

3360F Series
High power
Electronic Load
Operation manual

SAFETY SYMBOLS



Direct current (DC)



Alternating current (AC)



Both direct and alternating



Three-phase alternating



Protective earth



On (Supply)



Off (Supply)



Fuse



Caution ! Refer to this manual before using the meter.



Caution, risk of electric shock

CAT IV – Is for measurements performed at the source of the low-voltage installation.

CAT III – Is for measurements performed in the building installation.

CAT II – Is for measurements performed on circuits directly connected to the low-voltage installation.

CAT I – Is for measurements performed on circuits not directly connected to

Material Contents Declaration

(材料含量宣称)

(Part Name) 零件名称	Hazardous Substance (有毒有害物质或元素)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴 联苯 (PBB)	多溴 二苯醚 (PBDE)
PCBA (印刷电路装配件)	X	O	X	O	O	O
Electrical part not on PCBA's 未在PCBA上的电子零件	X	O	X	O	O	O
Metal parts 金属零件	O	O	O	X	O	O
Plastic parts 塑料零件	O	O	O	O	X	X
Wiring 电线	X	O	O	O	O	O
Package 封装	X	O	O	O	O	O

对销售之日的所售产品,本表显示, PRODIGIT 供应链的电子信息产品可能包含这些物质。注意:在所售产品中可能会也可能不会含有所有所列的部件。This table shows where these substances may be found in the supply chain of Prodigit electronic information products, as of the date of sale of the enclosed product. Note that some of the component types listed above may or may not be a part of the enclosed product. ○: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。○: Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T 113632006 standard. ×: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。×: Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

Note(注释):

1. Prodigit has not fully transitioned to lead-free solder assembly at this moment : However, most of the components used are RoHS compliant.
(此刻, Prodigit 并非完全过渡到无铅焊料组装;但是大部份的元器件一至于RoHS的规定。)
2. The product is labeled with an environment-friendly usage period in years.
The marked period is assumed under the operating environment specified in the product specifications.
(产品标注了环境友好的使用期限(年)。所标注的环境使用期限假定是在此产品定义的使用环境之下。)



Example of a marking for a 10 year period:

(例如此标制环境使用期限为10年)

SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. PRODIGIT assumes no liability for the *customer's failure to comply with these requirements.*

GENERAL

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

ENVIRONMENTAL CONDITIONS

This instrument is intended for indoor use in an installation category I, pollution degree 2 environments. It is designed to operate at a maximum relative humidity of 80% and at altitudes of up to 2000 meters. Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed.

GROUND THE INSTRUMENT

This product is a Safety Class 1 instrument (provided with a protective earth terminal). To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the ac power supply mains through a three conductor

power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired

Fuses or short circuited fuse holder. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.

Do not operate the instrument in the presence of flammable gases or fumes.

KEEP AWAY FROM LIVE CIRCUITS.

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

DO NOT SERVICE OR ADJUST ALONE.

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT EXCEED INPUT RATINGS.

This instrument may be equipped with a line filter to reduce electromagnetic interference and must be connected to a properly grounded receptacle to minimize electric shock hazard. Operation at line voltages or frequencies in excess of those stated on the data plate may cause leakage currents in excess of 5.0 mA peak.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a PRODIGIT ELECTRONICS Sales and Service Office for service and repair to ensure that safety features are maintained.

Instruments which appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.



DECLARATION OF CONFORMITY



Company Name: PRODIGIT ELECTRONICS CO., LTD

Address: 8/F, No.88, Baojhong Rd., Sindian City, Taipei County, Taiwan, R.O.C.

Declares under sole responsibility that the product as originally delivered

Product Names: DC Electronic Loads

Model Numbers: 33611F、33621F、33622F、33623F、33624F、33625F、33626F、33627F、
33627F、33671F、33672F、33673F、33674F、33675F

(And other customized products based upon the above)

Product Options:

This declaration covers all options and customized products based on the above products.

Complies with the essential requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE Marking accordingly.

EMC Information:

Class I a sample of the product has been assessed with respect to CE-marking according to the Low Voltage Directive (73/23/EEC & 93/68/EEC) and EMC Directive (89/336/EEC, 92/31/EEC, & 93/68/EEC) and Found to comply with the essential requirements of the Directives.

The Standard(s) used for showing the compliance and the full details of the results are given in the Test Reports as detailed below:

Safety Information:

Safety standards following:

IEC 61010-1:2001 / EN 61010-1:2001

Oct 27, 2010
 Date

Larsson Tsou / R&D Assistant Manager

The holder of the verification is authorized to use this verification in connection with the EC declaration Of conformity according to the Directives. The CE marking may only be used if all relevant and effective EC Directives are complied with. Together with the manufacturer's own documented production control, The manufacturer (or his European authorized representative) can in his EC Declaration of Conformity Verify compliance with the directives.

33611F Series High Power Electronic load operation manual

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Chapter 1 Introduction

1-1. General description

The 33611F Series Electronic Load is designed to test, evaluation and burn-in of DC power supplies and batteries. The 33611F Series electronic load can be operated for manual and GPIB operation. The power contour of 33611F 2400 Watts Electronic Load is shown in Fig 1-1, it has an input from 0-80A, and 0-500V current and voltage operating range respectively. The power contour of 33611F Series. The prodigit 33611F Series high power electronic Load can be controlled locally at the front panel or remotely via computer over the GPIB/RS-232C/USB/LAN. Current (CC) mode, Constant Resistance (CR) mode, and Constant Voltage (CV) mode. and Constant Power (CP) mode. The wide range dynamic load with independent rise and fall current slew rate and analog programming input with arbitrary wave-form input is available in Constant Current mode.

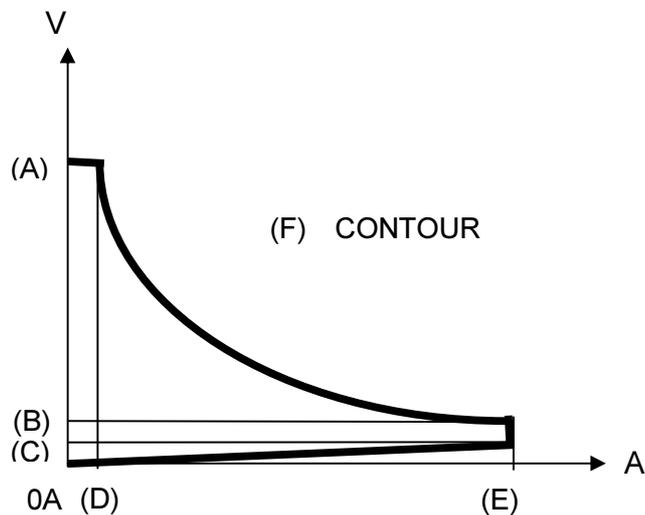


Fig 1-1 33611F Series Power Contour

Model	(A)	(B)	(C)	(D)	(E)	(F)
33611F	500V	30V	6V	4.8A	80A	2400W
33621F	500V	30V	6V	7.2A	120A	3600W
33622F	500V	30V	6V	10.8A	180A	5400W
33623F	500V	30V	6V	14.4A	240A	7200W
33624F	500V	30V	6V	18A	300A	9000W
33625F	500V	30V	6V	21.6A	360A	10800W
33626F	500V	30V	6V	25.2A	420A	12600W
33627F	500V	28.8V	6V	28.8A	500A	14400W
33671F	500V	150V	6V	7.2A	24A	3600W
33672F	500V	150V	6V	10.8A	36A	5400W
33673F	500V	150V	6V	14.4A	48A	7200W
33674F	500V	150V	6V	18A	60A	9000W
33675F	500V	150V	6V	21.6A	72A	10800W

CC Mode:

With the operating mode of constant current, the 33611F Electronic load will sink a current in accordance with the programmed value regardless of the input voltage (see Fig.1-2).

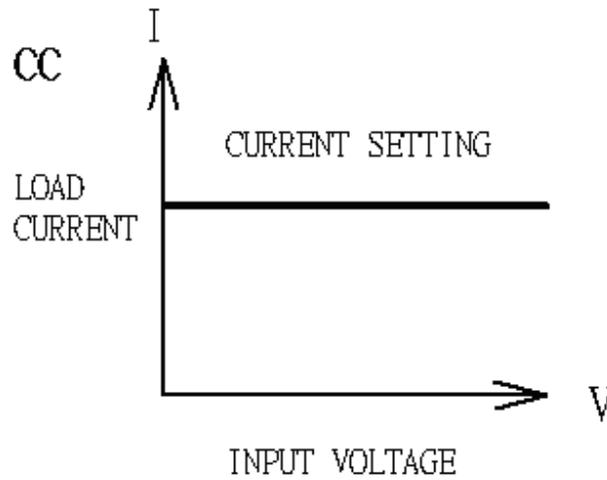


Fig 1-2 Constant Current mode

CR Mode:

At constant resistance mode, The 33611F Electronic Load will sink a current linearly proportional to the load input voltage in accordance with the programmed resistance setting (see Fig 1-3).

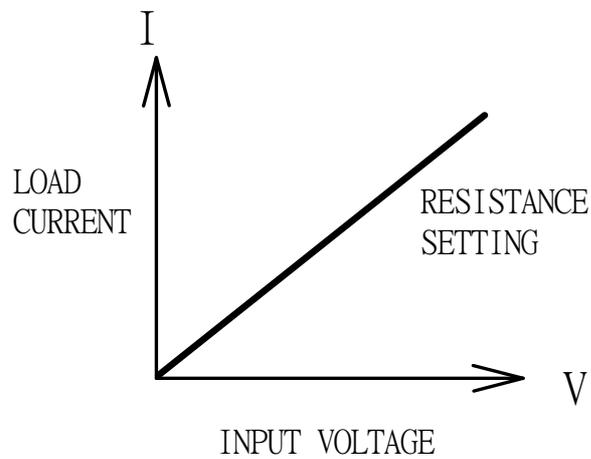


Fig 1-3 Constant Resistance mode

CV Mode:

At constant voltage mode, the 33611F Electronic Load will attempt to sink enough current until the load input voltage is equaled to the programmed value (see Fig 1-4).

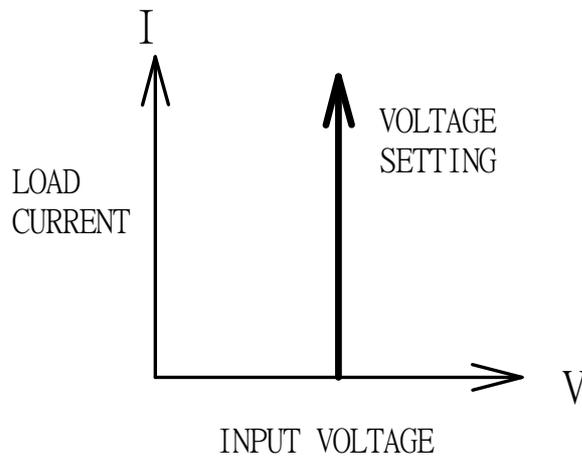


Fig 1-4 Constant Voltage mode

CP Mode:

At Constant Power mode, the 33611F Electronic Load will attempt to sink load power (load voltage x load current) in accordance with the programmed power. (See Fig 1-5).

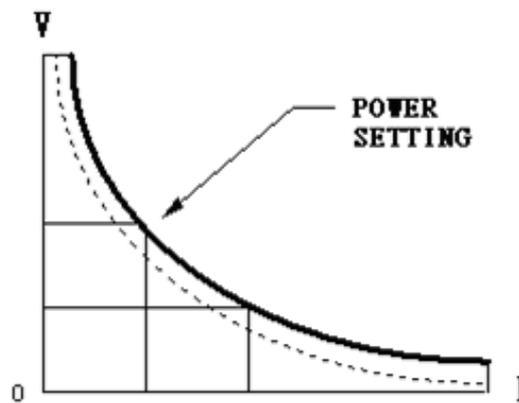


Fig 1-5 Constant Power mode

Dynamic wave form definition:

There are six parameters to generate dynamic wave form or pulse wave form, the 33611F Series Electronic Load will sink current from power source proportional to the dynamic wave form, the dynamic wave form definition is shown in Fig 1-9. The period of dynamic wave form is $T_{HIGH} + T_{LOW}$, dynamic frequency = $1 / (T_{HIGH} + T_{LOW})$, the Duty cycle = $T_{HIGH} / (T_{HIGH} + T_{LOW})$

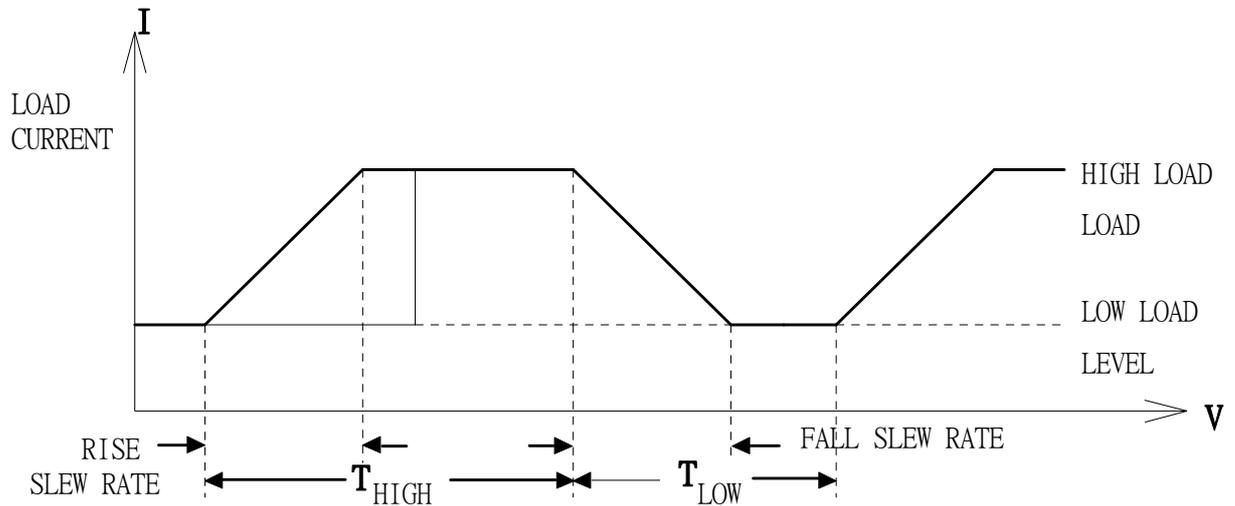


Fig 1-6 Dynamic Wave form

The load current level and load status are can be set with Front panel on each module, GPIB command. It is called manual operation and GPIB operation respectively, the load input voltage and load current can be read back to computer through GPIB.

The GPIB operation is described in Chapter 4 GPIB operation.

Slew Rate:

Slew rate is defined as the change in current or voltage over time. A programmable slew rate allows a controlled transition from one load setting to another to minimize induced voltage drops on inductive power wiring, or to control induced transients on a test device (such as would occur during power supply transient response testing).

In cases where the transition from one setting to another is large, the actual transition time can be Calculated by dividing the voltage or current transition by the slew rate. The actual transition time is Defined as the time required for the input to change from 10% to 90% or from 90% to 10% of the Programmed excursion. In cases where the transition from one setting to another is small, the small Signal bandwidth of the load limits the minimum transition time for all programmable slew rates. Because Of this limitation, the actual transition time is longer than the expected time based on the slew rate, as Shown in Figure 1-7

Therefore, both minimum transition time and slew rate must be considered when determining the actual transition time.

The minimum transition time for a given slew rate as about a 30% or greater load change, the slew rate increases from the minimum transition time to the Maximum transition time at a 100% load change. The actual transition time will be either the minimum transition time, or the total slew time (transition divided by slew rate), whichever is longer.

