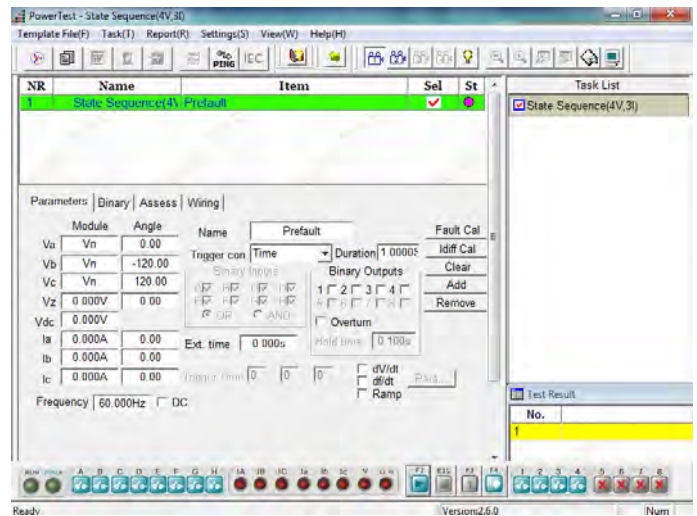
## ➤ Ramp (3I)

- ❖ 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



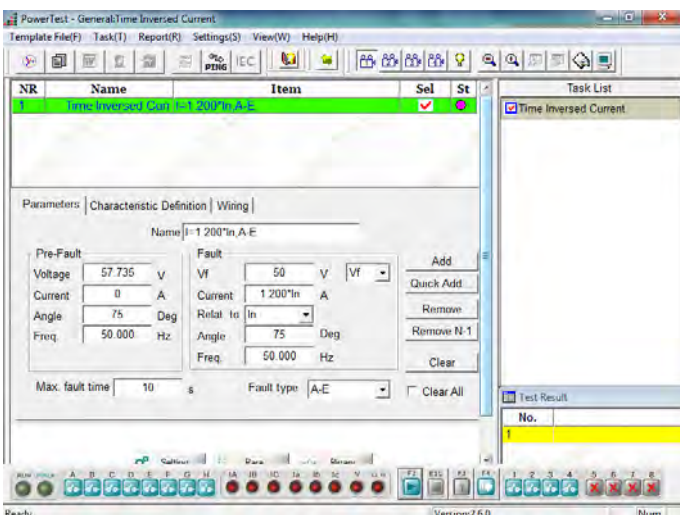
## ➤ State Sequence (4V, 3I)

- ❖ 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
- ❖ 4 voltage / 3 voltage and 3 current sources available for each state
- ❖ Trigger condition in each state can be set separately



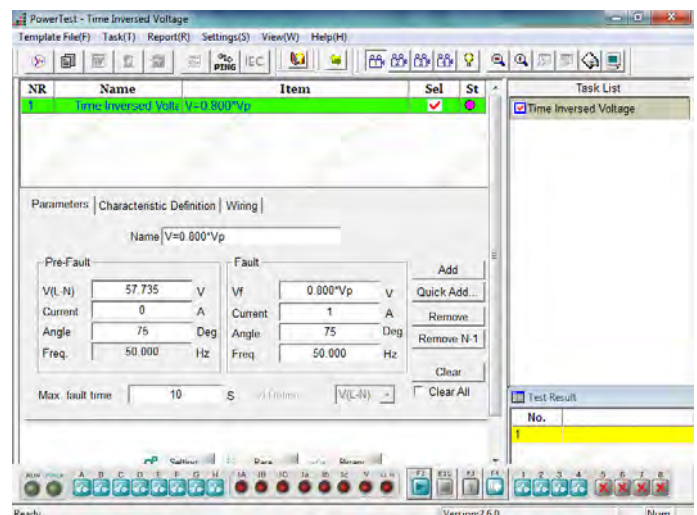
## ➤ Time Inversed Current

- ❖ Realize the directional over-current test and non-directional over-current test
- ❖ Include testing positive sequence, negative sequence and zero sequence inverse-time over-current, definite-time over-current, over-heat protection.
- ❖ Can import the IEC and IEEE standard curve or user defined curve



