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# *L336i*
# *HARDWARE INSTRUCTION MANUAL*

**VERSION:** **L336i -AE-3.21**
**DATE :** **26/06/2012**



This manual represents the technical status for the moment of publishing. The product information, description and specifications mentioned in the manual do not have any contact binding force and PONOVO POWER CO., LTD remains the right to make modifications to the technical specifications and configurations without prior notice. PONOVO POWER does not take responsibility to the possible error/mistakes in this manual.

# Content

## Notes:

 Please turn off the PC and test before connecting data cables.

 In order to prevent static electricity, the tester must be connected to ground before testing.

 Avoid electric shock accident when the output voltage is above 36V.

 It's not allowed to feed external voltage/current into the output side of tester.

 Disconnect the external circuit of the relay to assure precision.

 Do not block the ventilation outlets.

 Avoid the equipment being wet by rain.

 Do not switch-on and operate the equipment in the place having explosive gas or water vapor

 Put away the host in package timely.

 The 500V dangerous voltage can be in the equipment and please don't remove the cover by yourself.

 The software runs under Windows95, 98, Windows2000, Windows XP and Vista.

 Connect multi-wires in parallel to avoid over current damaging wires.

# Preface

This manual gives detailed introduction to ***L336i*** so that user can have the reasonable, effective and safe operation of this test kit.

This manual mainly consists of the following parts:

**Equipments and functions:**
This part describes the main hardware parts and their functions.

**Panel description**
This part describes the interfaces on the panels and their applications

**Technical specifications**
This part describes the application range, measuring precision etc, information to avoid dangerous situation and improper application, meanwhile to improve the reliability.

**Optional accessories**
This part describes the optional accessories to extend other special test functions. User chooses them according to the special demand.

The complete test system consists of ***L336i*** test equipment (used for generating analog test signals), ***PowerTest*** test software, Computer which has installed ***PowerTest*** software, Test Leads/cables, etc. This manual gives only the description to the hardware part. Please refer to ***PowerTest*** software user manual or ***PowerTest*** online help for details of the software.

**Notes:** At the test site user should also refer to other safety and test regulations required by his management authorities.

This test equipment must be operated by professional test people and careful reading of this manual is required before operating this test equipment.

# 1. General Description

## 1.1 Applications

***L336i*** can be used by power plants, substations, and relay manufactures, etc, for the following test applications.

Test protective relays
Test automation device
Power system simulation
General calibration equipment

Besides, the L336i also provides solutions for UHV, HVDC transmission, remote transmission series compensation, etc. Its test, recorder, real-time monitor functions are helpful for testing process.

# 1.2 Features

## 1.2.1 DSP+FPGA digital signal process system

L336i signal process platform is based on the most advanced DSP component, and it applies FPGA technology, get signal process ability. It realizes signal's real-time occurrence, recovery and record and runs closed.

## 1.2.2 Real-time Multi-functions

L336i is connected with Ethernet and PC and it is convenient to operate tester and relays on one PC. Meanwhile, the transmission speed is fast at Ethernet as a result it can improve the response time of the device to realize real-time control and quick test.

## 1.2.3 Unique output waveform monitor and record function

The tester makes samples from 7 binary analog output and 8 binary input channels. And the samples are saved in data storage area to make a record for wave analysis.

## 1.2.4 Alarm function

There are two sets of auto systems. One tests voltage source short circuit, current source open circuit, over hot and signal distortion by hardware. The other system makes a DFT calculation for samples by software and makes a analysis on output value to monitor the running conditions. The two systems are independent and can protect it from short circuit, overload, and abnormal voltage. Meanwhile, it provides security for the tested devices.

## 1.2.5 Transient playback function

L336i provides a perfect transient playback function for test software. It can playback 20 transient signal wave of harmonics and meet every test demand.

## 1.2.6 Output precision calibration

Conventional test device is based on the internal potentiometer while calibrating accuracy. For the heavy workload, the accuracy is affected by human factors. L336i makes calibration by software. It connects to PC through digital standard port and the port connects the tester and PC. While calibrating, the PC send voltage and current values to tester, automatically read the values. The correction factor is sent to tester and saved in Flash.

## 1.2.7 Flexible binary setting

8 binary logical can be set alone and the setting is air node or turnover level. The turnover level range is 0-250V.

## 1.2.8 Portable and safe

The lightest and smallest relay tester with weight of 9.4kg is much more suitable to work at site.

# 1.3 Online Adjustment

After the *PowerTest* software runs normally, the online adjustment can begin. For more installation information of *PowerTest*, please refer to *PowerTest Instruction Manual*: software description → software installation.

The steps for hardware online adjustment：

1) Connecting Ethernet interface of L336i with PC by cable.
2) Connecting power supplies of L336i and PC respectively.
3) Switching on PC and L336i.
4) Setting IP address of PC.
5) Double-clicking 

and entering software control center interface, pushing **"system settings**" and choosing **"Ethernet"** in **"Set Comm"**.

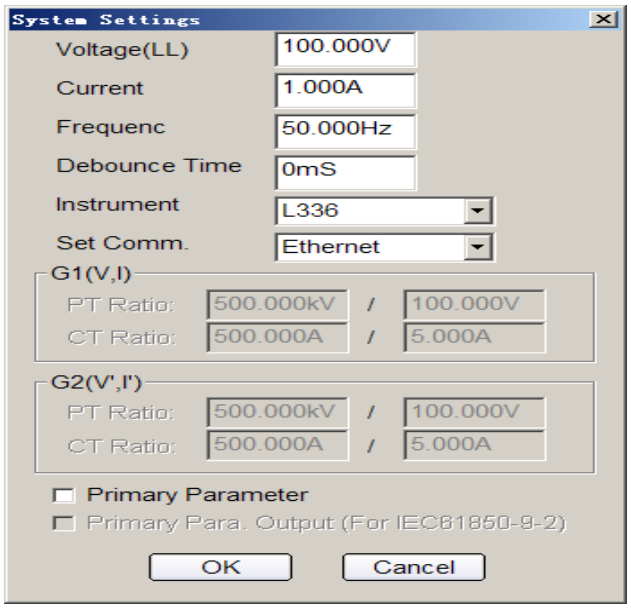



Figure 1-1 system settings interface

6) Entering **"General test/Auto test"**, and clinking 

or pushing "**F2**" on board.