Use the following formula to calculate the minimum transition time for a given slew rate

Min transition time = $6/\text{slew rate (in amps/second)}$ ($6\mu\text{s}(24/4\text{A}/\mu\text{s}) \cdot 0.8(10\% \sim 90\%) = 4.8\mu\text{S}$)

Use the following formula to calculate the maximum transition time for a given slew rate

Max transition time = $20/\text{slew rate (in amps/second)}$ ($20\mu\text{s}(80/4\text{A}/\mu\text{s}) \cdot 0.8(10\% \sim 90\%) = 16\mu\text{S}$)

EX. CCH=16A, CCL=0A Slew Rate = 4000mA/uS, The expected time is $3.2\mu\text{S}((16/4000\text{mA}/\mu\text{S}) \cdot 0.8)$ but the actual transition time will be limited to 4.8uS

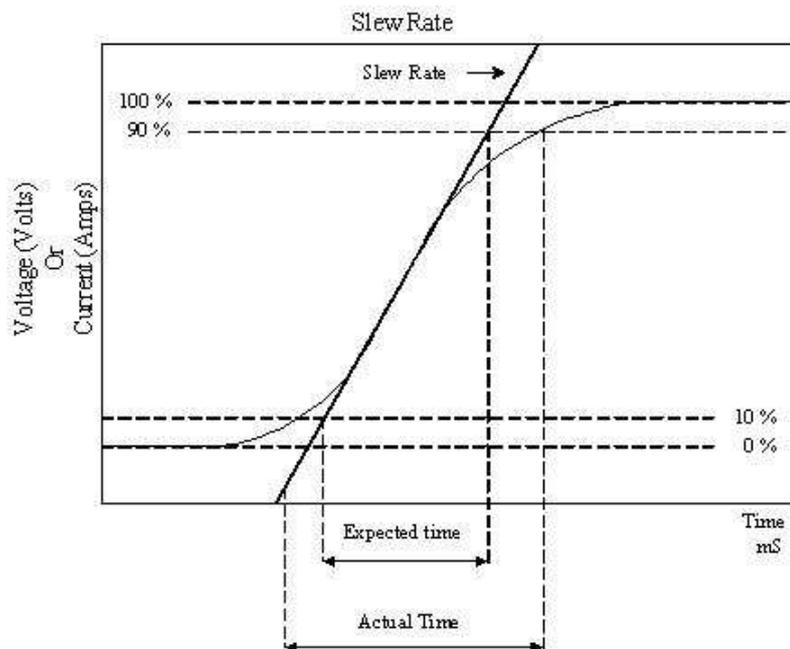


Fig 1-7 Rise Time Transition Limitation

1-2. Features

- 1-2-1 Flexible configuration of high power Electronic Load.
- 1-2-2 Fully GPIB control of Load condition setting and meter read back.
- 1-2-3 Dual high accuracy & resolution 5 digit voltage and current meter.
- 1-2-4 Built-in pulse generator includes wide Thigh/Tlow dynamic load range, independent Rise/Fall load current slew rate control, and High/Low Load level.
- 1-2-5 Controllable load current slew rate of load level change, load ON/OFF switch change, and power supply turn ON.
- 1-2-6 Short circuit test and current measure capability.
- 1-2-7 Automatic voltage sense capability.
- 1-2-8 Full protection from over power, over temperature, over voltage, and reverse polarity.
- 1-2-9 Analog programming input capability at rear panel.

1-3. Accessories

- | | | |
|-------|---|-------|
| 1-3-1 | 33611F Series operation manual | 1 PC |
| 1-3-2 | M8 ROUND SCREW | 2 PCs |
| 1-3-3 | Vsense – Alligator Clip (red \ black) Cable | 1 PC |
| 1-3-4 | Power Cord | 1 PC |

1-4. Option

- 1-4-1 IEEE-488 cable (1 Meter)
- 1-4-2 IEEE-488 cable (2 Meter)
- 1-4-3 RS232 interface
- 1-4-4 GPIB interface
- 1-4-5 USB interface + USB DRIVER CD
- 1-4-6 LAN interface + LAN DRIVER CD

1-5. Specifications

33611F Series

Model	33611F
Power	2400W
Current	0~80A
Voltage	0~500V
Min. Operating Voltage	6V @ 80A
Constant Current Mode	
Range **	0~8.04A/80.4A
Resolution	0.134mA/1.34mA
Accuracy	± 0.1% OF (Setting + Range)
Constant Resistance Mode	
Range	0.125~7.5~450KΩ
Resolution	0.125mΩ/0.0022mS
Accuracy	± 0.2% OF (Setting + Range)
Constant Voltage Mode	
Range	60V/500V
Resolution	1mV/10mV
Accuracy	± 0.05% OF (Setting + Range)
Constant Power Mode	
Range	0~240W/2400W
Resolution	4mW/40mW
Accuracy	± 0.5% OF (Setting + Range)
Dynamic Mode -CC	
Timing	
Thigh & Tlow	0.050~9.999 / 99.99 / 999.9 / 9999mS
Resolution	0.001 / 0.01 / 0.1 / 1mS
Accuracy	1uS/10uS/100uS/1mS + 50ppm
Slew rate	6.4mA~400mA/uS 64mA~4000mA/uS
Resolution	0.4/4mA/uS
Accuracy	(5% of setting) ± 10 uS
Min. Rise Time	20uS(typical)
Current	
Range	0~8.04/80.4A
Resolution	0.134mA/1.34mA
Accuracy	± 0.1% OF (Setting + Range)
Measurement	
Voltage Read Back	
Range (5 Digital)	0~60V/600V
Resolution	0.001V/0.01V
Accuracy	± 0.025% OF (Reading + Range)

1-8 PRODIGIT

Current Read Back	
Range (5 Digital)	0~8.04A/80.4A
Resolution	0.134mA/1.34mA
Accuracy	± 0.1% OF (Reading + Range)
Power Read Back	
Range (5 Digital)	0~240W/2400W
Resolution	0.1W
Accuracy	± 0.125% OF (Reading + Range)
Program mode(Mainframe)	
Sequence No.	F1~9/16 Steps
T1/T2 (Dwell)	0.1S~9.9S/Repeat 9999
Load Setting(External Programming)	0~10V for CC mode F.S.
GO/NG Check	Voltage/Current/Power
Protections	
Over Power	105% of Rated Power
Over Current	105% of Rated Current
Over Voltage	105% of Rated Voltage
Over Temp.	Yes
Interface(Mainframe)	
RS-232	Optional
GPIB	Optional
USB	Optional
Ethernet	Optional
RS-232 + GPIB	Optional
Others	
Load ON Voltage	
Range	0.4~100.0V
Resolution	0.4V
Accuracy	1% of Setting + 2.5V
Load OFF Voltage	
Range	0~100V
Resolution	Same as Voltage Meter
Accuracy	Same as Voltage Meter
General	
Short Circuit	
Current	80A
Temperature Coefficient	100ppm/°C(typical)
Power	100Wmax
Operating Temperature ²	0~40°C
Dimension(HxWxD)	354 x 440 x 445 mm/13.94x17.3x17.5 inch
Weight ³	38.8 Kg/85.54 lbs
Safety & EMC	CE

33621F Serise (1)

Model	33621F	33622F	33623F	33624F
Power	3600W	5400W	7200W	9000W
Current	0~120A	0~180A	0~240A	0~300A
Voltage	0~500V	0~500V	0~500V	0~500V
Min. Operating Voltage	6V @ 120A	6V @ 180A	6V @ 240A	6V @ 300A
Constant Current Mode				
Range ^{*1}	0~12A/120A	0~18A/180A	0~24A/240A	0~30A/300A
Resolution	0.2mA/2mA	0.3mA/3mA	0.4mA/4mA	0.5mA/5mA
Accuracy	± 0.1% OF (Setting + Range)			
Constant Resistance Mode				
Range	0.0833~5~300KΩ	0.0555~3.3330~200KΩ	0.0416~2.5~150KΩ	0.0333~2~120KΩ
Resolution	0.0833mΩ/3.3333uS	0.0555mΩ/5uS	0.0416mΩ/6.6666uS	0.0333mΩ/8.3333uS
Accuracy	± 0.2% OF (Setting + Range)			
Constant Voltage Mode				
Range	60V/500V			
Resolution	1mV/10mV	1mV/10mV	1mV/10mV	1mV/10mV
Accuracy	± 0.05% OF (Setting + Range)			
Constant Power Mode				
Range	0~360W/3600W	0~540W/5400W	0~720W/7200W	0~900W/9000W
Resolution	6mW/60mW	9mW/90mW	12mW/120mW	15mW/150mW
Accuracy	± 0.5% OF (Setting + Range)			
Dynamic Mode -CC				
Timing				
Thigh & Tlow	0.050~9.999 / 99.99 / 999.9 / 9999mS			
Resolution	0.001 / 0.01 / 0.1 / 1mS			
Accuracy	1uS/10uS/100uS/1mS + 50ppm			
Slew rate	9.6mA~600mA/uS 96mA~6000mA/uS	14.4mA~900mA/uS 144mA~9000mA/uS	0.0192A~1.2A/uS 0.192A~12A/uS	0.024A~1.5A/uS 0.24A~15A/uS
Resolution	2.4/24mA/uS	3.6/36mA/uS	0.0048/0.048A/uS	0.006/0.06A/uS
Accuracy	(5% of setting) ± 10 uS			
Min. Rise Time	20uS(typical)			
Current				
Range	0~12/120A	0~18/180A	0~24/240A	0~30A/300A
Resolution	0.2mA/2mA	0.3mA/3mA	0.4mA/4mA	0.5mA/5mA
Accuracy	0.1% + 0.1% F.S.			
Measurement				
Voltage Read Back				
Range (5 Digital)	0~60V/600V			
Resolution	0.001V/0.01V			
Accuracy	± 0.025% OF (Reading + Range)			

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Current Read Back				
Range (5 Digital)	0~12A/120A	0~18A/180A	0~24A/240A	0~30A/300A
Resolution	0.2mA/2mA	0.3mA/3mA	0.4mA/4mA	0.5mA/5mA
Accuracy	± 0.1% OF (Reading + Range)			
Power Read Back				
Range (5 Digital)	0~360W/3600W	0~540W/5400W	0~720W/7200W	0~900W/9000W
Resolution	0.1W			
Accuracy	± 0.125% OF (Reading + Range)			
Program mode(Mainframe)				
Sequence No.	F1~9/16 Steps			
T1/T2 (Dwell)	0.1S~9.9S/Repeat 9999			
Load Setting(External Programming)	0~10V for CC mode F.S.			
GO/NG Check	Voltage/Current/Power			
Protections				
Over Power	105% of Rated Power			
Over Current	105% of Rated Current			
Over Voltage	105% of Rated Voltage			
Over Temp.	Yes			
Interface(Mainframe)				
RS-232	Optional			
GPIB	Optional			
USB	Optional			
Ethernet	Optional			
RS-232 + GPIB	Optional			
Others				
Load ON Voltage				
Range	0.4~100.0V			
Resolution	0.4V			
Accuracy	1% of Setting + 2.5V			
Load OFF Voltage				
Range	0~100V			
Resolution	Same as Voltage Meter			
Accuracy	Same as Voltage Meter			
General				
Short Circuit				
Current	120A	180A	240A	300A
Temperature Coefficient	100ppm/°C(typical)			
Power	200Wmax	300Wmax	400Wmax	500Wmax
Operating Temperature	0~40°C			
Dimension(HxWxD)	354 x 440 x 445 mm/ 13.94x17.3x17.5 inch	531 x 440 x 445 mm/ 20.91x17.3x17.5 inch	708 x 440 x 445 mm/ 27.88x17.3x17.5 inch	885 x 440 x 445 mm/ 34.85x17.3x17.5 inch
Weight	47.2 kg / 104.06 lbs	78.9 Kg / 173.95 lbs	94.4 kg / 208.12 lbs	118 Kg / 260.15 lbs
Safety & EMC	CE			

33621F Series (2)

Model	33625F	33626F	33627F
Power	10800W	12600W	14400W
Current	0~360A	0~420A	0~500A
Voltage	0~500V	0~500V	0~500V
Min. Operating Voltage	6V @ 360A	6V @ 420A	6V @ 500A
Constant Current Mode			
Range ^{*1}	0~36A/360A	0~42A/420A	0~50.04A/500.4A
Resolution	0.6mA/6mA	0.7mA/7mA	0.834mA/8.34mA
Accuracy	± 0.1% OF (Setting + Range)		
Constant Resistance Mode			
Range	0.0277~1.6670~100KΩ	0.0238~1.4290~85.71KΩ	0.02~1.2~72KΩ
Resolution	0.0277mΩ/0.01mS	0.0238mΩ/0.0116mS	0.02mΩ/0.0138mS
Accuracy	± 0.2% OF (Setting + Range)		
Constant Voltage Mode			
Range	60V/500V		
Resolution	1mV/10mV	1mV/10mV	1mV/10mV
Accuracy	± 0.05% OF (Setting + Range)		
Constant Power Mode			
Range	0~1080W/10800W	0~1260W/12600W	0~1440W/14400W
Resolution	18mW/180mW	21mW/210mW	24mW/240mW
Accuracy	± 0.5% OF (Setting + Range)		
Dynamic Mode -CC			
Timing			
Thigh & Tlow	0.050~9.999 / 99.99 / 999.9 / 9999mS		
Resolution	0.001 / 0.01 / 0.1 / 1mS		
Accuracy	1uS/10uS/100uS/1mS + 50ppm		
Slew rate	0.0288A~1.8A/uS 0.288A~18A/uS	0.0336A~2.1A/uS 0.336A~21A/uS	0.04A~2.5A/uS 0.4A~25A/uS
Resolution	0.0072/0.072A/uS	0.0084/0.084A/uS	0.01/0.1A/uS
Accuracy	(5% of setting) ± 10 uS		
Min. Rise Time	20uS(typical)		
Current			
Range ^{*2}	0~36A/360A	0~42A/420A	0~50.04A/500.4A
Resolution	0.6mA/6mA	0.7mA/7mA	0.834mA/8.34mA
Accuracy	± 0.1% OF (Setting + Range)		
Measurement			
Voltage Read Back			
Range (5 Digital)	0~60V/600V		
Resolution	0.001V/0.01V		
Accuracy	± 0.025% OF (Reading + Range)		

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Current Read Back			
Range (5 Digital)	0~36A/360A	0~42A/420A	0~50.04A/500.4A
Resolution	0.6mA/6mA	0.7mA/7mA	0.834mA/8.34mA
Accuracy	± 0.1% OF (Reading + Range)		
Power Read Back			
Range (5 Digital)	0~1080W/10800W	0~1260W/12600W	0~1440W/14400W
Resolution	0.1W		
Accuracy	± 0.125% OF (Reading + Range)		
Program mode(Mainframe)			
Sequence No.	F1~9/16 Steps		
T1/T2 (Dwell)	0.1S~9.9S/Repeat 9999		
Load Setting(External Programming)	0~10V for CC mode F.S.		
GO/NG Check	Voltage/Current/Power		
Protections			
Over Power	105% of Rated Power		
Over Current	105% of Rated Current		
Over Voltage	105% of Rated Voltage		
Over Temp.	Yes		
Interface(Mainframe)			
RS-232	Optional		
GPIB	Optional		
USB	Optional		
Ethernet	Optional		
RS232 + GPIB	Optional		
Others			
Load ON Voltage			
Range	0.4~100.0V		
Resolution	0.4V		
Accuracy	1% of Setting + 2.5V		
Load OFF Voltage			
Range	0~100V		
Resolution	Same as Voltage Meter		
Accuracy	Same as Voltage Meter		
General			
Short Circuit			
Current	360A	420A	500.4A
Temperature Coefficient	100ppm/°C(typical)		
Power	600Wmax	700Wmax	800Wmax
Operating Temperature ²	0~40°C		
Dimension(HxWxD)	1062 x 440 x 445 mm/ 41.82x17.3x17.5 inch	1239 x 440 x 445 mm/ 48.79x17.3x17.5 inch	1416 x 440 x 445 mm/ 55.76x17.3x17.5 inch
Weight	141.6 kg / 312.18 lbs	165.2 kg / 364.21 lbs	188.8 kg / 416.24 lbs
Safety & EMC	CE		

33671F Series

Model	33671F	33672F	33673F	33674F	33675F
Power	3600W	5400W	7200W	9000W	10800W
Current	0~24A	0~36A	0~48A	0~60A	0~72A
Voltage	0~500V	0~500V	0~500V	0~500V	0~500V
Min. Operating Voltage	6V @ 24A	6V @ 36A	6V @ 48A	6V @ 60A	6V @ 72A
Constant Current Mode					
Range ¹	0~2.4A/24A	0~3.6A/36A	0~4.8A/48A	0~6A/60A	0~7.2A/72A
Resolution	0.04mA/0.4mA	0.06mA/0.6mA	0.08mA/0.8mA	0.1mA/1mA	0.12mA/1.2mA
Accuracy	± 0.1% OF (Setting + Range)				
Constant Resistance Mode					
Range	0.4166~25~1500KΩ	0.2777~16.667~1000KΩ	0.2083~12.5~750KΩ	0.1666~10~600KΩ	0.1388~8.3330~500KΩ
Resolution	0.4166mΩ/0.6666uS	0.2777mΩ/1uS	0.2083mΩ/1.3333uS	0.1666mΩ/1.6666uS	0.1388mΩ/2uS
Accuracy	± 0.2% OF (Setting + Range)				
Constant Voltage Mode					
Range	60V/500V				
Resolution	1mV/10mV	1mV/10mV	1mV/10mV	1mV/10mV	1mV/10mV
Accuracy	± 0.05% OF (Setting + Range)				
Constant Power Mode					
Range	0~360W/3600W	0~540W/5400W	0~720W/7200W	0~900W/9000W	0~1080W/10800W
Resolution	6mW/60mW	9mW/90mW	12mW/120mW	15mW/150mW	18mW/180mW
Accuracy	± 0.5% OF (Setting + Range)				
Dynamic Mode -CC					
Timing					
Thigh & Tlow	0.050~9.999 / 99.99 / 999.9 / 9999mS				
Resolution	0.001 / 0.01 / 0.1 / 1mS				
Accuracy	1uS/10uS/100uS/1mS + 50ppm				
Slew rate	1.92mA~120mA/uS 19.2mA~1200mA/uS	2.88mA~180mA/uS 28.8mA~1800mA/uS	3.84mA~240mA/uS 38.4mA~2400mA/uS	4.8mA~300mA/uS 48mA~3000mA/uS	5.76mA~360mA/uS 57.6mA~3600mA/uS
Resolution	0.48/4.8mA/uS	0.72/7.2mA/uS	9.6/96mA/uS	1.2/12mA/uS	1.44/14.4mA/uS
Accuracy	(5% of setting) ± 10 uS				
Min. Rise Time	20uS(typical)				
Accuracy					
Range ²	0~2.4A/24A	0~3.6A/36A	0~4.8A/48A	0~6A/60A	0~7.2A/72A
Resolution	0.04mA/0.4mA	0.06mA/0.6mA	0.08mA/0.8mA	0.1mA/1mA	0.12mA/1.2mA
Accuracy	± 0.1% OF (Setting + Range)				
Measurement					
Voltage Read Back					
Range (5 Digital)	0~60V/600V				
Resolution	0.001V/0.01V				
Accuracy	± 0.025% OF (Reading + Range)				