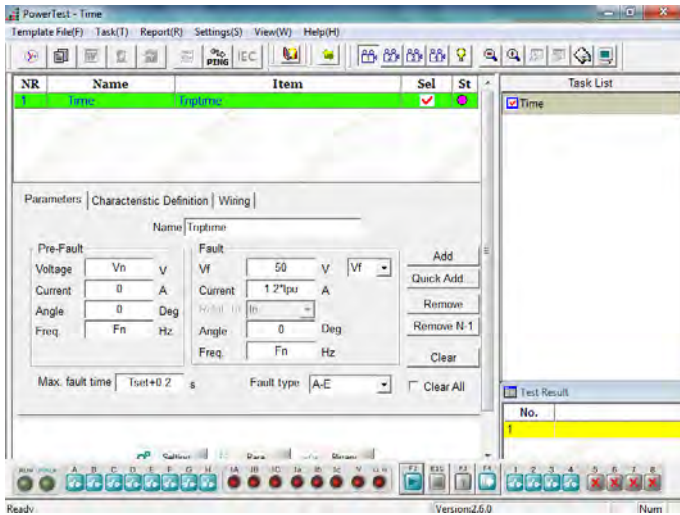
## ➤ Time Inversed Voltage

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



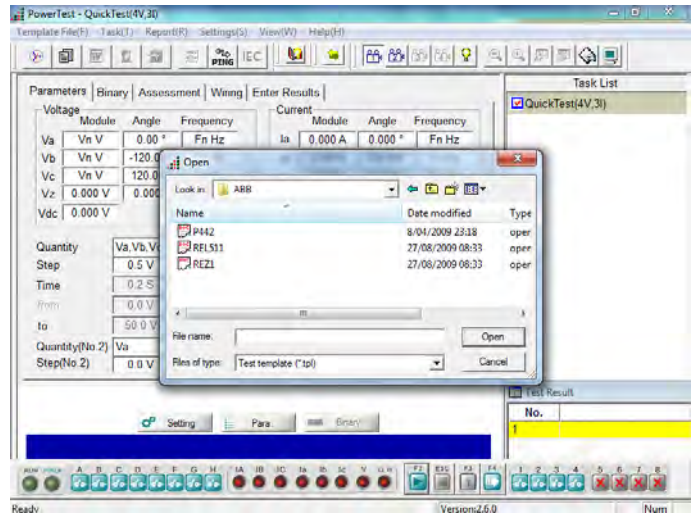
## Time

- ❖ Used to test trip time of protection relay
- ❖ Various value can be set separately, such as fault types, fault time, the voltage and current at pre-fault and fault state, etc.



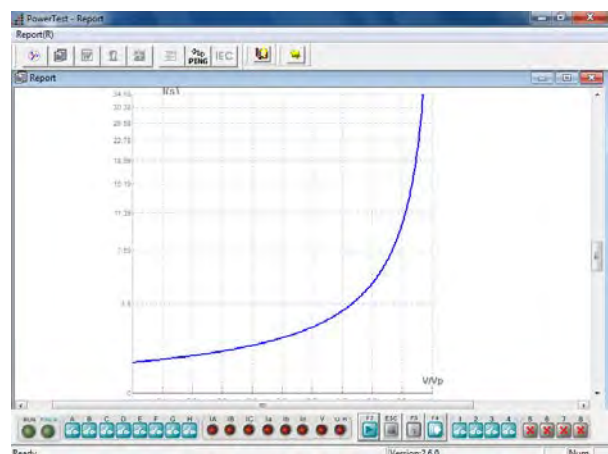
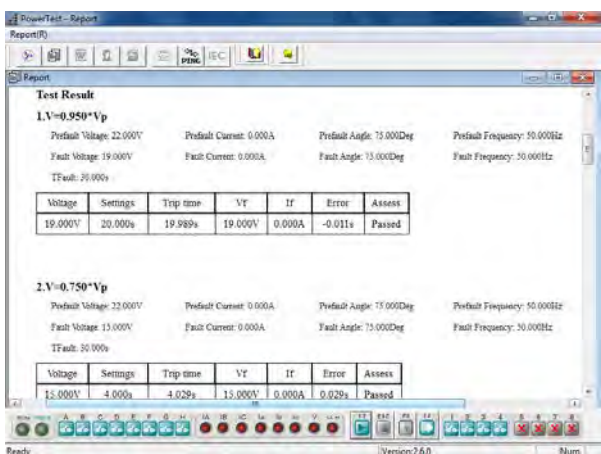
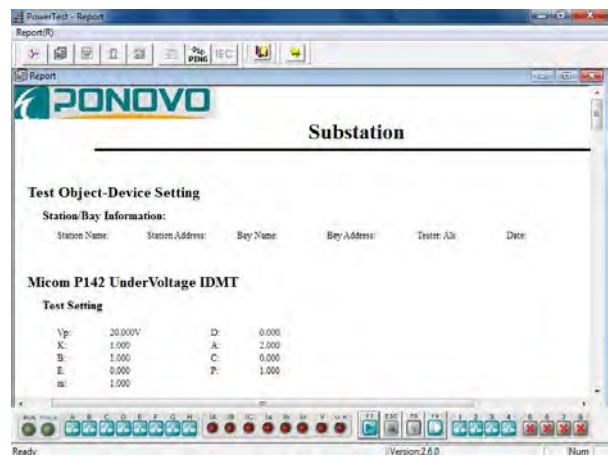
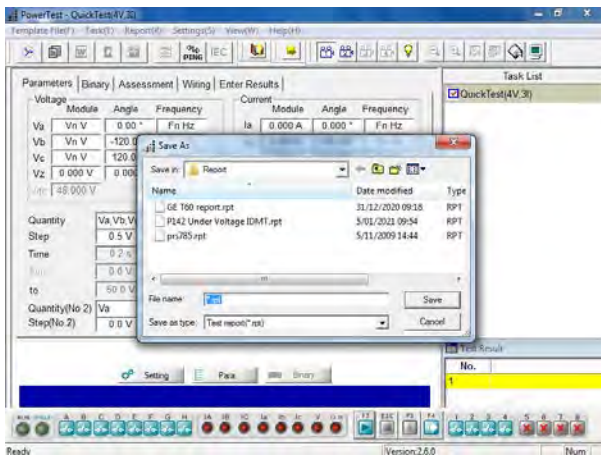
## About templates