If it is normal, the indication lamp runs as 

, the **"Run"** lamp on front panel of cabinet flashes and the tester makes voice.

**Notes:** Keep off the output end to avoid electric shock while L336i puts out.

# 2. Components and Functions

PC control testing system consists of *PowerTest* software and L336i tester. The testing software runs on the external PC to transmit control commands and testing parameters to L336i. The tester puts out or gets related signals and finishes the whole testing.

Functions of software and hardware test:

- Running the software on the PC
  Gaining input data
  Controlling test signals
  Processing test data
  Creating test report

- L336i hardware test
  Producing testing signals (current, voltage, binary)
  Test protection response
  Providing DC power to the tested device

**Notes:** The manual gives a detailed description for test hardware. For the software information, refer to *PowerTest Instruction Manual*.

# 2.1 Hardware

## 2.1.1 Voltage output (voltage amplifier)

There are 4 binaries for voltage output, A, B, C, and Z. A, B, C are for analog three phase voltage, Z is for extraction voltage or residual voltage.

The 4 voltage output channels are independent, so every output amplitude, phase angle and frequency can be set independently without any effect.

AC output ranges for 4 binary voltages: 4×0…150Vrms
DC output ranges for 4 binary voltages: 4×0…±150V
Protection for voltage output:

The voltage output can protect the device from short circuit and over hot. When the output is short circuit, the alarm indication lamp on the panel flashes and the analog indication lamp for “voltage short circuit” flashes and makes a voice. When the output power is too large, the alarm lamp is on and warns, “Over hot” lamp is on and all analog output is turned off.

## 2.1.2 Current output (current amplifier)

Current output consists of 1 set and 2 set. The current output 2 has current output only that the test software is set as 6 binaries output.

DC output range for 1, 2 set:

1 set:

3×0…30 Arms (3 binary current output model)

3×0…15 Arms (6 binary current output model)

2 set:

3×0…15 Arms (6 binary current output model)

DC output range for 1set:

3×0…±10A (3 binary current output model)

The current output channels are independent, so every output amplitude, phase angle and frequency can be set independently without any effect.

The current amplifier is based on DC coupling linear amplifier.

Protection for current output:

All protections are available for open circuit and over hot. The analog lamp on the testing software interface is on and flashes when the output is open circuit (Open circuit will not damage tester itself, and the port will not generate high voltage); When heavy power leads over hot, the alarm lamp and “over hot” analog lamp light and all current voltage outputs are switched off.

Limit parameters for uninterrupted current output:

| Single phase output range | <10A | 10A～20A | 20A～30A |
|---|---|---|---|
| Output time | Continuous output | >70s | >15s |

## 2.1.3 Binary input

The device has 8 binary inputs. Electricity is isolated in A-H. Space contact or active contact (15V-250V) can be set by software. The threshold impedance for space contact is shown in figure 2-1. The threshold impedance for active contact can be set by software in 10V-250V.

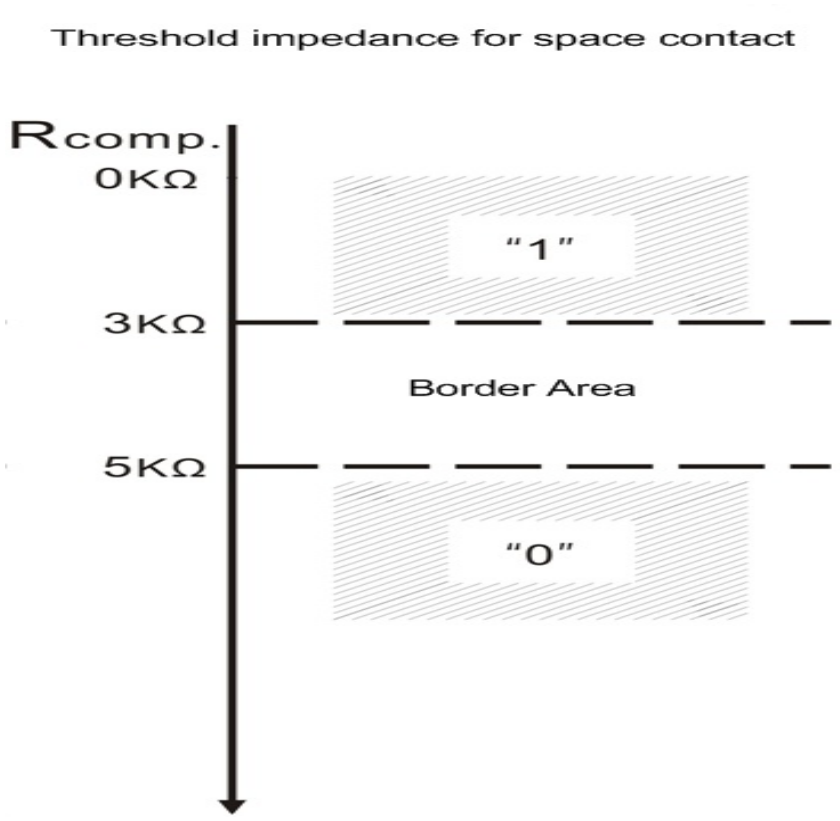



Figure 2-1 Characteristics of space contact

When connecting active contact, the polarity should be correct, red to positive, black to negative, otherwise, false tripping will occur. The polarity for A-H shows as below figure 2-2. The software interface for binary configuration (A-H) shows in figure 2-3.