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Current Read Back					
Range (5 Digital)	0~2.4A/24A	0~3.6A/36A	0~4.8A/48A	0~6A/60A	0~7.2A/72A
Resolution	0.04mA/0.4mA	0.06mA/0.6mA	0.08mA/0.8mA	0.1mA/1mA	0.12mA/1.2mA
Accuracy	± 0.1% OF (Reading + Range)				
Power Read Back					
Range (5 Digital)	0~360W/3600W	0~540W/5400W	0~720W/7200W	0~900W/9000W	0~1080W/10800W
Resolution	0.1W				
Accuracy	± 0.125% OF (Reading + Range)				
Program mode(Mainframe)					
Sequence No.	F1~9/16 Steps				
T1/T2 (Dwell)	0.1S~9.9S/Repeat 9999				
Load Setting(External Programming)	0~10V for CC mode F.S.				
GO/NG Check	Voltage/Current/Power				
Protections					
Over Power	105% of Rated Power				
Over Current	105% of Rated Current				
Over Voltage	105% of Rated Voltage				
Over Temp.	Yes				
Interface(Mainframe)					
RS-232	Optional				
GPIB	Optional				
USB	Optional				
Ethernet	Optional				
RS-232 + GPIB	Optional				
Others					
Load ON Voltage					
Range	0.4~100.0V				
Resolution	0.4V				
Accuracy	1% of Setting + 2.5V				
Load OFF Voltage					
Range	0~100V				
Resolution	Same as Voltage Meter				
Accuracy	Same as Voltage Meter				
General					
Short Circuit					
Current	12A	36A	48A	60A	72A
Temperature Coefficient					
	100ppm/°C(typical)				
Power					
	200Wmax	300Wmax	400Wmax	500Wmax	600Wmax
Operating Temperature ²					
	0~40°C				
Dimension(HxWxD)					
	354 x 440 x 445 mm/ 13.94x17.3x17.5 inch	531 x 440 x 445 mm/ 20.91x17.3x17.5 inch	708 x 440 x 445 mm/ 27.88x17.3x17.5 inch	885 x 440 x 445 mm/ 34.85x17.3x17.5 inch	1062 x 440 x 445 mm/ 41.82x17.3x17.5 inch
Weight					
	47.2 Kg/104.06 lbs	70.8 Kg/156.09 lbs	94.4 kg / 208.12 lbs	118 Kg/260.15 lbs	141.6 Kg/312.18 lbs
Safety & EMC					
	CE				

Table 1-1 33611F Series Specifications

Chapter 2 Installation

2-1. Inspection

The 33611F high power load was carefully inspected before shipment. If instrument damage has occurred during transport, please inform Prodigit's sales and service office or representative.

Your 33611F high power load was shipped with a power cord for the type of outlet used at your location. If the appropriated cord was not included, please contact your nearest Prodigit sales office to obtain the correct cord. Refer to "check line voltage "to check the line voltage selection and fuse type.

2-2. Check line voltage

The 33611F Series high power load can operation with 115, 230Vac input as indicated on the label on the rear panel.

Make sure that the factory check mark corresponds to your nominal line voltage. Skip this procedure if the label is corrected marked.

- 2-2-1 With the 33611F Series load power OFF, disconnect the power cord.
- 2-2-2 Refer the drawing on the rear panel of 33611F Series high power load in Fig 2-1, set the switches to the proper voltage as describe in the following:

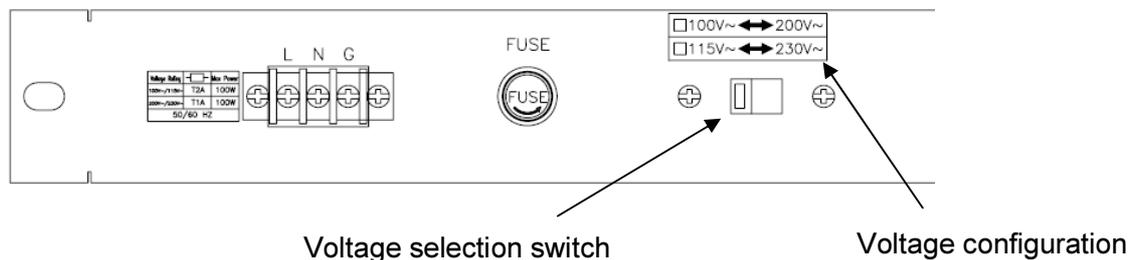


Fig 2-1 SET OF SWITCH

2-3. Fuse Exchange

This product has the power fuse, and exchanges it according to the following procedure.



CAUTION

Never fail to turn off the power of this product, and disconnect the plug of the AC Power cable.



To avoid the fire or electronic shock, the Fuse that will be used in the product should have the safety standard in the area of the region you use. Any use of improper Fuse or shorting the Fuse holder would be extremely dangerous and would be strictly prohibited.

- Before exchanging the Fuse, if there are abnormal odor or abnormal noise,
- Please stop using immediately and ask for the repair.

2-3-1 Check the rating of the line fuse and replace it with the correct fuse if necessary.

2-3-2 The AC line fuse is located below the AC line receptacle see Fig 2-2. Use a small screwdriver to extract the fuse holder, to change a new one. Change an appropriate specification fuse which indicated Table 2-1.

2-3-3 Reinstall fuse holder and connect the power cord.

	1Master + 1Slave	1Master + 2Slave	1Master + 3Slave	1Master + 4Slave	1Master + 5Slave	1Master + 6Slave	1Master + 7Slave
AC110V/ AC115V	T4A/250V (5*20mm)	T4A/250V (5*20mm)	T6A/250V (5*20mm)	T6A/250V (5*20mm)	T8A/250V (5*20mm)	T8A/250V (5*20mm)	T10A/250V (5*20mm)
AC200V/ AC230V	T2A/250V (5*20mm)	T2A/250V (5*20mm)	T4A/250V (5*20mm)	T4A/250V (5*20mm)	T4A/250V (5*20mm)	T4A/250V (5*20mm)	T6A/250V (5*20mm)

Table 2-1 33611F Series Fuse Specifications

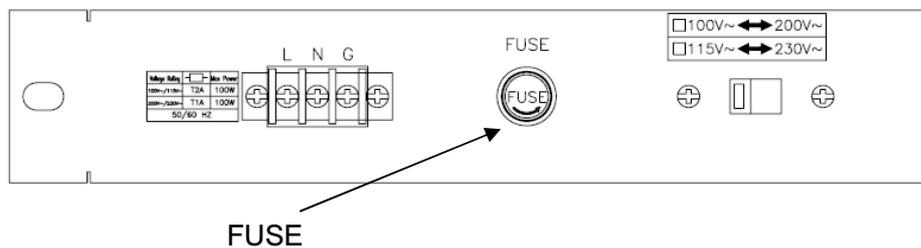


Fig 2-2 FUSE RECEPTACLE

2-4 Grounding requirements



SHOCK HAZARD

1. It is requested to use the 3Pin plug connector only for 33611F mainframe to out of danger when electric leakage. And the complete and proper grounded is necessary.
2. The 33611F Series high power load is equipped with three conductor cable which plugs in an appropriate receptacle to ground the instrument's cover.

2-5. Environmental requirements

- For indoor use only
- installation Category I
- Pollution Degree 2
- Altitude up to 2000 meters
- Relative Humidity 80% RH Max

2-6. Observe the International Electrical Symbol listed below

 Warning ! Risk of electric shock.

 Caution ! Refer to this manual before using the meter.

2-7. Cleaning

To clean this product, use a soft or wet cloth.



- Before you clean this product, power this product off and disconnect the power plug.
- Please do NOT use any organic solvent capable of changing the nature of the plastic such as benzene or acetone.
- Please pay attention that any liquid should not be penetrated into this product.

2-8. Power Up

Operation check

- 2.8.1 Turn off (O) the POWER switch
- 2.8.2 Check that the power cord is corrected.
- 2.8.3 Check that nothing is connected to the DC INPUT (load input terminal) on the front and rear panels.

2-9. Connection to the load Input Terminal on the Rear Panel

Connection procedure of the load input terminal on the rear panel

- 2.9.1 Turn off POWER switch.
- 2.9.2 Check that the output of the equipment under test is off.
- 2.9.3 Connect the load wire to the load input terminal on the rear panel.
- 2.9.4 Check the polarity of the connection and connect the load wire to the output terminal of the equipment under test.

2-10. Repair

If the instrument is damaged, please attach a tag to the instrument to identify the owner and indicated the require service or repairing. And inform the Prodigit sales and service office or representative.

2-11. GPIB connection Option

The GPIB connector is on the rear panel which to connect the 33611F mainframe to the controller and other GPIB devices. An GPIB system can be connected in any configuration (star, linear, or both) as long as

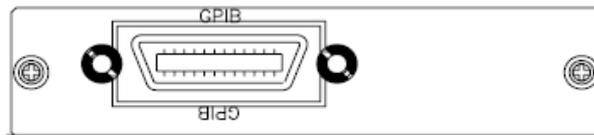


Fig 2-3 33611F Series GPIB Rear panel

2-12. RS-232C Connection Option

Fig 2-4 shows the RS-232C connector (Female) on the rear panel connects 33611F mainframe to RS-232C port of computer in one by one configuration .The RS-232C BAUD-RATE can be set in the front panel, it will be lit the GPIB address when press the "SYSTEM" button. Press it again, it will be lit the BAUD-RATE.



Fig 2-4 33611F Series Rs-232 Rear panel

2-13. USB Connection Option

Fig 2-5 shows the USB connector in the rear panel of 33611F mainframe. Please refer Appendix B.



Fig 2-5 33611F Series USB Connection Rear panel

2.14. LAN Connection Option

Fig 2-6 shows the LAN connector in the rear panel of 33611F mainframe. Please refer Appendix C.



Fig 2-6 33611F Series LAN Connection Rear panel

2.15. RS232 + GPIB Connection Option

- 2.15.1 GPIB + RS-232C connector is on the rear panel of 33611F Series mainframe for application GPIB , or RS-232C.
- 2.15.2 GPIB and RS-232C interface can only be used at the same time, to Change the interface must be reboot unit.
- 2.15.3 GPIB connection with three important limitations as Described below:
 - 2.15.3.1 The maximum number of devices including the controller is no more than 15.
 - 2.15.3.2 The maximum length of all cable in no more than 2 meters times the number of devices connected together, up to 20 meters maximum.
 - 2.15.3.3 RS-232C connections on the rear panel, the connecting Device and the computer RS-232C port to pin to pin connection. (Note: Don't 2-wire connection, the detail as 4-2).

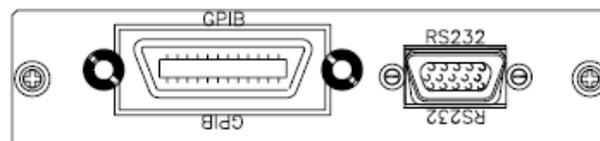


Fig 2-7 33611F Series RS232+GPIB Connection Rear pane

2-16. Analog programming Terminal input

The connector on the rear panel connects.

The 0 to 10V Analog signal can program the 0 to full scale input range in the CC mode (0 to 8.04A range when load current setting is less than 8.04A, or 0 to 80.4A range when load current setting is higher than 8.04A) or in the CP mode (0 to 240W range when load power setting is less than 240W, or 0 to 2400W range when load power setting is higher than 240W). The analog programming signal can act alone or it can be summed with the programmed value via GPIB, RS-232,USB,LAN or the front panel. Fig 2-8 shows the analog programming signal (4 Vac, 500Hz) is summed with the 32.16A programmed setting in CC mode of 33611F Load.

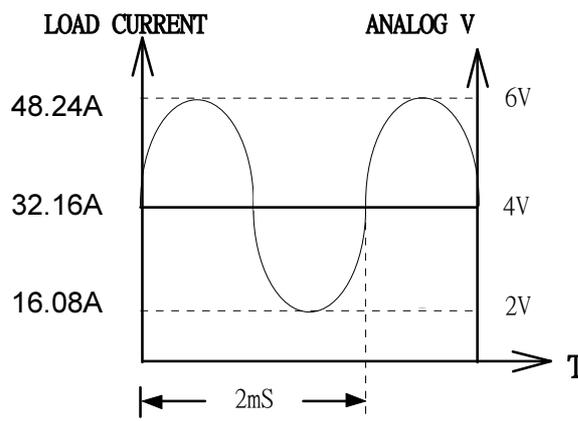


Fig 2-8 Analog programming load current in CC mode operation

2-17. Load current slew rate setting

What is the load current slew rate during load current level change, power supply turn ON/OFF switch between ON, and OFF? The 33611F Electronic load provides all of the above load current slew rate in controllable condition, the rise and fall current slew rate can be set independently from front panel operation or remote programming.

The slew rate determines a rate at which the current changes to a new programmed value. The slew rate can be set at the front panel or via GPIB on the rear panel of 33611F high power load.

The rise and fall slew rate can be independently programmed from 64mA/usec to 4000mA/usec (33611F Load) in the 80.4A current range and from 6.4mA/usec to 400mA/usec in the 8.04A current range. This allows a independent controlled transition from Low load current level to High load current level (Rise current slew rate) or from High load current level to Low load current level(Fall current slew rate) to minimize induced voltage drops on the inductive wiring, or to control induced transients on the est. device (power supply transient response testing).

This controllable load current slew rate feature also can eliminate the overload current phenomenon and emulate the actual load current slew rate at turn ON the power supply under test. Fig 2-9 shows the load current slew rate is according to the power supply's output voltage, load level setting and Load ON/OFF switch. So, you could do all items of power

supply testing task by using Constant current mode only, it can significantly improve the testing quality and process as well as efficiency.

There are two load current range in 33611F Load, Range I and Range II, the slew rate of range I, range II, RISE/FALL slew rate are listed in chapter 1-5 specifications.5.

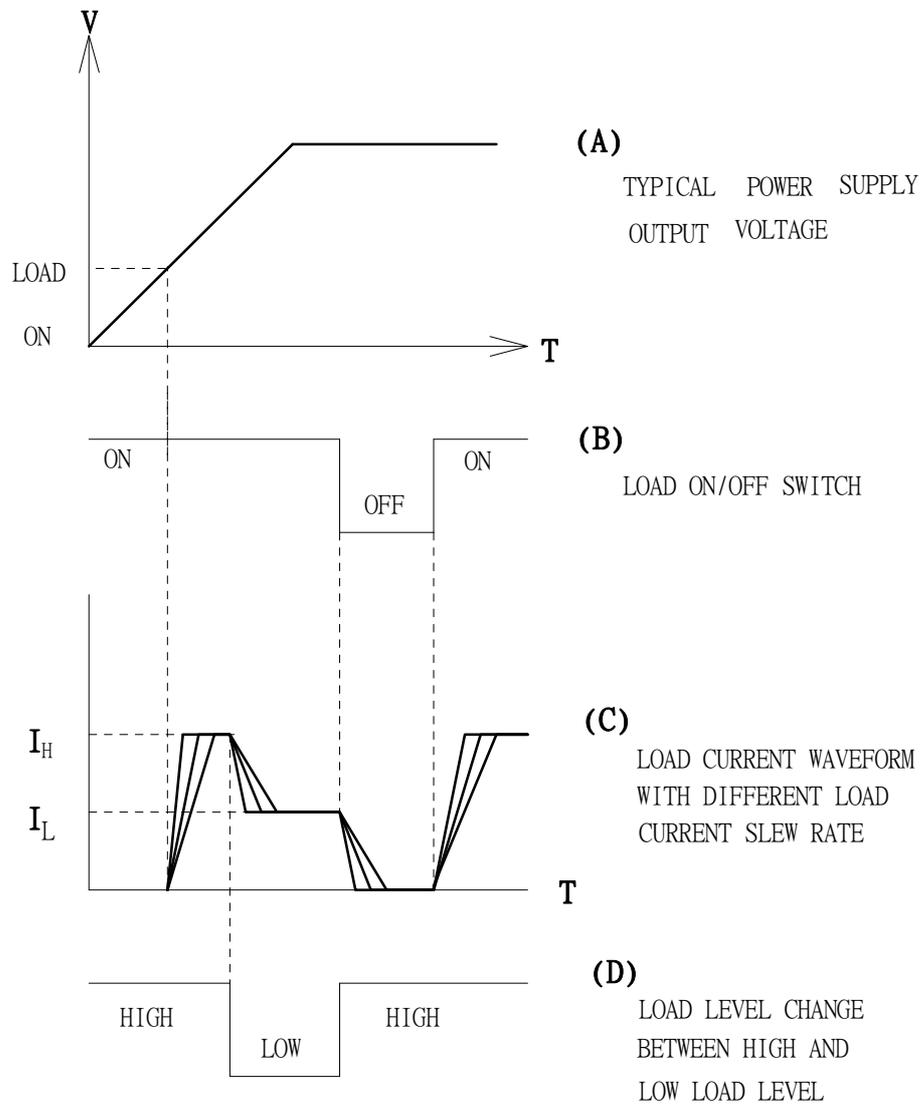


Fig 2-9 The relationship of load current load ON/OFF, load level and output voltage of DC power supply at turn ON

2-18. Emergency stop and Alarm

33611F series electronic load provided emergency stop signal input and alarm signals output interface on the Rear panel, connector to be D-sub25 Pin female port, Emergency stop signal and Alarm signal are isolated.

