



We manufacture Relay Testing Equipment



# MP3000F

## Relay Test System



# MP3000F

## Universal Relay Testing & Commissioning Set

### Introduction

The MP3000F is the all-in-one test system for protection relay testing and commissioning applications. In addition to the ability of testing conventional protective relay with analog voltage and current outputs, the MP3000F can also test IEC61850 complied digital protection devices and systems, such as simulating/subscribing GOOSE messages, publishing Sampled Values. The 12 low level analog output are provided for stimulating devices with low level inputs.

### Features

- ✓ Linear power amplifiers
- ✓ Six currents and four voltages
- ✓ High power and high accuracy
- ✓ All generators output simultaneously
- ✓ Auto detection for binary inputs in software
- ✓ Generators are protected for overload/over temperature/short circuit
- ✓ Audio visual overload, contact status, short circuit, hardware protection indication on front panel
- ✓ Advanced modular Plug-in structure
- ✓ Light weight, easy to use
- ✓ IEC 61850 testing capability
- ✓ Full automatic testing using PC controlled software
- ✓ 3 years warranty





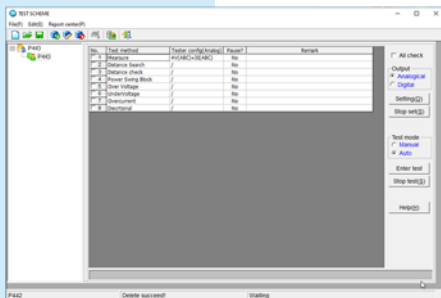
# MP3000F

## MPWin Relay Test Software



### MPWin Software

Apply in Windows 10/Windows 8/Windows 7 and Windows XP. User-friendly interface for quick operation. Set kit configuration in system configuration once, all the modules are auto configured.



### Test Scheme Manager

The test plan can be set up according to the protective relay functions. The test scheme makes the test automatic and standardization. The test report can be user-defined from Test Scheme, so the reports for the same relay or several reports for the similar relays can be managed well.



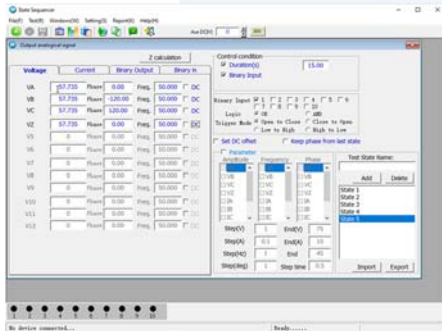
### Any Test

Adjust the current/voltage amplitude, frequency and phase online in each channel. Pre-set 3-states and trip time of the relay. Auto ramp test amplitude, frequency and phase in one or more channel. Pulse ramp test amplitude, frequency and phase in one or more channel



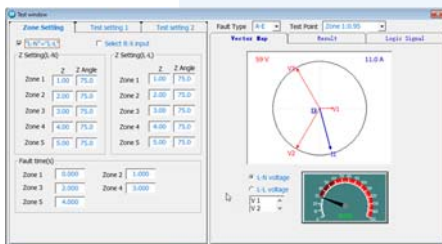
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## MPWin Relay Test Software



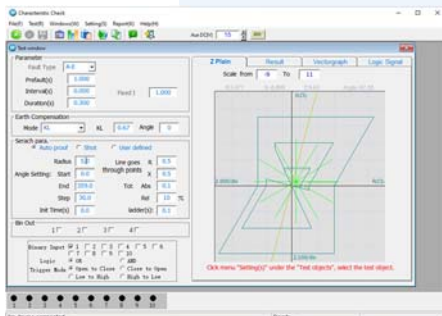
### State Sequence

Define different parameters in each state including: amplitude, frequency, phase, binary input/output and output time, etc. Parameter calculation is available.