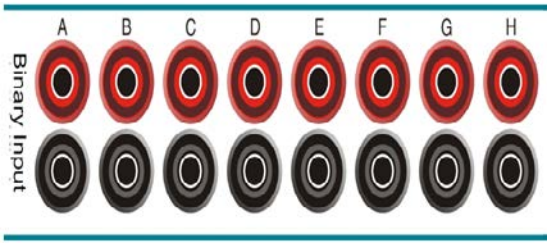



Figure 2-2 Polarity for binary input

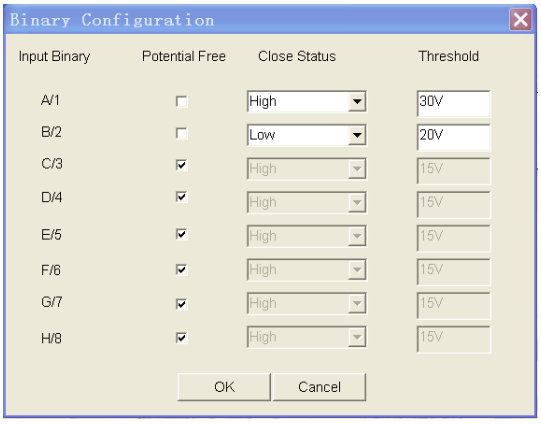


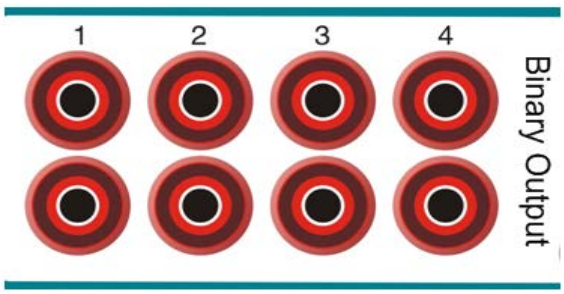

Figure 2-3 Binary configuration of A—H

**Notes：Any end of binary input is prohibited from connecting with ground.**

## 2.1.4. Binary outputs (4 pairs)

The device provides 4 pairs electrical isolation out. 4 pairs are air contact output, and the capacity is: AC/DC, 220V/0.5A. The outputs are not only output analog value, but also output switch signal to start other device, such as memory oscilloscope and fault recorder.

Figure 2-4 Binary Output 1-4




## 2.1.5. Host interface (Ethernet interface)

L336i is connected with PC by Ethernet interface to assure the data transmission.
The connection between host interface and PC supports crossover cable, clockwise networking cable and automatic identification.
The testing system requires the PC identifying *PowerTest* setup guideline.

## 2.1.6 GPS interface

The GPS is connected externally to gain GPS trigger signal and realize double-side simultaneous tests.
For detailed instructions, please refer to the 3.2 chapter.

## 2.1.7 CPU

The CPU consists of DSP and FPGA, and executes the following functions:

- Connecting with PC by Ethernet interface
- Processing digital signal
- Transmitting all digital signals
- Generating high precision central clock signal

Controlling the whole system

# 2.2 Signal generation

Digital signal processor is applied in L336i to improve accuracy and sine wave to meet the need of continuously adjustable phase for signal origin.
The system with digital signal generator is flexible. The amplitude, offset and phase can be changed according to setting the relative parameters in digital way.
Digital change avoids signal drift. Besides sine wave, the test can also have other period and transient signal.

## 2.2.1. DSP+FPGA digital signal processing system

L336i applies the newest DSP digital signal processing technology, 16 digital and analog transitions and 32 numerical counting accuracy. DSP owns high speed digital signal computing ability. The DSP technology makes data output points increase to 600 points per frequency current which improves transient response time and amplitude-frequency characteristic, also makes device own great real-time closed-loop function. The application of DSP+FPGA improves the output accuracy and output wave in small signal.

## 2.2.2 Analog signal amplifier

The advantages of amplifier:

- ◆ High reliability
- ◆ Smooth output wave and no high harmonic.
- ◆ Small-electricity wave is accurate, no electromagnetic pollution and no disruption with present device showing as Figure 2-5.

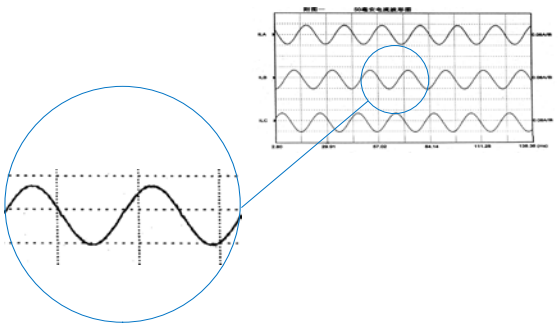


Figure 2-5 0.05A Output wave of L serial tester

# 3. Panel Description

## 3.1 Front Panel

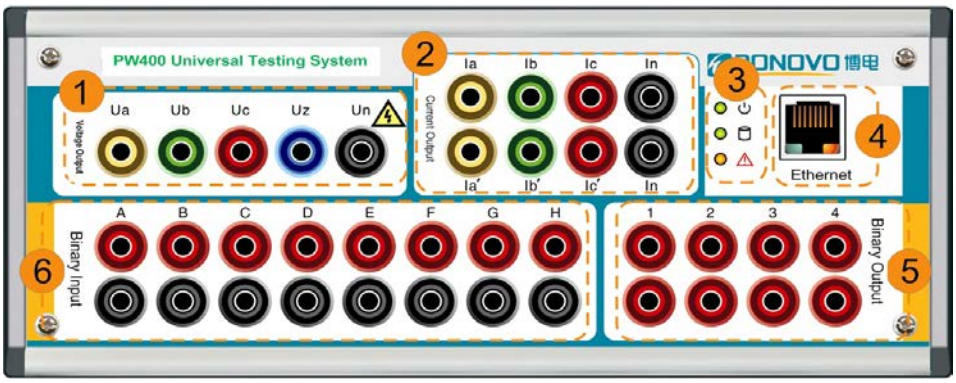



Figure 3-1 Front panel

1. Voltage output group
   AC Output: 4×0…150 Vrms
   DC Output: 4×±0…150V

2. Current output group
   Current output group 1: Ia、Ib、Ic
   AC Output:
   3×0…30Arms（3 binary current output model）
   3×0…15 Arms（6 binary current output model）
   DC output:
   3×0…±10A (3 binary current output model)
   Current output group 1:
   AC output:
   3×0…15 Arms（6 binary current output model）
3. LED indication
4. Ethernet interface
   Support crossover cable and clockwise networking cable
5. Binary output
   4 binary relay out
   Potential free relay contact (auto detection)
6. Binary input

8 groups
0-400Vdc threshold or potential free

## 3.1.1 LED indication

The LED indication on the front panel gives information about the hardware working conditions. In normal working condition the status of LEDs will have the following indication.