The emergency stop signal is active low, when emergency stop signal goes to low, the 33611F Series Load will go to load “off” immediately.

The Alarm signal is active low, when any one protection active (OVP, OCP, OPP, OTP), and this time the load will go to load “off” immediately.

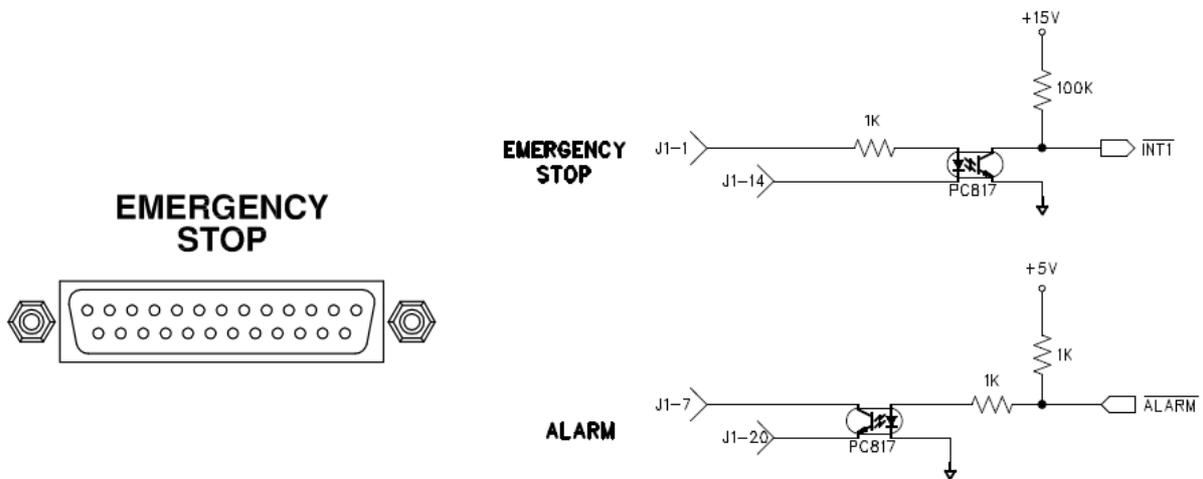


Fig 2-11 Emergency stop controller Connection

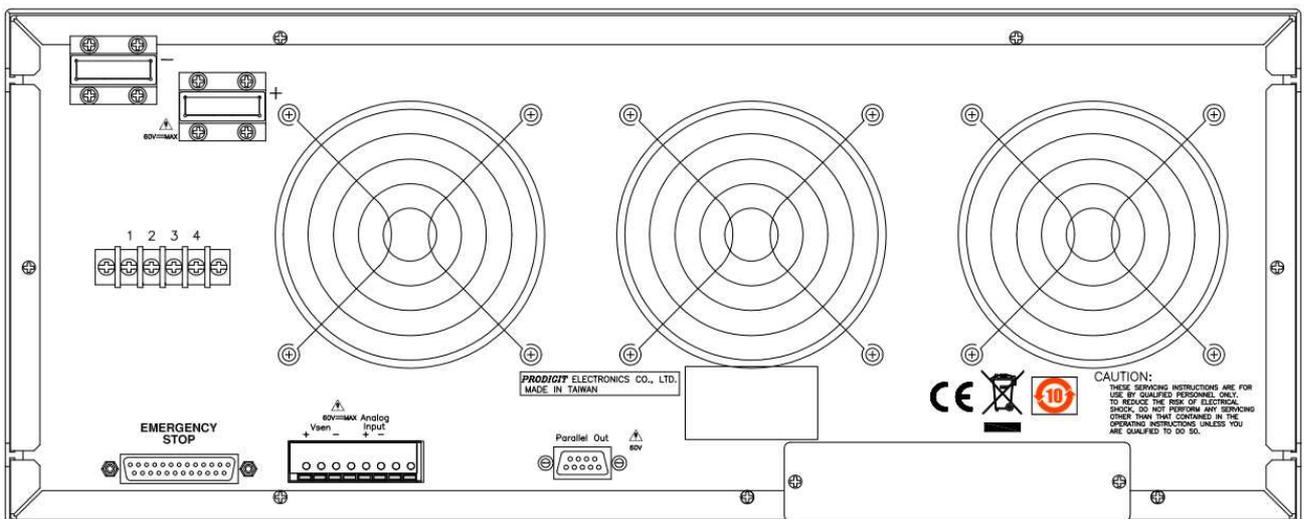


Fig 2-12 33501F series Rear panel

Chapter 3 Operation

This chapter describes the front panel function and operation of each 33611F Series load, the memory Store/Recall, GPIB/RS-232/LAN/USB remote programming are described in the mainframe operation manual. Please refer to the mainframe's operation manual for mainframe store/recall and GPIB/RS-232/LAN/USB programming.

3-1. Front panel description(1)

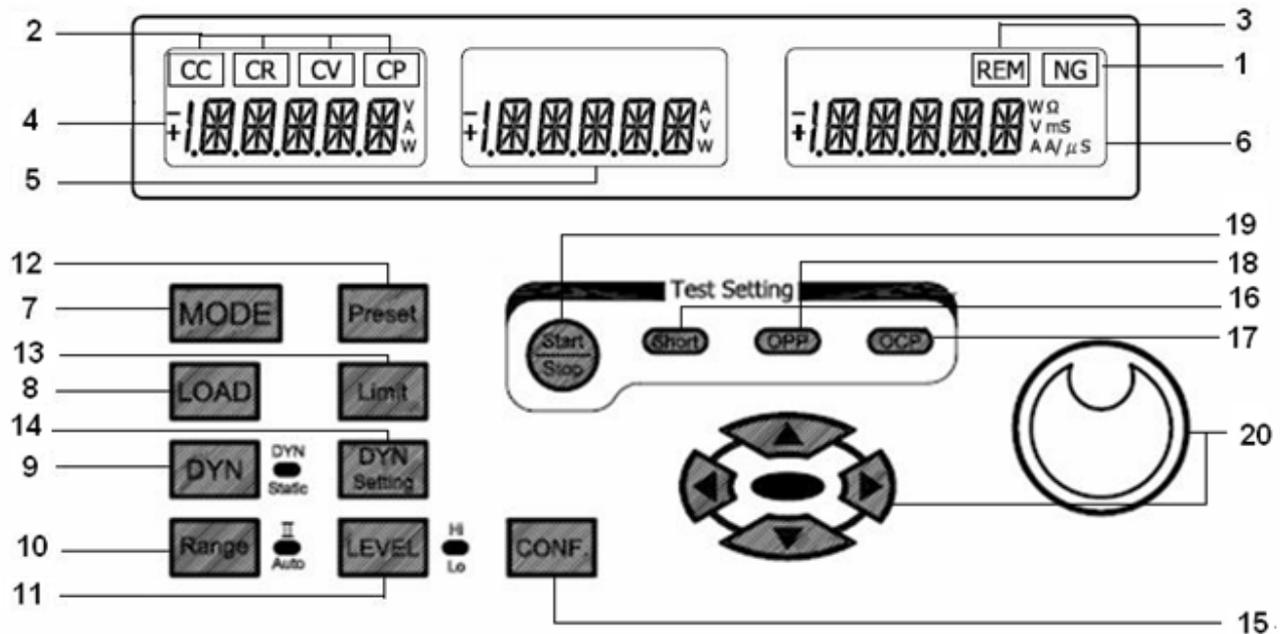


Fig 3-1 33611F Series High Power Front Panel

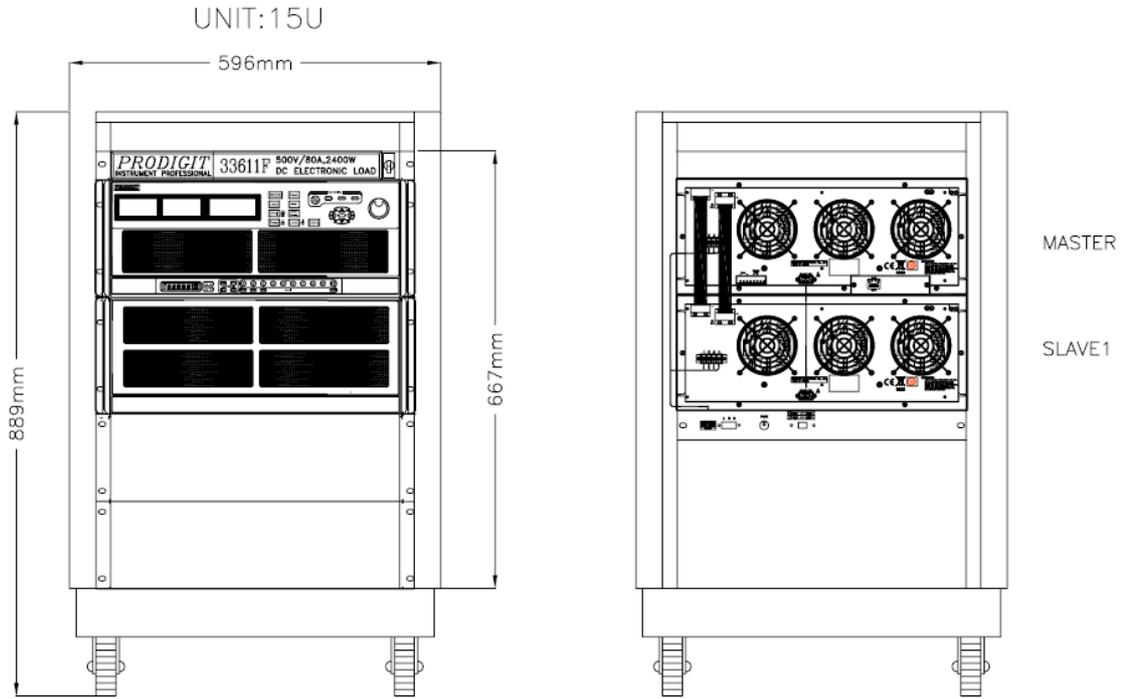


Fig 3-2 33611F Series High Power electronic load

3.1.1 NG Indicator

When the reading of Vmeter, Ameter, Watt meter exceeds the upper or lower limit set, this indicator will display.

3.1.2 MODE and CC, CR, CV, CP Indicator

There are four operating modes can be selected by press the " MODE " key on the 33611F Electronic Load .

The sequence is Constant Current (CC), Constant Resistance (CR), Constant Voltage (CV), Constant Power (CP) and then repeat while press the" MODE " key, the CC, CR, CV, CP mode indicator will be lit respectively when the appropriate operating mode is selected.

The operating theorem of CC, CR, CV and CP mode is described in Chapter 1-1, and the application information is described in Chapter 5-3, 5-4, 5-5 and 5-6 respectively.

There are two programming ranges in CC, CR, CV and CP mode respectively, the 33611F can adjust to the best fit range automatically according to the programmed load level. The rule is described below:

3.1.2.1 In Constant Current mode:

The Range I (8A) indicates low load current operating range, Range II (80A) indicated high load current operating range, the detail specification of range load current is listed on the Table 1-1, the current range is changed automatically in accordance to the programmed load current.

The range 1 is selected automatically if the programmed load current is less than the maximum current of range 1 (8A), and will set to range II automatically when the programmed current is higher than the maximum current of range 1 (8A).

3.1.2.2 In Constant Resistance mode:

Range I indicates low load resistance operating range, Range II indicates high load resistance operating range, the detail resistance range specifications is shown in table 1-1. The resistance range is changed automatically in accordance to the programmed load resistance.

The 33611F electronic load will set to range 1 automatically if the programmed load resistance is higher than the minimum load resistance of range 1, and will set to range II when the programmed load resistance is lower than the minimum load resistance of range 1.

3.1.2.3 In Constant Voltage mode:

Range I indicates low load voltage operating range, Range II indicates high load voltage operating range, the detail voltage range specifications is shown in table 1-1. The voltage range is changed automatically in accordance to the programmed load voltage.

The range 1 is selected automatically if the programmed load voltage is less than the maximum voltage of range 1 (60V), and will set to range II automatically when the programmed voltage is higher than the maximum voltage of range 1 (60V).

3.1.2.4 In Constant Power mode:

Range I indicates low load power operating range, Range II indicates high load power operating range, the detail power range specifications is shown in table 1-1. The power range is changed automatically in accordance to the programmed load power.

The range 1 is selected automatically if the programmed load power is less than the maximum power of range 1 (240W), and will set to range II automatically when the programmed power is higher than the maximum power of range 1 (240W).

3.1.3 Remote LCD Indicator

The Remote LCD Indicator is used to indicate the status of remote operation, all of the front panel operation can not be operated while Remote LCD is ON, in case of Local mode or manual operation, the Remote LCD is OFF.

3.1.4 Right 5 digit LCD display

The 5 digit LCD display is a multi-function display, the functions are described below:
Normal mode:

There is a 5 digit DVM display, display measuring data of the DC input terminal or V-sense input terminal if V-sense AUTO is programmed, or the 5 digit voltage meter displays the voltage of V-sense input terminal if V-sense ON is programmed.

When the auto-sense of V-sense function is programmed, the auto-sense circuit of 33611F electronic load can check the V-sense cable is connected or not, the V-

sense input is detected if it is greater than 7.0V (33611F,) or not, if yes then the 5 digit DVM measures the sense input, otherwise, the 5 digit DVM measures the DC input terminals of the load.

Test Setting Mode:

Short : Short test Enable and Short Setting programming : Display will show "Short".

OPP : OPP test Enable and OPP Setting programming : Display will show "OPP".

OCP : OCP test Enable and OCP Setting programming : Display will show "OCP".

Short testing \ OCP testing and OPP testing programming, will show Vsense's voltage or load Input voltage.

3.1.5 Middle 5 digit LCD display

Normal mode:

There is a 5 digit DAM display. The 5 digit DAM displays the measuring current of the DC load When Load ON programming.

Setting Mode:

- 3.1.5.1 Config ON programming: Display will individually show "SENSE", "LDon", "LDoFF" and "POLAR".
- 3.1.5.2 Limit ON programming : Display will individually show "V_Hi", "V_Lo", "A_Hi", "A_Lo", "W_Hi", "W_Lo" and "NG".
- 3.1.5.3 DYN setting ON programming : Display will individually show "T-Hi", "T-Lo", "RISE" and "FALL".
- 3.1.5.4 Short test Enable \ OCP test Enable and OPP test Enable programming: Display will individually show 「PRESS」.
- 3.1.5.5 Short setting programming : Display will individually show "TIME", "V-Hi" and "V-Lo".
- 3.1.5.6 OPP setting programming : Display will individually show "PSTAR", "PSTEP", "PSTOP" and "VTH".
- 3.1.5.7 OCP setting programming : Display will individually show "ISTAR", "ISTEP", "ISTOP" and "VTH".
- 3.1.5.8 Short testing programming, the current of actual load current, the unit is "A".
- 3.1.5.9 OCP testing programming, the setting current , the unit is "A".
- 3.1.5.10 OPP testing programming, the setting watt , the unit is "W"
- 3.1.5.11 When Over current protect : Display will show 「OCP」.

3.1.6 Left 5 digit LCD display

Normal mode : The left 5 digit LCD display is show load Consumption duty.

Setting Mode: Setting value is by rotating knob switch.