PW41i supports using relay templates in its local system for testings, which includes more than 400 available relay types for engineer's use for their testings. Register on our website to download the available relay templates for your testing use.



## Local Reports

After testing, each test items can be saved report in .rpt format and open it locally. Test object information, test equipment information, system parameters, characteristic curve, binary setting, test setting value, test result (including testing data, operating characteristic diagram, test result assessing), ect.



## PW41i Protective Relay Test Set



### Specifications

<b>Voltage generators</b>		<b>Auxiliary dc supply</b>	
<b>Setting range</b>		Voltage range	220V, 110V, ADJ(0~300V)
3-phase ac(L-N)	3x0~300V	Power	110W at 220V, 55W at 110V, 90W at 300V
1-phase ac(L-L)	1x0~600V	<b>Binary inputs</b>	
dc (L-N)	3x±0~300V	Number	8
dc (L-L)	1x±0~600V	Input characteristics	Dry/Wet
<b>Power</b>		Max. measuring time	999999.999 s
3-phase ac(L-N)	3x75VA at 300V typ.	Accuracy	0.1%±1ms
3-phase ac(L-L)	3x85VA at 300V typ.	Resolution	1ms
1-phase ac(L-L)	1x170VA at 600V typ.	<b>Binary output, relay</b>	
dc (L-N)	3x80W at ±300 V	Number	4
<b>Accuracy</b>	< 0.16% rd.+0.04%rg. guar., < 0.08% rd.+0.02%rg. typ.	Type	Potential free relay contacts, software controlled
<b>Ranges</b>	300V	Break capacity ac	Vmax: 300Vac /Imax: 8A /Pmax: 2000VA
<b>Resolution</b>	10mV	Break capacity dc	Vmax: 300Vdc /Imax:8A /Pmax: 150W
<b>Distortion</b>	0.1%	<b>Power supply</b>	
<b>Current generators</b>		Nominal input voltage	110~240Vac
<b>Setting range</b>		Permissible input	90~260Vac
3-phase ac(L-N)	3x0~40A	Nominal frequency	50/60Hz
1-phase ac(3L-N)	1x0~120A	Permissible frequency	45~65Hz
dc (3L-N)	1x±0~60A	<b>Environmental conditions</b>	
<b>Power</b>		Operation temperature	0~+50°C
3-phase ac(L-N)	3x65VA at 5A 3x400VA at 40A	Storage temperature	-25~+70°C
dc (3L-N)	700W at 60A	Relative humidity	5~95% non-condensing
<b>Accuracy</b>	< 0.16% rd.+0.04%rg. guar., < 0.08% rd.+0.02%rg. typ.	EMC(E&I)	EN/IEC 61326-1 EN/IEC 61000-3-2/3 EN/IEC 61000-4-2/3/4/5/6/8/ 11/18
<b>Resolution</b>	5mA	Environment	EN/IEC 60068-2-1/2/3/6/27
<b>Distortion</b>	0.1%	Safety	EN/IEC 61010-1/1-12/2-030 EN/IEC 60255-25/27
<b>General</b>		Others	FCC Part 15: Sub B ECS-001:2006 LVD EU
<b>Frequency</b>		<b>Others</b>	
Range	DC, 0.001Hz~1000Hz	USB port	2
Accuracy	0.002% at 50Hz	GPS interface	DB9/TTL
Resolution	0.001Hz	Ground socket(earth)	4mm banana socket
<b>Phase</b>		Weight	23kg
Angle range	0~360°	Dimensions (WxHxD)	364mmx200mmx475mm
Accuracy	0.2°		
Resolution	0.001°		

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