Table 3-1 LED indication in normal

| | Power on（no output） | All current/voltage channels are having outputs |
|---|---|---|
| Power lamp | Lighted | Lighted |
| Online lamp | Not lighted | Lighted and flashing |
| Alarm lamp | Not lighted | Not lighted |

The lamps are power lamp, online lamp and alarm lamp from top to bottom.

## 3.1.2. Ethernet interface

The Ethernet interface is used to connect to external PC via Ethernet control cable.
Model: 10/100Base-TX
Cable model: category 5 twisted cable

# 3.2. Rear panel


Figure 3.2 Rear Panel

1. GPS interface
2. IP reset
3. Connector for mains supply
4. Power switcher
5. Ground terminal

## 3.2.1 GPS interface

The interface connects PGPS02 or PIRIG-B01 to realize simultaneous test. The four stars of GPS should be locked to get the real-time function. Please refer to ‘PGPS02 user manual’ for details.


Figure 3-3 L336i and simultaneous connection

## 3.2.2 IP reset

This reset button is used to restore the IP address of ***L336i*** to the default factory setting.
Reset steps:

- Press this button
- Switching on the power for ***L336i***

After this operation the IP address will be restored to the following settings.
IP address: **191.168.1.133**
Subnet mask: **255.255.255.0**

**Note:** The IP after reset is only valid for the current operation. If users need to fix the default IP, please set it in “IP set” of *PowerTest*.

## 3.2.3 Ground terminal

It is used to test the ground connection of chassis. If the ground terminal is connected, the ground hole cannot be connected. If it is not, the ground hole must be connected with the ground.

## 3.2.4 Ventilation

The ventilation of L336i isolates air passage from circuit boards of electronic components to assure the clean of circuit. It applies smart fan system, and the wind is controlled by the temperature sensor. When the temperature reaches 50℃, the fan will quicken automatically and improve cool capacity. The design makes the device heavy load, high current and long-time working capacity to increase stability and reliability.

**Note:** When the device is on, the ventilation should be unblocked to cooling.

# 4 Technical Specifications

## 4.1 Main supply

Table 4-1 Main supply specification

| Main supply | |
|---|---|
| Rated voltage | 220V（AC） |
| Allow voltage | 187～253V（AC） |
| Rated frequency | 50Hz |
| Allow frequency | 40～60Hz |
| Current | 10A（max） |

# 4.2 Insulation class

Table 4-2 Insulation Class

| Insulation Class | |
|---|---|
| Over-voltage class | Ⅱ |
| Environmental rating | Ⅱ |
| Power input on Insulation | Electrical<br>Clearance: >2.5mm<br>Creepage distance: >4mm<br>Test voltage: 1500Vrms |
| Insulation between front and rear panel[1] | Electrical<br>Clearance:>1mm<br>Creepage distance: >2mm<br>Test voltage:1000 V（DC） |
| Insulation between function components[1] | Electrical<br>Clearance:>1mm<br>Creepage distance: >2mm<br>Test voltage:1000 V（DC） |
| Measurement port class (binary/analog input) | CAT Ⅱ |

**[1]** Front and rear panel include: AC voltage, AC current, 8 inputs binary and 4 outputs binary isolated.

# 4.3 Output

The panel diagram of signal generator is in Chapter 2.1 “main board diagram”.
The general specification is applicable for analog current and voltage output.

Table 4-3 General specification of output

| General specification | |
|---|---|
| Frequency | |
| Sine signal | 10～1000Hz |
| Transient signal | DC～10.0kHz |
| Accuracy | <1mHz (20Hz-65Hz)<br><10mHz (65Hz-450Hz)<br><20mHz (450Hz-1000Hz) |
| Resolution | 0.001Hz |
| Phase | |
| Phase angle range | 0-359. 9° |
| Accuracy | <±0.1° |
| Resolution | 0.1° |

**Note:**

Phase angle is only for sine wave.

All phase, frequency, amplitude of currents and voltages can be set separately without effect.

If overload occurs, relative tips will show in hardware and software interface.

## 4.3.1 AC current output

When the software is set 6 binary current output models, there are outputs in current output group 1 and 2.

When the software is set 3 binary current output models, there are outputs in current output group1 only.

Table 4-4 AC current output specification

| | |
|---|---|
| AC current range | 3×30A/phase or 6×15A/phase |
| Accuracy | ±1mA(<0.5A) ±0.1%(0.5A~20A)<br>±0.2%( 20A~30A) |
| Resolution | 1mA(0.1A~10A) 10mA( 10A~30A) |
| DC power | ≥ 210VA (at 30A, LN)<br>≥105VA (at 15A, LN)<br>≥420VA (at 30A, LL) |
| Port voltage（L-N）（max） | 10Vpk |
| Output response time | <100μs |
| THD% | ≤0.5% (0.5A~Imax) |
| Frequency | 10Hz ~1kHz |
| Amplitude-frequency characteristics | range≤±0.1%~±0.5% (10Hz~1kHz) |
| Current, voltage error | ≤1 0μs |

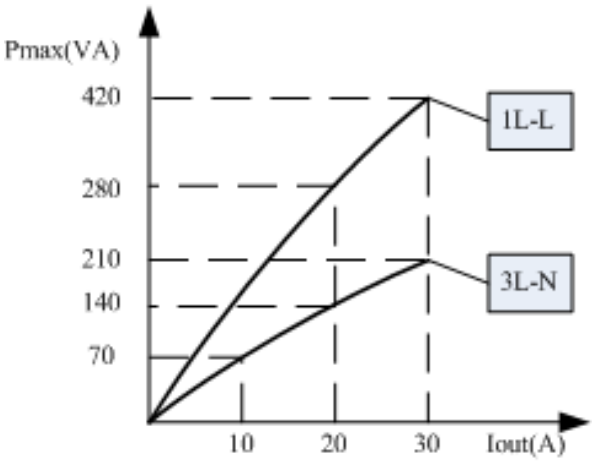



Figure 4-1 Power curve for AC output

## 4.3.2 DC current output

Table 4-5 Output specification of DC

| 1×3 binary(current output group 1) | |
|---|---|
| DC setting range(L-N) | 3×0…10A |
| Accuracy | ±5mA (0.2A～1A)，±0.5% (1A～10A) |
| Resolution | 1mA (0.2A～10A) |
| DC Power | 300W (30A/ 10V) |
| Port voltage(L-N)(max) | 10Vpk |