- 3.1.6.1 PRESET ON mode display will individually show :
 - 3.1.6.1.1 CC mode's current programming value display, the unit is "A".
 - 3.1.6.1.2 CR mode's resistor programming value display, the unit is "Ω"
 - 3.1.6.1.3 CV mode's voltage programming value display, the unit is "V".
 - 3.1.6.1.4 CP mode's power programming value display, the unit is "W".
- 3.1.6.2 LIMIT ON mode display will individually show :
 - 3.1.6.2.1 V_Hi(upper limit voltage) & V_Lo(lower limit voltage) value display, the unit is "V".
 - 3.1.6.2.2 A_Hi(upper limit current) & A_Lo(lower limit current) value display, the unit is "A"

- 3.1.6.2.3 W_Hi(upper limit power) & W_Lo(lower limit power) value display, the unit is "W"
- 3.1.6.2.4 NG programming display will show 「 ON 」 or 「 OFF 」 .
- 3.1.6.3 DYN setting ON mode display will individually show :
- 3.1.6.3.1 T-Hi(level high time)& T-Lo(level low time) programming value display, the unit is "ms".
- 3.1.6.3.2 Rise/Fall current slew rate programming value display, the unit is "(m)A/us".
- 3.1.6.4 Config ON mode display will individually show:
- 3.1.6.4.1 SENSE programming display will show 「 ON 」 or 「 AUTO 」 .
- 3.1.6.4.2 LDon & LDoFF value display, the unit are "V".
- 3.1.6.4.3 Load polarity value display will show 「 +LOAD 」 or 「 -LOAD 」 .
- 3.1.6.5 Short test Enable、OCP test Enable and OPP test Enable mode will show 「 START 」 .
- 3.1.6.6 Short Setting mode
- 3.1.6.6.1 Short setting display will show "CONTI", Short time setting; the unit is "ms".
- 3.1.6.6.2 V-Hi & V-Lo value display, the unit is "V".
- 3.1.6.7 OPP Setting mode
- 3.1.6.7.1 OPP PSTAR、OPP PSTEP and OPP PSTOP value display, the unit is "W".
- 3.1.6.7.2 OPP Vth value display, the unit is "V".
- 3.1.6.8 OCP Setting mode
- 3.1.6.8.1 OCP ISTAR, OCP ISTEP and OCP ISTOP value display, the unit is "A".
- 3.1.6.8.2 OCP VTH value display, the unit is "V".
- 3.1.6.9 OCP test & OPP test mode display will show 「 RUN 」
- 3.1.6.10 When Over power protect : Display will show 「 OPP 」 .
- 3.1.6.11 When Over temperature protect : Display will show 「 OTP 」 .

3.1.7 MODE and CC, CR, CV, CP Indicator

There are four operating modes can be selected by press the " MODE " key on the 33611F Electronic Load.

The sequence is Constant Current (CC), Constant Resistance (CR), Constant Voltage (CV), Constant Power (CP) and then repeat while press the" MODE " key, the CC, CR, CV, CP mode indicator will be lit respectively when the appropriate operating mode is selected.

3.1.8 LOAD ON/OFF key and LED

The 33611F Electronic Load input can be toggled ON/OFF at the front panel's LOAD ON/OFF key. The load current slew rate change uses the slew rate setting, so the load current slew rate will change at the programmed Rise/Fall slew rate setting respectively.

Turning the LOAD OFF does not affect the programmed settings. The LED is OFF to indicate LOAD OFF status. The LOAD will return to the previously programmed values when the LOAD key is turned to ON again.

The Load ON LED indicates the 33611F electronic load is ready to sink current from DC input.

- 3.1.8.1 Load ON/OFF key: Switch load ON to load OFF in the load, the fall slew rate is according to the slew rate setting on the front panel.
- 3.1.8.2 DC input voltage: There is a load ON and load OFF voltage control circuit in 33611F electronic load.

When the Device under Test turns ON, the output voltage of D.U.T will increase up from 0 to rated output voltage. The 33611F electronic load will start to sink current after load voltage is higher than load ON voltage setting within the Config key.

The programmed load ON voltage for model 33611F load is from 0.4 to 100V.

When the Device under Test turns OFF, the output voltage of D.U.T will decrease down to 0 volt. The 33611F electronic load will stop to sink current after load voltage is lower than load OFF voltage setting within the Config key.

The programmed load OFF voltage for model 33611F load is from 0 to load ON voltage.

3.1.9 DYN / STA key and LED

This Key is available in Constant Current and Constant Power mode only. In Constant Resistance and Constant Voltage mode, there is no any function in this key and the LED is OFF, the 33611F load will automatically adjust to static mode. In Constant Current and Constant Power mode, the Static or Dynamic mode is toggled by this key; the LED will be lit at Dynamic mode.

3.1.10 Range key and LED

Range AUTO / II Key is for range setting, if Range AUTO LED is OFF, load will setting to Range I or II in accordance with the actual current value. When Range II, LED will ON, the current programming will setting to Range II .

Note: Coercion Range II only in CC Mode.

3.1.11 LEVEL key and LED

In the dynamic mode of Constant Current mode, there is no any effect to the 33611F load although the LED can be indicated the High or Low level in the Static mode. The only fact is switching the 33611F load from Dynamic load to Static load; it can determine the load current is High or Low load current level.

3.1.11.1 In Constant Current mode:

The level is initial setting on High, LEVEL High / Low has two level, Low current level setting must be lower than Level High.

3.1.11.2 In Constant Resistance mode:

The level is initial setting on High, LEVEL High / Low has two level, Low resistance level setting must be higher than Level High.

P.S. : CR Mode Level High / Low level by current perspectives.

3.1.11.3 In Constant Voltage mode:
The level is initial setting on High, LEVEL High / Low has two level, Low voltage level setting must be lower than Level High.
P.S. : CV Mode Level High / Low has "automatic push function".

3.1.11.4 In Constant Power mode:
The level is initial setting on High, LEVEL High / Low has two level, Low power level setting must be lower than Level High.

P.S Automatically Push Function
Level setting, Level High must be higher or equal than Level Low; When Level High equal to than LEVEL Low, it can not be adjusted anymore.

when Level High equals to lower low, the Automatic push function can push down the level Low value.
Therefore, the Level High can continue adjusting.

3.1.12 PRESET ON/OFF key and LED

At Preset OFF state, the load input voltage is shown on the right 5 digit Meter, and load input current is shown on the middle 5 digit Meter, the load input power is shown on the left 5 digit Meter, the engineering unit "V", "A" and "W" LCD will be lit respectively.

At Preset ON state, the PRES. LED is ON, the left 5 digit Meter will be affected by the CC, Dynamic, CR, CV, and CP operating mode.

In Preset ON condition, the 5 digit DAM indicates the setting load current which can be from front panel setting or remote system setting.

3.1.12.1 In Constant Current mode:
The High/Low level load current value can be preset at left 5 digit LCD display, the unit is "A", the "A" will be lit as well.

3.1.12.2 In Dynamic load mode:
The Thigh/Tlow parameters value of High/Low load current duration and Rise/Fall setting can be displayed on the left 5 digit LCD display, the unit is "ms", the "ms" will be lit as well.

3.1.12.3 In Constant Resistance mode:
The High/Low level load resistance value can be preset on the left 5 digit LCD display, the engineering unit is " Ω ", the " Ω " will be lit as well.

3.1.12.4 In Constant Voltage mode:
The High/Low level load voltage value can be preset on the right 5 digit LCD display, the unit is "V", the "V" will be lit as well.

3.1.12.5 In Constant Power mode:
The High/Low level load power value can be preset on the right 5 digit LCD display, the unit is "W", the "W" will be lit as well.

3.1.13 Limit key and LED

In the 33611F electronic load, the Limit key setting includes the GO/NG check of Digital Voltage meter Upper/Lower limit, Current meter

Upper/Lower limit, and Watt meter Upper/Lower limit within the Limit key setting. The setting sequence is shown below:

OFF → DVM Upper/Lower limit → DAM Upper/Lower limit → DWM Upper/Lower limit → GO/NG check ON/OFF → OFF → Repeat

3.1.14 DYN setting key and LED

DYN setting key is setting Dynamic Mode parameter, There are rise, fall, Thigh and Tlow parameters, Setting the parameter is rotating the knob switch. Press any key to escape the DYN parameters setting mode.

3.1.14.1 Press DYN setting key, LED will ON

3.1.14.2 Setting level High Period, Middle 5 digit LCD display will show "T-Hi" left 5 digit LCD display will show setting value , the unit is "ms".

3.1.14.3 Setting level Low period, Middle 5 digit LCD display will show "T-Lo", left 5 digit LCD display will show setting value , the unit is "ms".

3.1.14.4 Setting rises time , Middle 5 digit LCD display will show "RISE", left 5 digit LCD display will show setting value , the unit is "(m)A/us".

3.1.14.5 Setting fall time , Middle 5 digit LCD display will show "FALL", left 5 digit LCD display will show setting value , the unit is "(m)A/us".

3.1.15 Config key and LED

The Config key setting includes the Sense AUTO/ON, Load ON/OFF voltage and Load Polarity. The setting sequence is shown below.

OFF → SENSE AUTO/ON → Load ON/OFF Voltage → Polarity setting → OFF → Repeat

3.1.16 SHORT key and LED

3.1.16.1 Short test function Enable/Disable Key.

Press "SHORT" key to enable the short test function and the indicator LED is lit on. The LCD display show "SHORT" on right 5 digits LCD display, shows "PRESS" on middle 5 digits LCD display and shows "START" on left 5 digits LCD display.

3.1.16.2 Short test function parameter setting key.

There are 3 parameter for the SHORT test function. The parameter as TIME, V-Hi and V-Lo. Press "SHORT" key again to set short test time when SHORT test function is enabled. Press SHORT key again to next parameter by the sequence of TIME, V-Hi, V-Lo and disable, press another key to exit the setting and save the setting. The short test parameter description as following.

3.1.16.3 TIME : setting the short test time, The LCD display shows "SHORT", "TIME" and CONTI(initial) from right to left 5 digits LCD display, the setting range is "CONTI" means continue, 100ms to 10000ms, step 100ms by clockwise rotate the setting knob.

The short test will be no time limitation when setting to CONTI until press "START/STOP" key to stop the short test.

3.1.16.4 V-Hi : Short test voltage check upper limitation setting, The LCD display shows "SHORT", "V-Hi" and 0.00V(initial) from right to left 5 digits, the V-Hi setting range from 0.00 to 500.00 step 0.01V by rotating the setting knob.

- 3.1.16.5 V-Lo : Short test voltage check lower limitation setting, The LCD display shows "SHORT", "V-Lo" and 0.00V(initial) from right to left 5 digits, the V-Hi setting range from 0.00 to 500.00 step 0.01V by rotating the setting knob.

Note. The V-Hi and V-Lo parameter is difference with the V-Hi and V-Lo in the LIMIT function.

- 3.1.16.6 START/STOP Test key.

Press START/STOP key to start or stop the short test by SHORT test setting parameter when SHORT test function is enabled.

The Load will goes to "ON" automatically when press START/STOP key to start the short test and the Load will goes to "OFF" automatically when press START/STOP key to stop the short test. The Load will stay to "ON" if load was "ON" before short test.

The SHORT test function for test the UUT's short protection, The SHORT test will sink load's full scale current(33611F 80A) until to fit in with the test condition, and the UUT's drop voltage is between V_{Hi} and V_{Lo} limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

Press any key to goes to normal mode of LCD display.

- 3.1.17 OCP key and LED

- 3.1.17.1 OCP test function Enable/Disable Key.

Press " OCP" key to enable the OCP test function and the indicator LED is lit on. The LCD display show "OCP" on right 5 left LCD display, shows "PRESS" on middle 5 digits LCD display and shows "START" on left 5 digits LCD display.

- 3.1.17.2 OCP test function parameter setting key.

There are 4 parameter for the OCP test function. The parameter as ISTAR, ISTEP, ISTOP and V_{th}.

Press "OCP" key again to set OCP test parameter ISTAR(start current point) When OCP test function is enabled. Press OCP key again to next parameter by the sequence of ISTEP, ISTOP, V_{th} and disable, press another key also can to exit the setting and save the setting. The OCP test parameter description as following.

- 3.1.17.3 ISTAR : setting the start current point, The LCD display shows "OCP", "ISTAR" and 0.000A(initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

- 3.1.17.4 ISTEP : setting the increment step current point, The LCD display shows "OCP", "ISTEP" and 0.000A(initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

- 3.1.17.5 ISTOP : setting the stop current point, The LCD display shows "OCP",

“ISTOP” and 80.0AI(33611F initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

3.1.17.6 Vth : Setting threshold voltage; The LCD display shows “OCP”, “Vth” and 0.50VI(initial) from right to left 5 digits LCD display, the setting range is 0.00V to the full scale of the Voltage specification. The setting is by rotating the setting knob.

3.1.17.7 START/STOP Test key.

Press START/STOP key to start or stop the OCP test by OCP test setting parameter when OCP test function is enabled.

The Load will goes to “ON” automatically when press START/STOP key to start the OCP test and the Load will goes to “OFF” automatically when press START/STOP key to stop the OCP test. The Load will stay to “ON” if load was “ON” before OCP test.

The OCP test function for test the UUT's over current protection, The OCP test will start sink current from I-START to increase ISTEP current until the UUT's output voltage drop-out lower than the threshold voltage(V-th setting), and the OCP trip point is between A_Hi and A_Lo limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

Press any key to goes to normal mode of LCD display.

3.1.18 OPP key and LED

3.1.18.1 OPP test function Enable/Disable Key.

Press “ OPP” key to enable the OPP test function and the indicator LED is lit on. The LCD display show “OPP” on right 5 left LCD display, shows “PRESS” on middle 5 digits LCD display and shows “START” on left 5 digits LCD display.

3.1.18.2 OPP test function parameter setting key.

There are 4 parameter for the OPP test function. The parameter as PSTAR, PSTEP, PSTOP and Vth.

Press “OPP” key again to set OPP test parameter PSTAR(start power point) When OPP test function is enabled. Press OPP key again to next parameter by the sequence of PSTEP, PSTOP, Vth and disable, press another key also can to exit the setting and save the setting. The OPP test parameter description as following.

3.1.18.3 PSTAR : setting the start power, The LCD display shows “OPP”, “PSTAR” and 0.00WI(initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.

3.1.18.4 PSTEP : setting the increment step power, The LCD display shows “OPP”, “PSTEP” and 0.00WI(initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.

3.1.18.5 PSTOP : setting the stop power, The LCD display shows “OPP”, “PSTOP” and 2400.0W(33611F initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.

3.1.18.6 Vth : Setting threshold voltage; The LCD display shows “OPP”, “Vth” and 0.50V(initial) from right to left 5 digits LCD display, the setting range is 0.00V to the full scale of the Voltage specification. The setting is by rotating the setting knob.

3.1.18.7 START/STOP Test key.

Press START/STOP key to start or stop the OPP test by OPP test setting parameter when OPP test function is enabled.

The Load will goes to “ON” automatically when press START/STOP key to start the OPP test and the Load will goes to “OFF” automatically when press START/STOP key to stop the OPP test. The Load will stay to “ON” if load was “ON” before OPP test.

The OPP test function for test the UUT’s over power protection, The OPP test will start sink current from PSTART to increase PSTEP current until the UUT’s output voltage drop-out lower than the threshold voltage(V-th setting), and the OPP trip point is between P_Hi and P_Lo limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

Press any key to goes to normal mode of LCD display.

3.1.19 START/STOP key

3.1.19.1 Press START/STOP key to start or stop the short test by SHORT 、 OCP & OPP test setting parameter when SHORT 、 OCP & OPP test function is enabled.

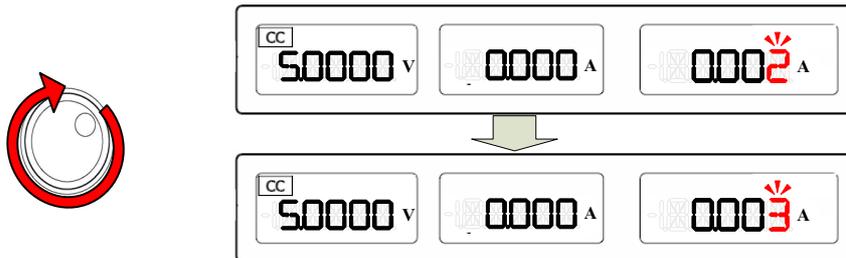
3.1.19.2 The Load will goes to “ON” automatically when press START/STOP key to start the short test and the Load will goes to “OFF” automatically when press START/STOP key to stop the short test. The Load will stay to “ON” if load was “ON” before short test.

3.1.19.3 The SHORT 、 OCP & OPP test function for test the UUT’s short protection, The SHORT 、 OCP & OPP test will sink load’s full scale current(33611F 80A) until to fit in with the test condition, and the UUT’s drop voltage is between V_Hi and V_Lo limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

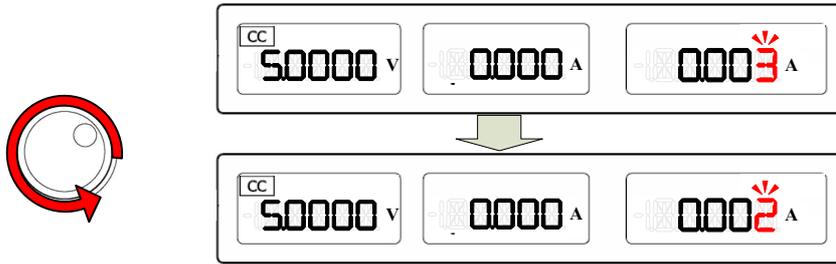
Press any key to goes to normal mode of LCD display.