### Distance - setting verification

Quickly verify the settings of distance relay



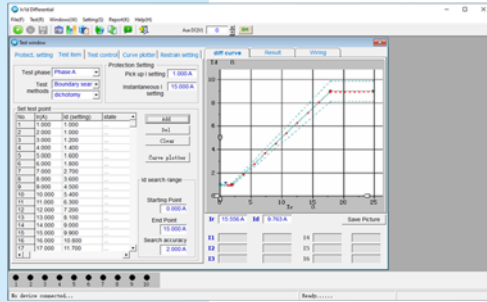
### Distance - characteristic check

Check the distance relay characteristic based on the distance relay characteristic curve. The curve can be drawn automatically according to the XRIO file imported from protective relay



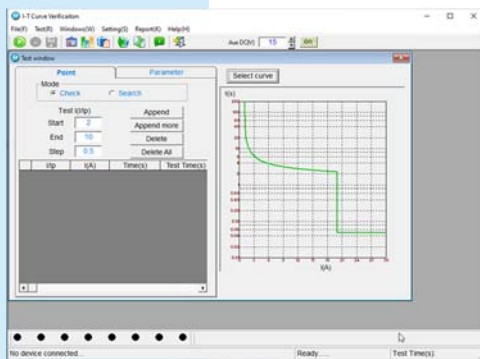
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## MPWin Relay Test Software



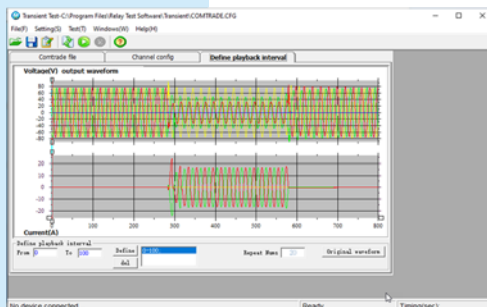
### Differential Relay

In differential 6I module, no need wiring connection during testing. The trip characteristic and trip time can be checked. Auto-calculation and evaluation for stability characteristic is available.



### I-T Curve Verification

Check or search IEC or ANSI curve with different current trip time



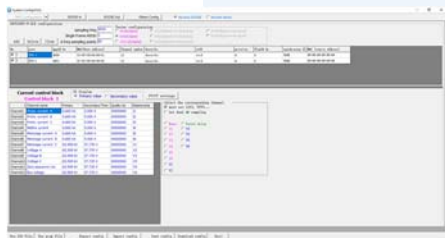
### Trans Playback

Play back the current, voltage and binary output in Comtrade file to analyze the transient fault. Support to extend, cut and copy the original Comtrade file



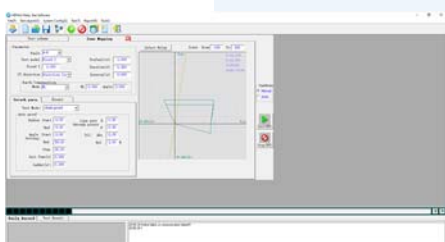
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## MPWin Relay Test Software



### IEC61850 test configuration

Support SMV format IEC61850-9-2/9-21e. Support goose format IEC61850-8-1 output. Support direct import of substation IED configuration file, including CID, ICD, SCD etc., and automatically map them to output channels.



### XRIO Import

Support the import of XRIO files and link the XRIO file with relay characteristic curve and settings, enabling various automatic test functions



### Test Report

Managing the test reports and save them in different format, including Microsoft Word and Excel, rtf, TXT, html, tif, etc



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## Specifications

### Voltage generators

Number of outputs	4
<b>Ranges</b>	
AC (L-N)	4 x 0-300V
AC (L-L)	2 x 0-600V
DC (L-N)	4 x 0-±424V
DC (L-L)	2 x 0-±848V
<b>Power</b>	
AC (L-N)	4 x 100VA typ. at >100V 4 x 85VA guar. at >100V
AC (L-L)	2 x 200VA typ. at >200V 2 x 170VA guar. at >200V
DC (L-N)	4 x 70W at >100V
<b>Accuracy</b>	error < 0.1% rd. + 0.02% rg. guar.; error < 0.05% rd. + 0.01% rg. typ.
<b>Resolution</b>	10mV for 300Vac
<b>Step response time</b>	<100µS at <75V
<b>Distortion (THD%)</b>	<0.05% typ., <0.1% guar., at >5V
<b>Frequency-Amplitude characteristic</b>	<0.5% at ≤ 450Hz, <1% at ≤ 1000Hz
<b>Output time</b>	Continuous
<b>Operation indication</b>	LED on front panel