## 4.3.3 Single phase current output

Table 4-6 Single phase output

| Single phase output（6 binary output model） | |
|---|---|
| Current output 2 groups current connect parallel then serial [1] | 1×0……45A |
| Power 2 groups current connect serial then parallel | 1×585 VA……45A |

**Connection diagram [1]:**

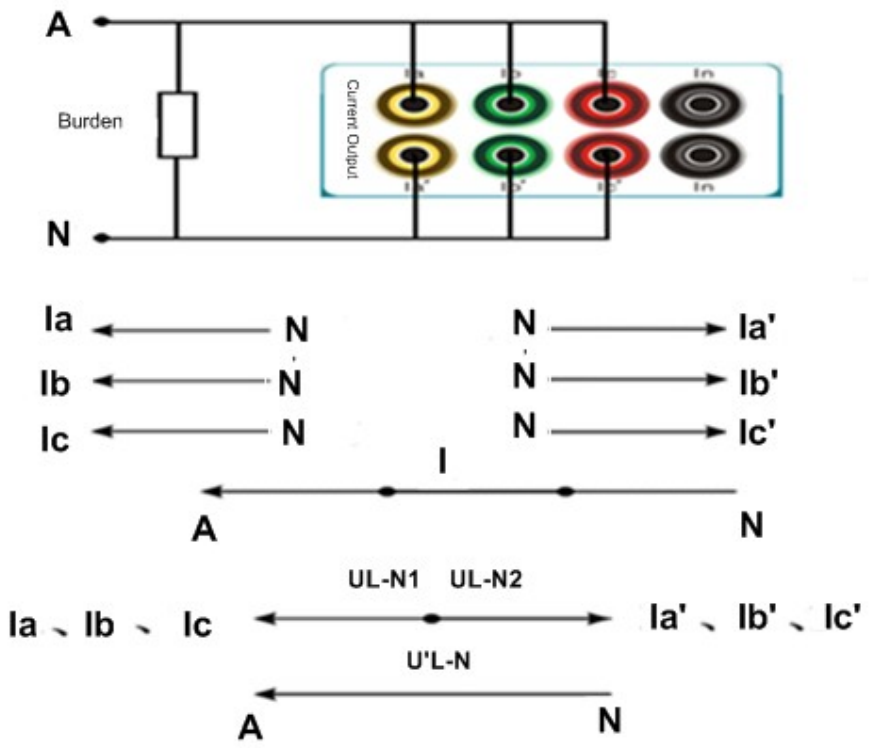



Figure 4-2 2 groups current connect parallel then serial

Current group 1 and 2 are in the same place, so the In polar does not connect.

**Software setting [1]:**

Currents of Group 1 connect parallel, and every phase of magnitude is the same, so does Group 2. Meanwhile, Group 1 and Group 2 connect series. Group 1 is set 0, and Group 2 is set 180, and the total output current amplitude equals to amplitude of any group.

**Note [1]:**

Single current load capacity of cable is 30A (sectional area of single cable is 2.5mm$^2$). Several cables connecting parallel needs more cables.

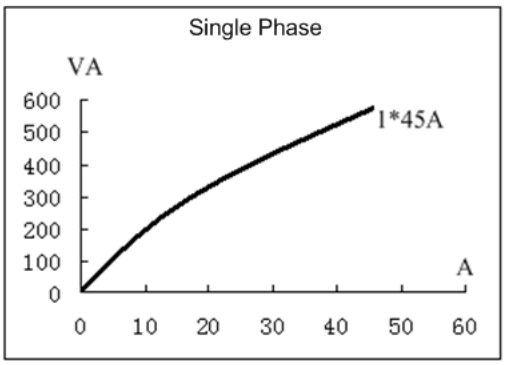



Figure 4-3 Single phase current output power curve

## 4.3.4 4 binary voltage output

Table 4-7 4binary voltage output

| Item / Model | L336i |
|---|---|
| AC voltaget setting ranges(L-N) | 4×0…150Vrm |
| DC voltage setting ranges(L-N) | 4×0…±150V |
| AC power(L-N) | 4×60VA (150V) |
| DC power(L-N) | 4×36W (±150V) |
| Accuracy | ±2mV(0.2V~2V)<br>±0.1%(2 V ~150V) |
| Resolution | 1 mV(0.2V~10V)<br>10 mV(10V~150V) |
| THD% | ≤0.5%(2V～150V) |
| Frequency | 10Hz ~1kHz |
| Amplitude-frequency characteristics | ranges≤±0.1%~±0.5% (10Hz ~1kHz) |
| Output time | Continuously output at rated time |
| Time for voltage up and down | <100μs |
| Error for current and voltage | ≤10μs |

## 4.3.5 Single phase voltage output

Table 4-8 Single phase voltage output

| Item / Model | L336i |
|---|---|
| AC current setting range(L-L) | 1×0…300Vrms |
| AC(L-L) | 1×120VA (300V) |

**Connection diagram:**

Any two ports connect parallel among Ua, Ub, Uc, for example Ua, Ub connecting parallel.