3.1.20 Knob and Knob key

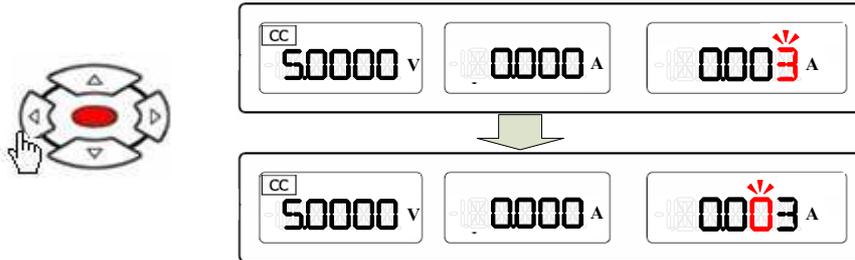
- Right Knob: Setting digit can flash clockwise add setting value.



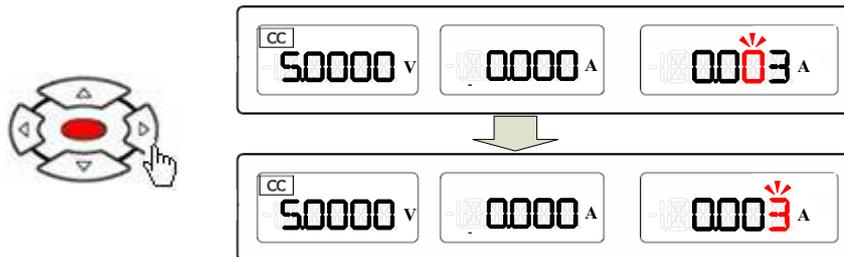
- Left Knob: Setting digit can flash Anti-clockwise to decrease setting value.



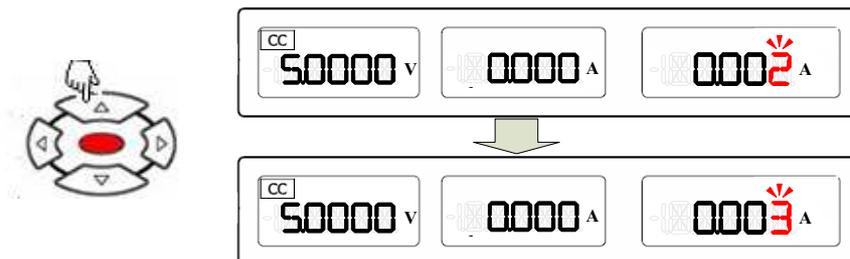
- Knob Left key: Setting digit can flash Left Knob key to push down setting value move left one-digit.



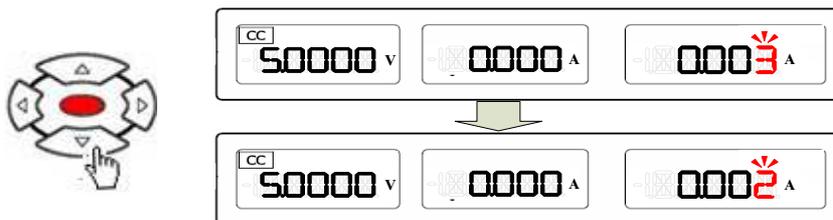
- Knob Right key: Setting digit can flash Knob Right key to push down setting value move Right one-digit.



- Knob up key: Setting digit can flash Knob UP KEY to push down add setting value.



- Knob down key: Setting digit can flash Knob down key to push down to decrease setting value.



NOTE: ON CR MODE Right Knob and Knob UP KEY to push down decrease setting value.
ON CR MODE LEFT Knob DOWN KEY to push down add setting value.

3.1.21 +/- DC INPUT Terminal.

The positive and negative terminal of load input connector, it should connect to the positive and ground output for a positive output power supply, or the ground and negative output for a negative output power supply respectively.

3.1.22 V-sense input terminal

To measure the specific voltage points through the V-sense input terminal, refer Fig 3-3 for detail application information.

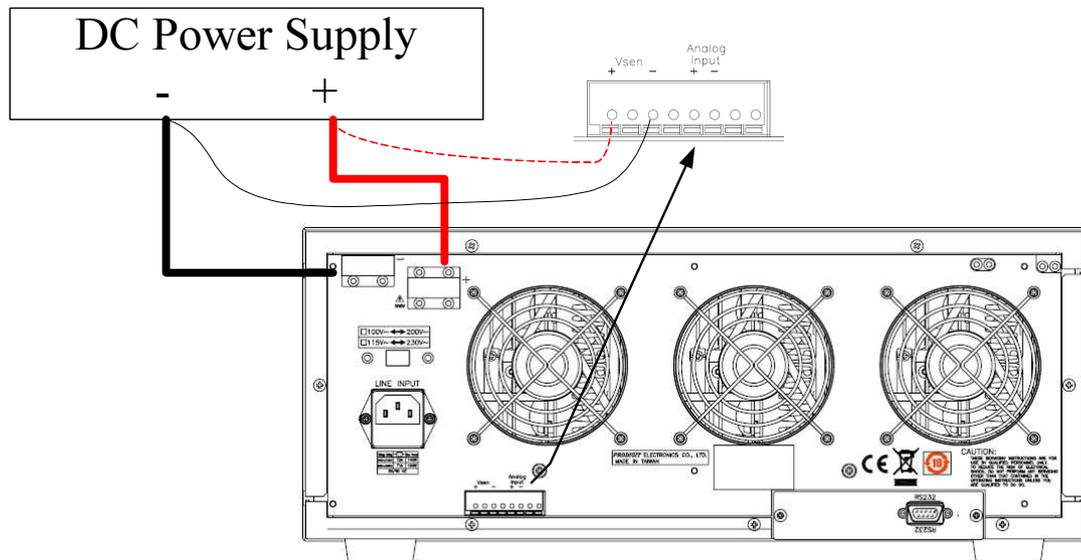
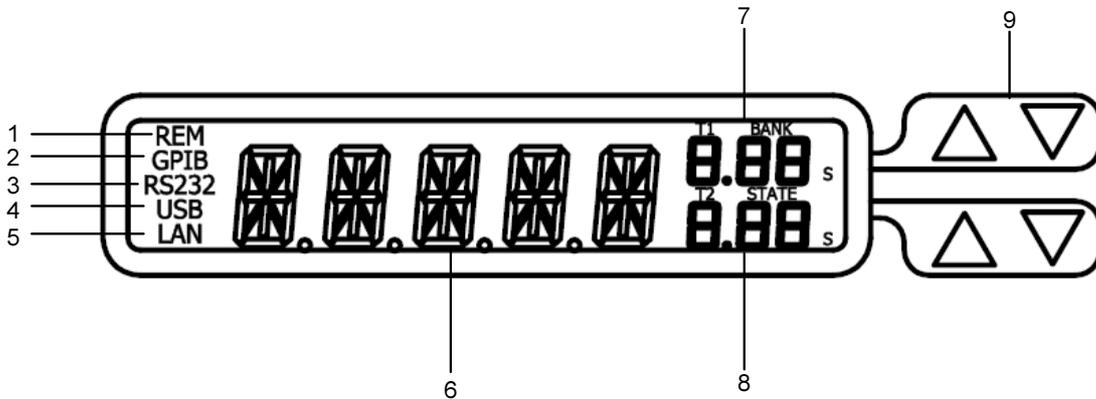


Fig 3-3 Remote sense connection on front panel

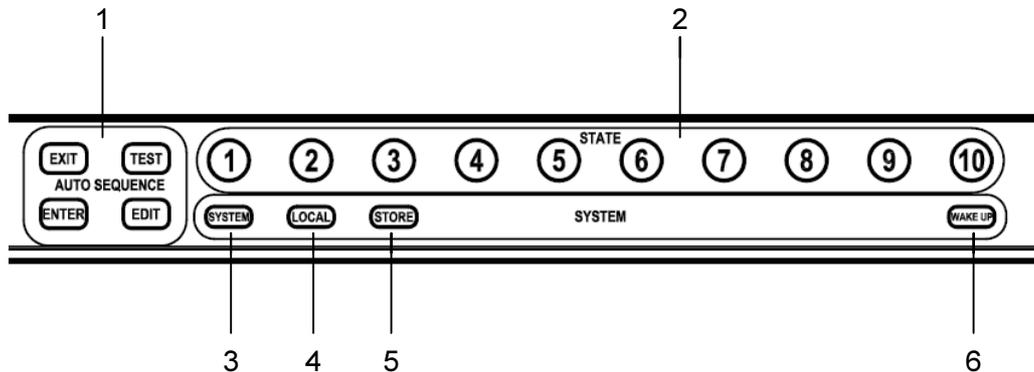
3-2. Front panel description(2)

The LCD will be lit the 33611F Series status when Power ON :



- 3.2.1 In REMOTE mode:
The REM will be lit when 33611F Series is controlled through GPIB/RS232/USE/LAN by PC, and it means 33611F Series is in REMOTE mode, any icon will not effective but LOCAL.
- 3.2.2 In GPIB mode:
It is GPIB inside. The LCD will be lit GPIB when Power ON. If 33611F Series is controlled by GPIB through PC, the GPIB will be lit.
- 3.2.3 In RS232 mode:
It is RS232 inside. The LCD will be lit RS232 when Power ON. If 33611F Series is controlled by RS232 through PC, the RS232 will be lit.
- 3.2.4 USB mode Lit :
It is USB interface inside.
- 3.2.5 LAN mode Lit :
It is LAN interface inside.
- 3.2.6 33611F Series Display:
Power ON the LCD will display Nor. It means Normal.
- 3.2.7 T1/BANK Display:
One of T1/BANK Display means T1 (Test Time) value when setting AUTO SEQUENCE. And the second one means the BANK value of RECALL/STORE mode.
- 3.2.8 T2/STATE Display:
One of T2/STATE Display means T2 (DELAY Time) value when setting AUTO SEQUENCE. And the second one means the STATE value of RECALL/STORE mode.
- 3.2.9 Press UP/DOWN to adjust T1/BANK and T2/BANK.

3-3. Front panel description(3)



- 3.3.1 Press these 4 buttons to set AUTO SEQUENCE
- 3.3.2 STATE1~10 are used for setting and adjusting the AUTO SEQUENCE and testing the RECALL/STORE mode.
- 3.3.3 Press SYSTEM to set the argument \ GPIB address \ RS232 BAUD-RATE and buzzer alarm power ON/OFF.
- 3.3.4 Press LOCAL to exit REMOTE mode.
- 3.3.5 Press STORE to save the LOAD and the LOAD of WAKE-UP mode status and AUTO SEQUENCE.
- 3.3.6 Press WAKE-UP to recall the set status of Load when power ON.

3-4. Front panel description(4)

The function keys on the front panel of 33611F Series mainframe are designed for high testing throughput purpose. There are 150 operation states or testing steps can be store in the EEPROM memory of 33611F Series electronic load module respectively, each state can store or recall the load status and level for Electronic load modules simultaneously.

	33611F
BANK	15
STATE	10
TOTAL STATE	150

- 3.4.1 STORE process:
 - 3.4.1.1 Set the load status and load level from load module within the mainframe respectively.
 - 3.4.1.2 Select the Memory Bank (01-15) to be stored for 33611F Series load module.
 - 3.4.1.3 Press the STORE key on the 33611F Series mainframe, the STORE LED is flashing (about one time every second) to indicate ready to store. Press Store key again or wait for about 20 sec to exit the store operation.

Press one of the state 1-10 key, the appropriate state key's LED will be lit immediately, the load level and status of load module is stored into the EEPROM memory this time, then the STORE LED turns to OFF, it means the STORE procedure is completed.

Note:

After press the STORE key, the STORE LED will flash for 20 seconds, if the STATE 1-10 key is not pressed within this 20 seconds, the STORE LED will be OFF, it indicated the STORE process is not available now,

please repeat the STORE procedure for a new STORE operation. After press the STORE key, then press the STORE key, the STORE LED will be blank, it indicates the STORE process is not available.

After press the STORE key, it is available and useful to operate the front panel key on the 33611F Series Electronic load module. However, the STATE LED will be OFF if any key on any load module is operated, this indicates the front panel state of load module is not the same as STORE state.

3.4.2.1 STORE function:

Please refer chapter section on the 33611F Series electronic load module operation manual to more detail operation flow-chart for store and recall operation.

It can store up to states of 33611F Series load module setting simultaneously, if you store 2 different states in the same state key, the later state will overcome the previous state, it acts as update the new data.

3.4.2.2 RECALL operation:

For 33611F Series, using UP and Down key to select the Memory Bank, then press one of the Memory State 1 through 10 key, the appropriate LED will be lit, the store state on the 33611F Series mainframe is sending to the electronic load module simultaneously. Before press the states key, you press any key on the load module then the state LED is blank immediately, it indicates the STORE state has been changed on load module's front panel.

3.4.3 WAKE-UP function

This function is designed for auto setting the load status and load level in turning on the 33611F Series every time. Press WAKE-UP first, the LCD will be lit and shown "CLEAR" to cancel or "SET" to set. Adjust BANK and STATE keys to reset the WAKE-UP. Press STORE key to be stored or EXIT the WAKE-UP.

3.4.4 AUTO SEQUENCE

There are two modes in AUTO SEQUENCE function, EDIT MODE and TEST MODE, The AUTO SEQ mode can be entered by press EDIT key, after that, the LCD will be lit "FX-XX". "FX" means to select the state F1-F9. "XX" means the test STEP01-16.

3.4.4.1 EDIT MODE

The EDIT MODE flow chart is described below:

1. There are nine Auto Sequence (F1-F9) can be set within 33611F Series.
2. Each Auto Sequence has up to 16 test steps, where each step is one Memory of 150 sets store memory.
3. Each test step has T1 (Test Time) and T2 (Delay time), the unit is 100ms; the range is 0.1S - 9.9S in 100mS resolution. 33611F Series mainframe will check each module GO/NG at the end of T1 (Test time), the next step will be started after duration T2 (Delay time).
4. Setting REPEAT(REPEAT TEST) , Press UP 、DOWN key adjustment setting 0~9999 , Press STORE SAVE REPEAT value , or Press EXIT key Exit EDIT MODE.
Example: Press UP 、DOWN key adjustment setting 2023 the following picture shows.

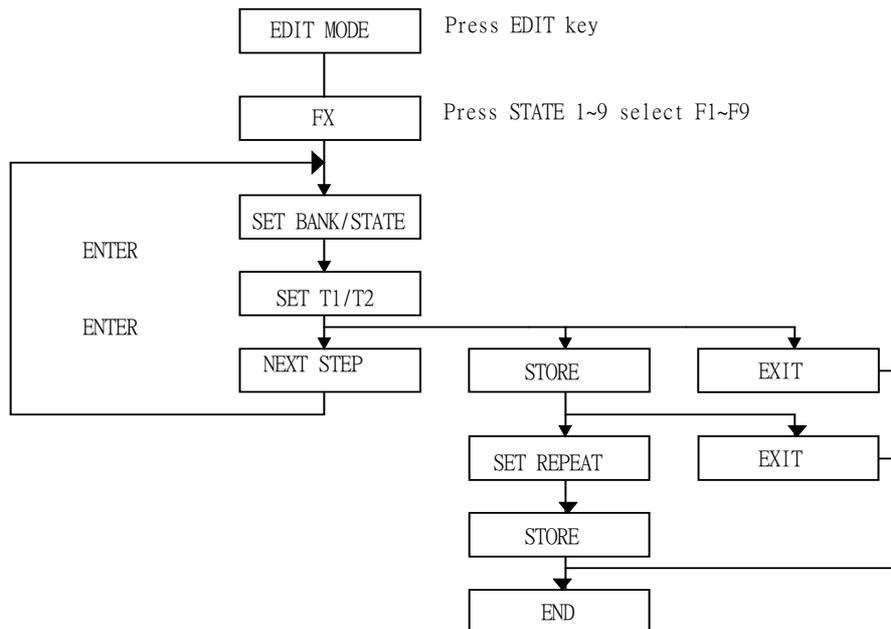
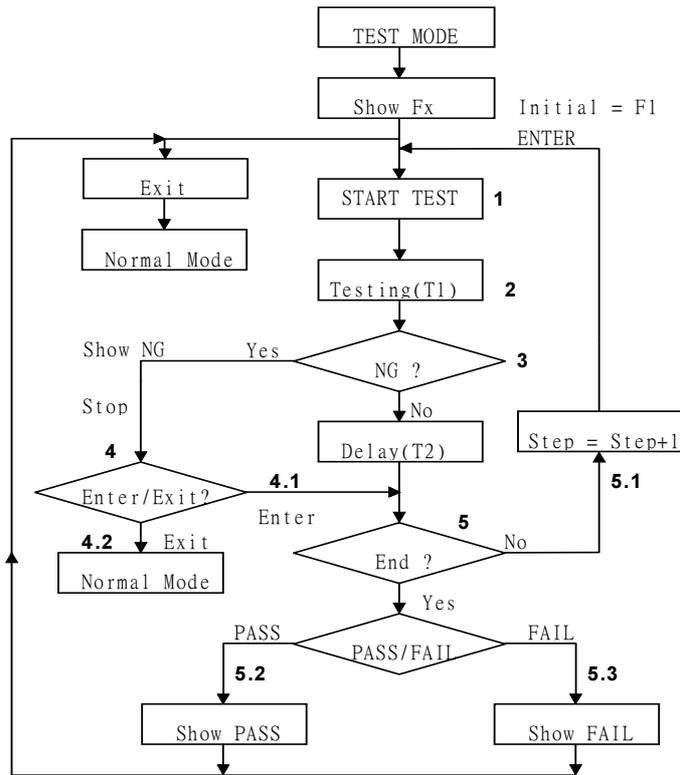


Fig 3-4 STORE (EDIT) MODE OPERATIONO FLOW-CHART

3.4.4.2 TEST MODE

The TEST MODE flow chart is described below:

1. After press TEST, select the state F1-F9 and enter Auto Testing mode.
2. The sequence start from (Step 1 - T1 - T2), then (step 2 - T1 - T2), and so on until last step or stop by press EXIT .The LCD will be lit NG if the result of test is not successful.
3. The LCD display will show PASS if all test in all module are passed, and it will show FAIL if there is at least one failure during the test. If the buzzer sets for the ON, When the test result "PASS" the buzzer will call one time, if test result "FAIL" the buzzer will call two times.
4. User can press ENTER to test again, or the 33611F Series can quit from AUTO-SEQUENCE mode by press EXIT .