# MP3000F

## Specifications

### Current generators

Number of outputs 6

#### Ranges

AC (L-N) 6 x 0-30A

1-phase AC (6L-N) 1 x 0-180A

3-phase AC (2L-N) 3 x 0-60A

DC (L-N) 6 x 0-±20A

DC (6L-N) 1 x 0-±120A

#### Power

6-phase AC (L-N) 6 x 450VA typ. at 30A

6 x 400VA guar. at 30A

3-phase AC (2L-N) 3 x 800VA typ. at 60A

3 x 700VA guar. at 60A

1-phase AC (6L-N) 1 x 1200VA typ. at 180A

1 x 1000VA guar. at 180A

DC (L-N) 6 x 250W typ. at 20A

6 x 200W guar. at 20A

DC (6L-N) 1 x 1400W typ. at 120A

1 x 1000W guar. at 120A

**Max compliance voltage (L-N)** 21Vpk

**Accuracy** error < 0.1% rd. + 0.05% rg. guar. at 0-30A

error < 0.1% rd. + 0.02% rg. typ. at 0-30A

**Resolution** 1mA

**Step response time** <100µS at resistive load

**Distortion (THD%)** <0.06% typ., <0.1% guar.

**Frequency-Amplitude characteristic** <0.5% at ≤ 450Hz, <1% at ≤ 1000Hz

**Output time** >15 Sec. at 30A

**Operation indication** LED on front panel





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## Specifications

### General

#### Frequency

Sine signal (Range)	DC, 0.001Hz - 1000Hz
Transient signal	DC - 5kHz
Frequency accuracy/drift	$\pm 1$ ppm
Frequency resolution	0.001Hz

#### Phase

Phase angle range	0-360°
Phase angle accuracy	$< 0.05^\circ$ typ., $< 0.1^\circ$ guar., at 50Hz/60Hz
Phase angle resolution	$\pm 0.005^\circ$
Synchronization time between I and V	$< 20\mu\text{s}$

#### Auxiliary DC supply

Voltage range	0-300V
Power	100W at $> 100\text{V}$
Accuracy	error $< 0.1\%$ rg. typ., error $< 0.5\%$ rg. guar.

#### Power supply

Nominal supply voltage	110-240Vac, 1 phase
Permissible supply voltage	90-260Vac
Nominal frequency	50/60Hz
Permissible frequency	45-65Hz
Max. current	10A



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## Specifications

### Binary inputs & outputs

#### **Binary inputs**

Number of inputs	10
Input characteristic	0-250Vdc/ac peak threshold or potential free
Sample rate	50kHz
Time resolution	20 $\mu$ S
Max. measuring time	Infinite
Debounce/deglitch time	0-25ms
Counting function	<5kHz at pulse width >100 $\mu$ S
Galvanic isolation	10 galvanically isolated

#### **Binary outputs, relay**

Number of outputs	4
Type	Potential free relay contacts, software controlled
Break capacity AC	Vmax: 250Vac, Imax: 5A, Pmax: 1250VA
Break capacity DC	Vmax: 30Vdc, Imax: 5A, Pmax: 150W

#### **Binary outputs, semiconductor**

Number of outputs	4
Type	semiconductor
Break capacity DC	Vmax: 300Vdc, Imax: 0.1A, Pmax: 30W
Update rate	100 $\mu$ S
Imax	100mA



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## Specifications

### Others

#### **Low level outputs**

Setting range	12 x 0-10Vpk
Max. output current	10mA
Accuracy	error < 0.05% typ., <0.1% guar., at 1-10Vpk
Resolution	250 $\mu$ V
Distortion (THD%)	<0.05% typ., <0.1% guar.
Connection	4mm banana socket (on the side)

#### **Control Interface**

PC Connection	1 Ethernet, rear side, 10M/100M
GPS synchronization interface	optional, Coaxial cable, connector, rear side
Ground socket (earth)	4 mm banana socket

#### **Weight and dimensions**

Weight	17 kg
Dimensions (WxHxD)	360mm x 210mm x 462mm

#### **Environmental condition**

Operating temperature	0-45 °C
Storage temperature	-5° - +70 °C
Relative humidity	5-95%, non-condensing
CE certificate (EMC/EMI)	EN 61326-1: 2006 EN61000-3-2: 2006 EN61000-3-3: 1995 + A1:2001 + A2:2005 EN61010-1: 2001
FCC	PART 15, Class A

#### **IEC 61850**

GOOSE simulation/subscription	Virtual binary input/output: 255; GOOSE message: 12
Sampled value publishing	4 x SV stream per port
Connection of GOOSE and SV	4 fiber-optic Ethernets
FT3 interface	4 x SC ports for FT3 simulation

#### **GPS Synchronization control (optional)**

Signal	PPS, or IRIG-B (optional)
Time setting	free trigger time setting
Signal receiving time	< 60 Sec



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