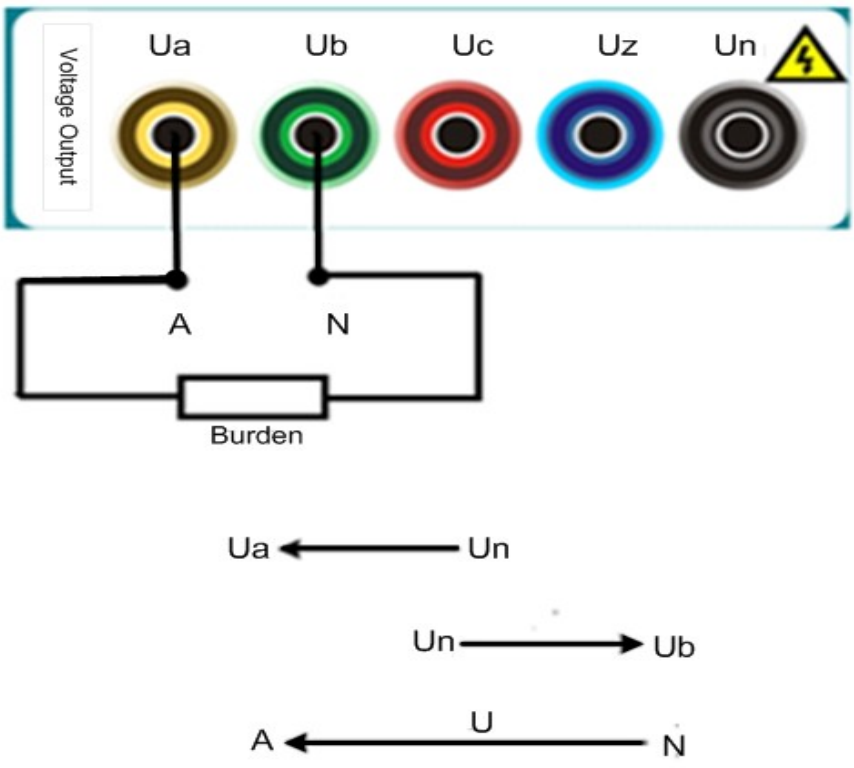



Figure 4-5 Single phase (L-L) output parallel

**Software setting:**

The Ua, Ub phase angle should be contrary (phase angle is 180°), and the amplitudes cannot be the same but the total output voltage amplitude should be equal to the sum of Ua and Ub.

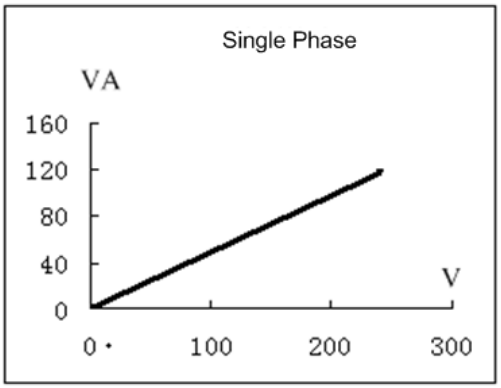



Figure 4-6 Power curve of single phase output

## 4.3.6 Relay out

Table 4-9 Relay out

| Relay out | |
|---|---|
| Quantity | 4 pairs |
| Type | No polarity distinction in air contact |
| AC capacity | Vmax：250V(AC)/ Imax：0.5A |
| DC capacity | Vmax：250V(DC)/ Imax：0.5A |

# 4.4 Input (A-H)

Air contact and active contact can be set by software. The threshold voltage of active contact can also be set by software and ranges from 10V-250V. The threshold resistance of air contact ranges from 3 kΩ…5kΩ.

Table 4-10 Input (A-H)

| Input (A-H) | |
|---|---|
| Quantity | 8 binary |
| Characteristics | 0-400Vdc threshold or potential free |
| Frequency of sampling | 10kHz |
| Time resolution | 100μs |
| Max. test time | $1.50\times10^5$s |
| Error for timing | ± 1ms ( 0.001s ～1s)，<br>± 0.1% (1s ～$1.50\times10^5$ s) |
| Setting range for shake reduction time( software set) | 0 ms～25ms |
| Counting function | <3kHz (pulse width>150μs) |
| Electricity isolation | 8 binary input electricity isolation |
| Threshold voltage error | 10 V～100 V:error<5 V；<br>100 V～250 V:error <±5% range |
| Threshold insulation specification( set as air contact) | 3 kΩ…5kΩ |
| Threshold voltage specification(Potential contact) | 10 V～250 V |

# 4.5 Environment Conditions

Table4-11 Environment condition specification

| Environment condition specification | |
|---|---|
| Operation temperature | 0～+50℃ |
| Storage temperature | -25～70℃ |
| Relative humidity | 5～95%　No condensation |
| EMC(Radiation) | IEC-61000-3-2/3 |
| EMC(Interference) | IEC61000-4-2/3/4/5/6/11 |
| Safety | IEC61010-1 |

# 4.6 Other Specification

Table 4-12 other specification

| Other specification | |
|---|---|
| PC Interface | Ethernet interface, 10M/100M |
| GPS Interface | RS232 |
| Ground terminal | 4mm socket, rear panel |
| Weight | 8.8kg |
| Dimension | 256 mm×110 mm×395mm (W×H×D) |

# 5. L336i-Related Products and Accessories

This chapter describes the optional equipments and accessories for the *L336i* test set. Please visit the PONOVO Web site **www.ponovo.com.cn** for up-to-date information.

## Optional accessories

| Item | Part No. |
|---|---|
| PGPS02 GPS based synchronization device | SAG0101 |
| IRIG-B based synchronization device | SAG0102 |
| PSS01 circuit breaker simulator | SAB0101 |
| PACB108 scanning head | SAS0101 |
| Synchronization control cable | SAW0015 |
| Fiber optic cable | SAW0016 |
| Fiber optic cable | SAW0017 |

## Standard accessories

| Item | Part No. |
|---|---|
| Color coded current cables | SAW0201/0203 |
| Color coded voltage cables | SAW0202 |
| Signal cables | SAW0204/0205 |
| Flexible terminal adapter | SAW0206 |
| Flexible jumpers | SAW0207 |
| Crocodile clips | SAW0208 |
| U clamps 1# | SAW0209 |
| U clamps 2# | SAW0210 |
| Pin clamps | SAW0211 |
| Power cord | SAW0009 |
| Earthing lead | SAW0018 |
| PC control cable (LAN) | SAW0012 |
| Transportation case | SAC0105 |

## 5.1 PGPS02-GPS-based Synchronization Device

It provides GPS synchronization signal in PPS (pulse per second) or PPM (pulse per minute) for synchronized test. Trigger time can be set locally.


SAG0101 PGPS02

You can synchronize two or more PONOVO test sets by connecting a PGPS synchronization unit to each of the test sets' inputs.