- 1.Press TEST key
- 2.Press STATE 1~9 Select F1-F9
- 3.Press ENTER

- 1.Recall correspond memory which had been stored in F1-F9 memory
- 2.Check the GO/NG indicator
- 3.Stop testing if the result was NG.
 - 3.1 Press ENTER to be continued.
 - 3.2 Press EXIT to end the test, and back to normal mode.
- 4.If test is GO, than step is last?
 - 4.1 If no than Step+1, continue another step
 - 4.2 If "Yes" , than if all the test in all module is pass, show GO
 - 4.3 If "Yes", than if there is at least one failure during the test, show NG

Fig 3-5 TEST MODE OPERATION FLOW-CHA

3-5. Initial setting of 33611F Series load module

When you receive the 33611F Series electronic load, the load value initial setting after power ON is listed in Table 3-1 ~ Table 3-13 respectively, this is the factory or initial setting.

Item		Initial value	Item	Initial value	
CC L+Preset		0.0000 A	LIMIT	V_Hi	500.00 V
CC H+Preset		0.0000 A		V_Lo	0.00 V
CR H+Preset		450K Ω		I_Hi	80.400 A
CR L+Preset		450K Ω		I_Lo	0.000 A
CV H+Preset		500.00 V		W_Hi	2400.0 W
CV L+Preset		500.00 V		W_Lo	0.0 W
CP L+Preset		0.00W	CONFIG	SENSE	Auto
CP H+Preset		0.00W		LD-ON	4.0 V
DYN	T HI	0.050 mS		LD-OFF	0.50 V
	T LO	0.050 mS		POLAR+LOAD	
	RISE	64.0mA/uS	SHORT	Disable	
	FALL	64.0mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-1 33611F initialize

Item		Initial value	Item	Initial value	
CC L+Preset		0.000 A	LIMIT	V_Hi	500.00 V
CC H+Preset		0.000 A		V_Lo	0.00 V
CR H+Preset		300K Ω		I_Hi	120.00 A
CR L+Preset		300K Ω		I_Lo	0.00 A
CV H+Preset		500.00 V		W_Hi	3600.0 W
CV L+Preset		500.00 V		W_Lo	0.0 W
CP L+Preset		0.00W	CONFIG	SENSE	Auto
CP H+Preset		0.00W		LD-ON	4.0 V
DYN	T HI	0.050 mS		LD-OFF	0.50 V
	T LO	0.050 mS		POLAR+LOAD	
	RISE	96.0mA/uS	SHORT	Disable	
	FALL	96.0mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-2 33621F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	600K Ω		I_Hi	180.00 A	
CR L+Preset	600K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	5400.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00 W	CONFIG	SENSE	Auto	
CP H+Preset	0.00 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.500 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	144.0mA/uS	SHORT	Disable	
	FALL	144.0mA/uS	OPP	Disable	
		OCP	Disable		

Table 3-3 33622F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	150K Ω		I_Hi	240.00 A	
CR L+Preset	150K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	7200.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00 W	CONFIG	SENSE	Auto	
CP H+Preset	0.00 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	0.0192A/uS	SHORT	Disable	
	FALL	0.0192A/uS	OPP	Disable	
		OCP	Disable		

Table 3-4 33623F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	120K Ω		I_Hi	300.00 A	
CR L+Preset	120K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	9000.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00W	CONFIG	SENSE	Auto	
CP H+Preset	0.00W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	0.024A/uS	SHORT	Disable	
	FALL	0.024A/uS	OPP	Disable	
			OCP	Disable	

Table 3-5 33624F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	100K Ω		I_Hi	360.00 A	
CR L+Preset	100K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	10800 W	
CV L+Preset	500.00 V		W_Lo	0 W	
CP L+Preset	0.0 W	CONFIG	SENSE	Auto	
CP H+Preset	0.0 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	0.0288A/uS	SHORT	Disable	
	FALL	0.0288A/uS	OPP	Disable	
			OCP	Disable	

Table 3-6 33625F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	85.71K Ω		I_Hi	420.00 A	
CR L+Preset	85.71K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	12600 W	
CV L+Preset	500.00 V		W_Lo	0 W	
CP L+Preset	0.0 W	CONFIG	SENSE	Auto	
CP H+Preset	0.0 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE		0.0336A/uS	SHORT	Disable
	FALL	0.0336A/uS	OPP	Disable	
			OCP	Disable	

Table 3-7 33626F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.000 A		V_Lo	0.00 V	
CR H+Preset	72K Ω		I_Hi	500.40 A	
CR L+Preset	72K Ω		I_Lo	0.00 A	
CV H+Preset	500.00 V		W_Hi	14400 W	
CV L+Preset	500.00 V		W_Lo	0 W	
CP L+Preset	0.0 W	CONFIG	SENSE	Auto	
CP H+Preset	0.0 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE		0.040A/uS	SHORT	Disable
	FALL	0.040A/uS	OPP	Disable	
			OCP	Disable	

Table 3-8 33625F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.0000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.0000 A		V_Lo	0.00 V	
CR H+Preset	1500K Ω		I_Hi	24.000 A	
CR L+Preset	1500K Ω		I_Lo	0.000 A	
CV H+Preset	500.00 V		W_Hi	3600.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00W	CONFIG	SENSE	Auto	
CP H+Preset	0.00W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	19.20mA/uS	SHORT	Disable	
	FALL	19.20mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-9 33671F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.0000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.0000 A		V_Lo	0.00 V	
CR H+Preset	1000K Ω		I_Hi	36.000 A	
CR L+Preset	1000K Ω		I_Lo	0.000 A	
CV H+Preset	500.00 V		W_Hi	5400.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00W	CONFIG	SENSE	Auto	
CP H+Preset	0.00W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE	28.80mA/uS	SHORT	Disable	
	FALL	28.80mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-10 33672F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.0000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.0000 A		V_Lo	0.00 V	
CR H+Preset	750K Ω		I_Hi	48.000 A	
CR L+Preset	750K Ω		I_Lo	0.000 A	
CV H+Preset	500.00 V		W_Hi	7200.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.00 W	CONFIG	SENSE	Auto	
CP H+Preset	0.00 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE		38.40mA/uS	SHORT	Disable
	FALL	38.40mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-11 33673F initialize

Item	Initial value	Item	Initial value		
CC L+Preset	0.0000 A	LIMIT	V_Hi	500.00 V	
CC H+Preset	0.0000 A		V_Lo	0.00 V	
CR H+Preset	600K Ω		I_Hi	60.000 A	
CR L+Preset	600K Ω		I_Lo	0.000 A	
CV H+Preset	500.00 V		W_Hi	9000.0 W	
CV L+Preset	500.00 V		W_Lo	0.0 W	
CP L+Preset	0.0 W	CONFIG	SENSE	Auto	
CP H+Preset	0.0 W		LD-ON	4.0 V	
DYN	T HI		0.050 mS	LD-OFF	0.50 V
	T LO		0.050 mS	POLAR+LOAD	
	RISE		48.0mA/uS	SHORT	Disable
	FALL	48.0mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-12 33674F initialize

Item		Initial value	Item	Initial value	
CC L+Preset		0.0000 A	LIMIT	V_Hi	500.00 V
CC H+Preset		0.0000 A		V_Lo	0.00 V
CR H+Preset		500K Ω		I_Hi	72.000 A
CR L+Preset		500K Ω		I_Lo	0.000 A
CV H+Preset		500.00 V		W_Hi	10800 W
CV L+Preset		500.00 V		W_Lo	0 W
CP L+Preset		0.0 W	CONFIG	SENSE	Auto
CP H+Preset		0.0 W		LD-ON	4.0 V
DYN	T HI	0.050 mS		LD-OFF	0.50 V
	T LO	0.050 mS		POLAR+LOAD	
	RISE	57.60mA/uS	SHORT	Disable	
	FALL	57.60mA/uS	OPP	Disable	
			OCP	Disable	

Table 3-13 33675F initialize

3-6. Load current course/fine increase/decrease adjustment knob

Change amount that CC/CR/CV/CP MODE (CR contrary) load current adjusts form 3-14 shows analyzes one degree of relations with knobing. Push the knob when operate (the figure will glimmer), can enter one and analogize , rotate increment right or rotate decrement left, will continue increasing or reducing and reach the minimum value or the maximum to establish constantly to adjust in load current, or the knob no longer continues rotating in the way.

33611F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		8.04A			80.4A		
CURRENT	RANGE	0~8.04A/80.4A					
METER	RESOLUTION	0.134mA/1.34mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		10.05mA	1.072mA	0.134mA	100.5mA	10.72mA	1.34mA
CR Mode		0.22mS	0.022mS	0.0022mS	12.5mΩ	1.25mΩ	0.125mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1W	0.1W	0.008W	10W	1W	0.08W

33621F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		12A			120A		
CURRENT	RANGE	0~12A/120A					
METER	RESOLUTION	0.2mA/2mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		100mA	10mA	1mA	1000mA	100mA	10mA
CR Mode		333.33uS	33.333uS	3.3333uS	8.33mΩ	0.833mΩ	0.0833mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.002W	0.102W	0.006W	10.02W	1.02W	0.06W

33622F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		18A			180 A		
CURRENT	RANGE	0~18A/180A					
METER	RESOLUTION	0.3mA/3mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		100.2mA	12mA	0.9mA	1002mA	120mA	9mA
CR Mode		500uS	50uS	5uS	5.555mΩ	0.555mΩ	0.0555mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.008W	0.108W	0.009W	10.08W	1.08W	0.09W

33623F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		24A			240 A		
CURRENT	RANGE	0~24A/240A					
METER	RESOLUTION	0.4mA/4mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		100mA	10mA	0.8mA	1000mA	100mA	8mA
CR Mode		666.66uS	66.666uS	6.6666uS	4.16mΩ	0.416mΩ	0.0416mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.008W	0.108W	0.012W	10.08W	1.08W	0.12W

33624F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		30A			300A		
CURRENT	RANGE	0~30A/300A					
METER	RESOLUTION	0.5mA/5mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		100mA	10mA	1mA	1000mA	100mA	10mA
CR Mode		833.33uS	83.333uS	8.3333uS	3.33mΩ	0.333mΩ	0.0333mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.005W	0.105W	0.015W	10.05W	1.05W	0.15W

33625F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		36A			360A		
CURRENT	RANGE	0~36A/360A					
METER	RESOLUTION	0.6mA/6mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		100.2mA	1.2mA	0.6mA	1000.2mA	12mA	6mA
CR Mode		1mS	0.1mS	0.01mS	2.77mΩ	0.277mΩ	0.0277mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		10.008W	1.008W	0.1W	100.08W	10.008W	1.008W

33626F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		42A			420A		
CURRENT	RANGE	0~42A/420A					
METER	RESOLUTION	0.7mA/7mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		100.1mA	14mA	0.7mA	1001mA	140mA	7mA
CR Mode		1.116mS	0.116mS	0.0116mS	2.38mΩ	0.238mΩ	0.0238mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		10.008W	1.008W	0.1W	100.08W	10.008W	1.008W

33627F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		50.04A			500.4 A		
CURRENT	RANGE	0~50.04A/500.4A					
METER	RESOLUTION	0.834mA/8.34mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		100.08mA	10.008mA	0.834mA	1008mA	100.08mA	8.34mA
CR Mode		13.8mS	0.138mS	0.0138mS	2mΩ	0.2mΩ	0.02mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		10.008W	1.008W	0.096W	100.08W	10.08W	0.96W

33671F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		2.4A			24A		
CURRENT	RANGE	0~2.4A/24A					
METER	RESOLUTION	0.04mA/0.4mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		10mA	1mA	0.08mA	100mA	10mA	8mA
CR Mode		66.66uS	6.666uS	0.6666uS	41.66mΩ	4.166mΩ	0.4166mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.002W	0.102W	0.006W	10.02W	1.02W	0.06W

33672F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		3.6 A			36 A		
CURRENT	RANGE	0~3.6A/36A					
METER	RESOLUTION	0.06mA/0.6mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		10.02mA	1.02mA	0.06mA	100.2mA	10.2mA	0.6mA
CR Mode		133.3uS	13.33uS	1.3333uS	20.83mΩ	2.083mΩ	0.2083mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.008W	0.108W	0.009W	10.08W	1.08W	0.09W

33673F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		4.8A			48A		
CURRENT	RANGE	0~4.8A/48A					
METER	RESOLUTION	0.08mA/0.8mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT KEY							
CC Mode		100mA	10mA	0.08mA	1000mA	100mA	0.8mA
CR Mode		100uS	10uS	1uS	27.77mΩ	2.777mΩ	0.2777mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.008W	0.108W	0.012W	10.08W	1.08W	0.12W

33674F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		6 A			60 A		
CURRENT	RANGE	0~6A/60A					
METER	RESOLUTION	0.1mA/1mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		100mA	10mA	0.1mA	1000mA	100mA	10mA
CR Mode		166.6uS	16.66uS	1.6666uS	166.6mΩ	16.66mΩ	0.1666mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		1.005W	0.105W	0.015W	10.05W	1.05W	0.15W

33675F		RANGE I			RANGE II		
FULL SCALE LOAD CURRENT		7.2 A			72 A		
CURRENT	RANGE	0~7.2A/72A					
METER	RESOLUTION	0.12mA/1.2mA					
COURSE/FINE LOAD CURRENT ADJUSTMENT knob							
CC Mode		100.08mA	1.08mA	0.12mA	1000.8mA	10.8mA	1.2mA
CR Mode		200uS	20umS	2uS	13.88mΩ	1.388mΩ	0.1388mΩ
CV Mode		0.1V	0.01V	0.001V	1V	0.1V	0.01V
CP Mode		10.008W	1.008W	0.1W	100.08W	10.008W	1.008W

Table 3-14 the resolution of range I/II vs. Course/Fine load setting Key

3-7. Protection features

The 33611F Series Electronic load modules include the following protection features:

- 3-7-1 Over voltage
- 3-7-2 Over current
- 3-7-3 Over power
- 3-7-4 Over temperature

The Over voltage protection circuit is set at a predetermined voltage (525V for 33611F Series) which can not be changed. If the Over voltage circuit has tripped, the Electronic load input turns OFF immediately to protect the abnormal condition.

When the Over voltage condition is occurred, the Digital Current Meter's LCD display will indicate " OVP ".

CAUTION : Never apply the AC line voltage or input voltage excised than 500V, or it may cause damage of the electronic load module.

The 33611F Series Electronic load can monitor the power dissipation of the load, when the power dissipation is greater than 105% of rate power input, the load module will turn load to OFF state internally.

When the Over power condition is occurred, the Digital Current Meter's LCD display will indicate " OPP ".

As soon as the temperature of 33611F Series heat sink greater than 85 degree, the Over temperature protection is occurred, the Digital Current Meter's LCD display will indicate " OTP " at same time, the 33611F Series Electronic Load will turn load to OFF state internally.

Please check the environment condition such as the ambient temperature and distance between the rear panel of Electronic load mainframe and wall is greater than 15cm.

The 33611F Series Electronic load can reset the Over voltage, Over correct, Overpower and over temperature protection if the protection condition is removed and press the " LOAD " key to " ON " state.

The 33611F Series electronic load conducts reverse current when the polarity of the DC source connection is incorrect. The maximum reverse current is 20A for 33611F. If the reverse current exceeds the maximum reverse current, it may cause damage of the 33611F Series Electronic Load.

When the reverse condition , the reverse current is displayed on the 5 digit Current Meter on the front panel, and the 5 digit DCM indicates negative current reading, whenever the reverse current is displayed on the current meter, turn OFF power to the DC source and make the correct connections.

Chapter 4 Remote control programming operation

4-1. Introduction

The rear panel remote control interface of 33611F Series mainframe is designed to connect PC or NOTEBOOK PC with remote control interface, the NOTEBOOK PC acts as a remote controller of 33611F Series Electronic Load.

This feature can be used as an automatic load/cross load regulation and centering voltage testing for a switching power supply or an rechargeable battery charge/discharge characteristic testing. The function capability of rear panel remote control interface not only can set the load level and load status, but also can read back the load voltage and load current.