For detailed information about the PGPS, please refer to the ***PGPS User Manual,*** the product catalog, or the PONOVO Web site www.ponovo.com.cn

Table 8-2

| | |
|---|---|
| Pulse signal level | TTL or RS-232 |
| Timing error between two RT GPS | TYP.<100ns<br>MAX.<500ns |
| Pulse width | 100ms |
| Weight | 640g |
| Dimension W x H x D | 95x45x160mm |

## 5.2 IRIG-B Based Synchronization Device

It converts external IRIG-B signal into trigger pulse to synchronize several of our relay test equipment for synchronized test application.


SAG0102 PIRIG-B

Via the PIRIG-B interface box users can connect devices to the L336i test set that either transmit or receive the IRIG-B time reference signal (DC level shift protocol B00x). That way, two or more PONOVO test sets are synchronized.

For detailed information about the PIRIG-B, please refer to the ***PIRIG-B User Manual***

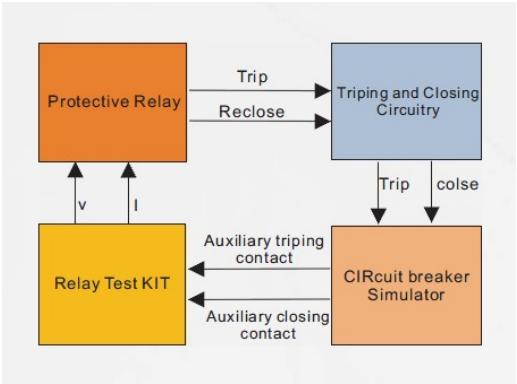
## 5.3 PSS01 Circuit Breaker Simulator

It can simulate circuit breaker behaviors in three pole or 1 pole tripping of 6-500KV voltage grade, being available for power system, etc.

It provides 12 circuit breaker auxiliary contacts for complex test applications.

SAB0101 PSS01

This is one of the application examples:




## 5.4PACB108 Scanning Head

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.

SAS0101 PACB108

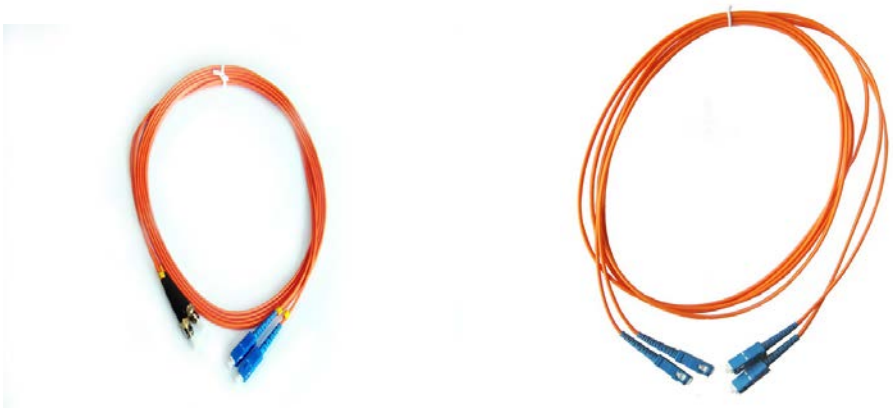
Output pulse: 5V or 24V
Sampling distance: 10-30 mm
Maximum sampling pulse: 100 pulses/second

## 5.5 Synchronization Control Cable

Synchronization control cable is used to connect more relay test kits for synchronized control.

SAW0015 Synchronization control cable

## 5.6 Fiber Optic Cable



SAW0016/SAW0017 Fiber Optic Cable

MTRJ-ST MTRJ-MTRJ

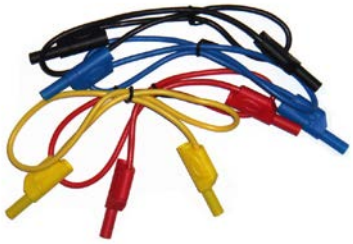
When L336i is connected with a fiber switcher, fiber optic cables are required.

## 5.7 Standard Accessories

### 5.7.1 Soft Bag for Test Leads

The L336i Wiring Accessory Package contains the following articles:

1. Colour coded current cables

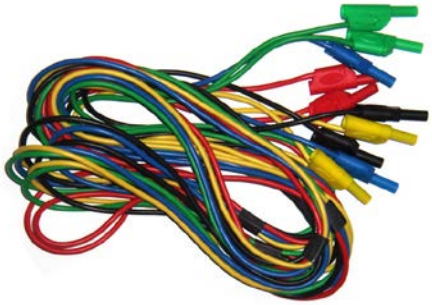


SAW0201/ 0203 colour coded current cable

Amount: 2xred, 2xblack, 2xyellow, 2xblue 1xred, 1xblack, 1xyellow, 1xblue

The current cables to connect the L336i output to other safety sockets of, generally the current parts, voltage and signal tripping.

2. Color coded voltage cables



SAW0202 Colour coded voltage cable

Amount: Amount: 1x red, 1x yellow, 1x green, 1x blue, 1x black

The voltage cables to connect the L336i output to other safety sockets of, generally the voltage parts, current and signal tripping.

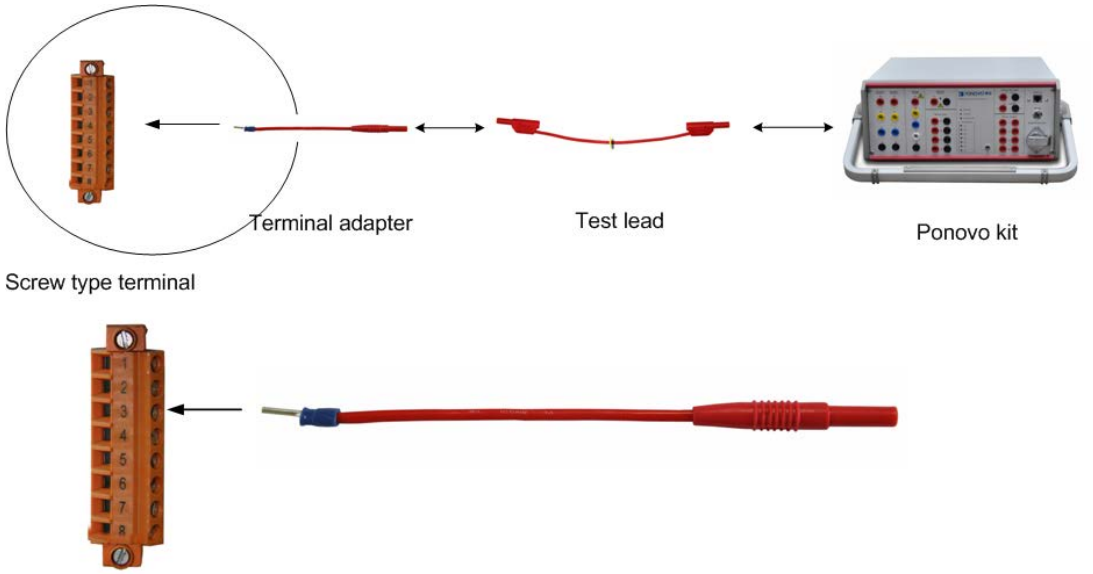
3. Signal Cable

SAW0204/0205 Signal cables

Amount: 2xred, 2x black 2xred, 2xblack

It connects the L336i with other different sockets, generally with signal tripping and current/voltage testing.

4. Flexible Terminal Adapter




SAW0206 Flexible terminal adapter

Amount: 10xred, 10xblack

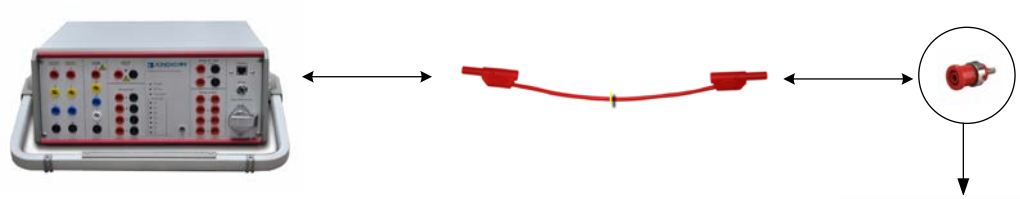
Flexible terminal adapter connect to screw-clip terminals.

---

**Notes:** One end of the adapters have no insulator, users should make sure there is no output during connecting the adapters. Users insert the non-safety into the terminals and screw it firmly, then connect the test lead with the other end.

---

5. Jumper Cable



Ponovo kit

Jumper cable

Device with safety jack

SAW0207 Flexible jumpers

Amount: 4xblack

Flexible jumper connects current outputs in parallel.

6. Crocodile Clips

Screw type terminal

Crocodile clamp

Test lead

Ponovo kit

SAW0208 Crocodile clips

Amount: 2xred, 2xblack, 2xyellow, 2xblue

Crocodile clips for secondary side to connect to pins or screw types.

## 7. U Clamps

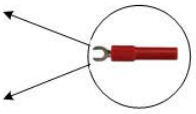
SAW0209 U clamps 1#

Amount: 10xred, 10xblack

SAW0210 U clamps 2#

5xred, 5xblack

Screw type terminal



U clamp

Test lead

Ponovo kit

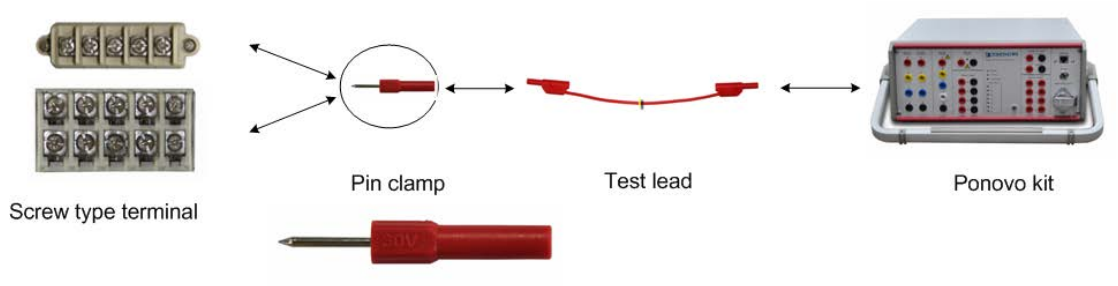
It is used to connect test leads with screw type terminals.

---

**Notes:** One end of the adapters have no insulator, users should make sure there is no output during connecting the adapters. Users insert the non-safety into the terminals and screw it firmly, then connect the test lead with the other end.

---

8. Pin clamps




SAW0211 Pin clamps

Amount: 4xred, 4xblack

It is used to connect test leads with screw type terminals.

9. Power Cord

SAW0009 Power code

Amount: 1 piece

Power cord connects the L336i with power supply socket. PONOVO will provide relevant plug socket according to different countries. For the plug socket information, please check the Chapter **11. Appendix.**

10. Earthing Lead


SAW0018 Earthing lead

Specification: 2.5mm²×4m

Amount: 1 piece

Earthing lead connects the L336i with ground to ensure kit safety.

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**Notes:** In order to avoid static induction, users should connect the L336i with ground reliably before testing.

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11. 11. PC control cable (LAN)

SAW0012 PC control cable (LAN)

Amount: 1 piece

The LAN cable connects the L336i with PC for communications.

### 5.7.2 Transportation Case

The large-size case with wheels is designed for heavy transport stress with folding hand it is made of fireproof materials and smooth rolling rubber tires.


SAC0105 Transportation case

Dimension: 465x250x525mm (WxHxD)
Weight: 10Kg

# 6. Appendix

In order to assure PONOVO sockets are used smoothly in foreign countries, PONOVO provides the plug sockets to our customers in different countries.

The followings are the sockets used in different countries.

1. Plug Type B

Type B adapter is mainly used in America, Canada and Taiwan etc.

2. Plug Type I Adapter

The UK type plug is mainly used in United Kingdom, India, Pakistan, Thailand, Malaysia, Singapore, New Zealand and Hong Kong etc.

3. Plug Type L Adapter

Type L Adapter is mainly used in South Africa and British Standard 15A.

4. Plug Type N Adapter

This adapter is mainly used in Italy.

5. Type G Adapter

Type G Adapter is mainly used in German, Finland, France, Norway, Sweden, Poland, South Korean, Austria, Spain, Hungary, Czech, Ukraine, Turkey, Brazil and Russia etc.