4-2. The summary of RS-232 Interface and command

The following RS-232 commands are same as GPIB commands. The RS-232 protocol in 33611F Series mainframe is listing below:

Baud-rate : 9600~115200bps

Parity : none

Data bit : 8 bits

Stop bit : 1 bit

Handshaking : Hardware(RTS/CTS).

The RS-232C Interface connector of 33611F Series rear panel, RS-232 is shown in Fig4-1.

Inside of 33611F Mainframe

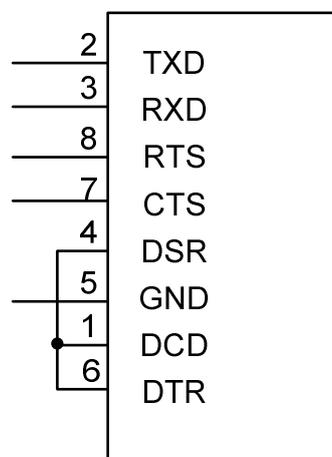


Fig 4-1 RS-232C INTERFACE CONNECTION OF REAR PANEL

4-3. 33611F Series REMOTE CONTROL COMMAND LIST1

SIMPLE TYPE FORMAT

SETTING PRESET NUMERIC COMMAND	REMARK
RISE{SP} {NR2} { ; NL}	(m)A/us
FALL{SP} { ; NL}	(m)A/us
PERD : {HIGH LOW} {SP} {NR2} { ; NL}	
LDOINV{SP} {NR2} { ; NL}	
LDOFFV{SP} {NR2} { ; NL}	
CC CURR : {HIGH LOW} {SP} {NR2} { ; NL}	
CP : {HIGH LOW} {SP} {NR2} { ; NL}	
CR RES : {HIGH LOW} {SP} {NR2} { ; NL}	
CV VOLT : {HIGH LOW} {SP} {NR2} { ; NL}	
TCONFIG {SP} {NORMAL OCP OPP SHORT } { ; NL}	
OCP:START {SP} {NR2} { ; NL}	
OCP:STEP {SP} {NR2} { ; NL}	
OCP:STOP {SP} {NR2} { ; NL}	
VTH {SP} {NR2} { ; NL}	
OPP:START {SP} {NR2} { ; NL}	
OPP:STEP {SP} {NR2} { ; NL}	
OPP:STOP {SP} {NR2} { ; NL}	
STIME {SP} {NR2} { ; NL}	

Table 4-1 REMOTE CONTROL SETTING COMMAND SUMMARY

QUERY PRESET NUMERIC COMMAND	RETURN
RISE {?} { ; NL }	###.####
FALL {?} { ; NL }	###.####
PERD : {HIGH LOW} {?} { ; NL }	###.####
LDOINV {?} { ; NL }	###.####
LDOFFV {?} { ; NL }	###.####
CC CURR : {HIGH LOW} {?} { ; NL }	###.####
CP : {HIGH LOW} {?} { ; NL }	###.####
CR RES : {HIGH LOW} {?} { ; NL }	###.####
CV VOLT : {HIGH LOW} {?} { ; NL }	###.####
TCONFIG {?}; NL}	1:NORMAL 3:OPP 2:OCP 4:SHORT
OCP:START {?} { ; NL }	###.####
OCP:STEP {?}; NL}	###.####
OCP:STOP {?}; NL}	###.####
VTH {?}; NL}	###.####
OPP:START {?} { ; NL }	###.####
OPP:STEP {?}; NL}	###.####
OPP:STOP {?}; NL}	###.####
STIME {?}; NL}	###.####
OCP{?}	###.####
OPP{?}	###.####

Table 4-2 REMOTE CONTROL QUERY COMMAND SUMMARY

LIMIT COMMAND	REMARK
IH IL{SP}{NR2}{ ; NL }	
IH IL{?}{ ; NL }	
WH WL{SP}{NR2}{ ; NL }	
WH WL{?}{ ; NL }	###.####
VH VL{SP}{NR2}{ ; NL }	
VH VL{?}{ ; NL }	###.####
SVH SVL{SP}{NR2}{ ; NL }	
SVH SVL{?}{ ; NL }	###.####

Table 4-3 REMOTE CONTROL LIMIT COMMAND SUMMARY

STAGE COMMAND	REMARK
LOAD {SP}{ON OFF 1 0}{ ; NL}	
LOAD {?}{ ; NL}	0 : OFF 1 : ON
MODE {SP}{CC CR CV CP}{ ; NL}	
MODE {?}{ ; NL}	0 : CC 1 : CR 2 : CV 3 : CP
SHOR {SP}{ON OFF 1 0}{ ; NL}	
SHOR {?}{ ; NL}	0 : OFF 1 : ON
PRES {SP}{ON OFF 1 0}{ ; NL}	
PRES {?}{ ; NL}	0 : OFF 1 : ON
SENS {SP}{ON OFF AUTO 1 0}{ ; NL}	
SENS {?}{ ; NL}	0 : OFF/AUTO 1 : ON
LEV {SP}{LOW HIGH 0 1}{ ; NL}	
LEV {?}{ ; NL}	0 : LOW 1 : HIGH
DYN {SP}{ON OFF 1 0}{ ; NL}	
DYN {?}{ ; NL}	0 : OFF 1 : ON
CLR{ ; NL}	
ERR {?}{ ; NL}	
NG {?}{ ; NL}	0 : GO 1 : NG
PROT {?}{ ; NL}	
CCR{SP}{AUTO R2}{ ; NL}	
NGENABLE{SP}{ON OFF}{ ; NL}	
POLAR{SP}{POS NEG}{ ; NL}	
START{ ; NL}	
STOP{ ; NL}	
TESTING {?}{ ; NL}	0 : TEST END , 1 : TESTING

Table 4-4 STAGE COMMAND SUMMARY

System command : Available for all module.

COMMAND	NOTE	RETURN
RECALL {SP}{m [,n]}{ ; NL}	m=1~10 n=1~15 m:STATE , n:BANK	
STORE {SP}{m [,n]}{ ; NL}	m=1~10 n=1~15 m:STATE , n:BANK	
REMOTE { ; NL}	RS232/USB/LAN command	
LOCAL{ ; NL}	RS232/USB/LAN command	
NAME {?}{ ; NL}		"XXXXX"

Table 4-5 SYSTEM COMMAND SUMMARY

Measure command

COMMAND	RETURN
MEAS : CURR{?}{ ; NL}	###.####
MEAS : VOLT{?}{ ; NL}	###.####
MEAS : POWEr{?}{ ; NL}	###.####

Table 4-6 MEASURE COMMAND SUMMARY

REMARK :

1. Current engineering unit : A
2. Voltage engineering unit : V
3. Resistance engineering unit : Ω
4. Period engineering unit : mS
5. Slew-rate engineering unit : (m)A/uS
6. Power engineering unit : W

AUTO SEQUENCE : Available for all module.

AUTO SEQUENCE SET COMMAND	NOTE	RETURN
FILE {SP} {n}{ ; NL}	n=1~9	1~9
STEP {SP} {n}{ ; NL}	n=1~16	1~16
TOTSTEP {SP} {n}{ ; NL}	Total step n=1~16	1~16
SB {SP} {m,n}{ ; NL}	m=1~10 n=1~15 m:STATE , n:BANK	
T1 {SP} {NR2}{ ; NL}	0.1~9.9(s)	0.1~9.9(sec)
T2 {SP} {NR2}{ ; NL}	0.0~9.9(s)	0.0~9.9(sec)
SAVE { ; NL}	Save "File n" data	
REPEAT {SP} {n}{ ; NL}	n=0~9999	0~9999
RUN {SP} {F} {n}{ ; NL}	N=1~9	AUTO REPLY "PASS" or "FAIL:XX" (XX=NG STEP)

Table 4-7 Auto sequence command list

33611F Series REMOTE CONTROL COMMAND LIST2

COMPLEX TYPE FORMAT

SETTING COMMAND SUMMARY	REMARK
[PRESet :] RISE{SP} {NR2} { ; NL}	(m)A/us
[PRESet :] FALL{SP} { ; NL}	(m)A/us
[PRESet :] PERI PERD : HIGH LOW {SP} {NR2} { ; NL}	
[PRESet :] LDONv{SP} {NR2} { ; NL}	
[PRESet :] LDOFv{SP} {NR2} { ; NL}	
[PRESet :] CC CURR : {HIGH LOW} {SP} {NR2} { ; NL}	
[PRESet :] CP : {HIGH LOW} {SP} {NR2} { ; NL}	
[PRESet :] CR RES : {HIGH LOW} {SP} {NR2} { ; NL}	
[PRESet :] CV VOLT : {HIGH LOW} {SP} {NR2} { ; NL}	
[PRESet :] TCONFIG {SP} {NORMAL OCP OPP SHORT}{ ; NL}	
[PRESet :] OCP:START {SP} {NR2}{ ; NL}	
[PRESet :] OCP:STEP {SP} {NR2}{ ; NL}	
[PRESet :] OCP:STOP {SP} {NR2}{ ; NL}	
[PRESet :] VTH {SP} {NR2}{ ; NL}	
[PRESet :] OPP:START {SP} {NR2}{ ; NL}	
[PRESet :] OPP:STEP {SP} {NR2}{ ; NL}	
[PRESet :] OPP:STOP {SP} {NR2}{ ; NL}	
[PRESet :] STIME {SP} {NR2}{ ; NL}	

Table 4-1B REMOTE CONTROL SETTING COMMAND SUMMARY

QUERY COMMAND SUMMARY	RETURN
[PRESet :] RISE {?} { ; NL }	###.####
[PRESet :] FALL {?} { ; NL }	###.####
[PRESet :] PERI PERD : {HIGH LOW} {?} { ; NL }	###.####
[PRESet :] LDONv {?} { ; NL }	###.####
[PRESet :] LDOFv {?} { ; NL }	###.####
[PRESet :] CC CURR : {HIGH LOW} {?} { ; NL }	###.####
[PRESet :] CP : {HIGH LOW} {?} { ; NL }	###.####
[PRESet :] CR RES : {HIGH LOW} {?} { ; NL }	###.####
[PRESet :] CV VOLT : {HIGH LOW} {?} { ; NL }	###.####
[PRESet :] TCONFIG {?}; NL}	1:NORMAL 3:OPP 2:OCP 4:SHORT
[PRESet :] OCP:START {?} { ; NL }	###.####
[PRESet :] OCP:STEP {?}; NL}	###.####
[PRESet :] OCP:STOP {?}; NL}	###.####
[PRESet :] VTH {?}; NL}	###.####
[PRESet :] OPP:START {?} { ; NL }	###.####
[PRESet :] OPP:STEP {?}; NL}	###.####
[PRESet :] OPP:STOP {?}; NL}	###.####
[PRESet :] STIME {?}; NL}	###.####

Table 4-2B REMOTE CONTROL QUERY COMMAND SUMMARY

LIMIT	RETURN
LIMit : CURRent : {HIGH LOW} {SP} {NR2} { ; NL }	
LIMit : CURRent : {HIGH LOW} {?} { ; NL }	###.####
IH IL {SP} {NR2} { ; NL }	
IH IL {?} { ; NL }	
LIMit : POWer : {HIGH LOW} {SP} {NR2} { ; NL }	
LIMit : POWer : {HIGH LOW} {?} { ; NL }	###.####
WH WL {SP} {NR2} { ; NL }	
WH WL {?} { ; NL }	####.###
LIMit : VOLTage : {HIGH LOW} {SP} {NR2} { ; NL }	
LIMit : VOLTage : {HIGH LOW} {?} { ; NL }	###.####
VH VL {SP} {NR2} { ; NL }	
VH VL {?} { ; NL }	###.####
SVH SVL {SP} {NR2} { ; NL }	
SVH SVL {?} { ; NL }	###.####

Table 4-3B REMOTE CONTROL LIMIT COMMAND SUMMARY

STAGE COMMAND	REMARK
[STAtE :] LOAD {SP}{ON OFF}{ ; NL}	
[STAtE :] LOAD {?}{ ; NL}	0 : OFF 1 : ON
[STAtE :] MODE {SP}{CC CR CV CP}{ ; NL}	
[STAtE :] MODE {?}{ ; NL}	0 1 2 3 : CC CR CV CP
[STAtE :] SHORt {SP}{ON OFF}{ ; NL}	
[STAtE :] SHORt {?}{ ; NL}	0 : OFF 1 : ON
[STAtE :] PRESet {SP}{ON OFF}{ ; NL}	
[STAtE :] PRESet {?}{ ; NL}	0 : OFF 1 : ON
[STAtE :] SENSE {SP}{ON OFF AUTO}{ ; NL}	
[STAtE :] SENSE {?}{ ; NL}	0 : OFF/AUTO 1 : ON
[STAtE :] LEVEl {SP}{LOW HIGH}{ ; NL}	
[STAtE :] LEVEl {?}{ ; NL}	0 : LOW 1 : HIGH
[STAtE :] LEV{SP}{LOW HIGH}{ ; NL}	
[STAtE :] LEV{?}{ ; NL}	0 : LOW 1 : HIGH
[STAtE :] DYNamic {SP}{ON OFF}{ ; NL}	
[STAtE :] DYNamic {?}{ ; NL}	0 : OFF 1 : ON
[STAtE :] CLR{ ; NL}	
[STAtE :] ERRor {?}{ ; NL}	
[STAtE :] NO{SP}GOOD {?}{ ; NL}	0 : GO 1 : NG
[STAtE :] NG {?}{ ; NL}	0 : GO 1 : NG
[STAtE :] PROTEct {?}{ ; NL}	
[STAtE :] CCR{SP}{AUTO R2}{ ; NL} (Note1)	
[STAtE :] NGENABLE{SP}{ON OFF}{ ; NL}	
[STAtE :] POLAR{SP}{POS NEG}{ ; NL}	
[STAtE :] START{ ; NL}	
[STAtE :] STOP{ ; NL}	
[STAtE :] TESTING {?}{ ; NL}	0 : TEST END , 1 : TESTING

Table 4-4B STAGE COMMAND SUMMARY

SYSTEM COMMAND: available for all module

COMMAND	NOTE	RETURN
[SYStem :] RECall {SP} {m [,n]}{ ; NL}	m=1~10 n=1~15	
[SYStem :] STORe {SP} {m [,n]}{ ; NL}	m=1~10 n=1~15	
[SYStem :] REMOTE { ; NL}	RS232/USB/LAN command	
[SYStem :] LOCAL{ ; NL}	RS232/USB/LAN command	
[SYStem :] NAME {?} { ; NL}		"XXXXX"

Table 4-5B SYSTEM COMMAND SUMMARY

measure command: available for all module

COMMAND	RETURN
MEASure : CURRent{?} { ; NL}	### #####
MEASure : VOLTage{?} { ; NL}	### #####
MEASure : POWEr{?} { ; NL}	### #####

Table 4-6B MEASURE COMMAND SUMMARY

REMARK :

1. Current engineering unit : A
2. Voltage engineering unit : V
3. Resistance engineering unit : Ω
4. Period engineering unit : mS
5. Slew-rate engineering unit : (m)A/uS
6. Power engineering unit : W

Auto sequence : available for all module

AUTO SEQUENCE COMMAND	NOTE	RETURN
FILE {SP} {n}{ ; NL}	n=1~9	1~9
STEP {SP} {n} { ; NL}	n=1~16	1~16
TOTSTEP {SP} {n}{ ; NL}	Total step n=1~16	1~16
SB {SP} {m,n} { ; NL}	m=1~10 n=1~15 m:STATE , n:BANK	
T1 {SP} {NR2} { ; NL}	0.1~9.9(s)	0.1~9.9(sec)
T2 {SP} {NR2} { ; NL}	0.0~9.9(s)	0.0~9.9(sec)
SAVE { ; NL}	Save "File n" data	
REPEAT {SP} {n} { ; NL}	n=0~9999	0~9999
RUN {SP} {F} {n} { ; NL}	n=1~9	AUTO REPLY "PASS" or "FAIL:XX" (XX=NG STEP)

Table 4-8B Auto sequence command list

4-4. The description of abbreviation

SP : Space, the ASCII code is 20 Hexadecimal.

; : Semicolon, Program line terminator, the ASCII code is 0A Hexadecimal.

NL : New line, Program line terminator, the ASCII code is 0A Hexadecimal.

NR2 : Digits with decimal point. It can be accepted in the range and format of####.#####.

For Example :

30.12345, 5.0

The description of GPIB programming command syntax.

4-5. Remote Control Command Language description

- { } : The contents of the { } symbol must be used as a part or data of the GPIB command, it can not be omitted.
- [] : The contents of the [] symbol indicates the command can be used or not. It depends on the testing application.
- | : This symbol means option. For example "LOW|HIGH" means it can only use LOW or HIGH as the command, it can choose only one as the setting command.
- Terminator : You have to send the program line terminator character after send the GPIB command, the available command terminator characters which can be accepted in 33611F Series mainframe is listed in Table 4-9.

LF
LF WITH EOI
CR , LF
CR , LF WITH EOI

Table 4-8 GPIB COMMAND TERMINATOR

Semicolon ` ; ` : The semicolon ` ; ` is a back-up command, the semicolon allows you to combine command statement on one line to create command message.

4-6. Remote control command description

4.6.1 PRESET Set and Read the Default of Load

RISE

Syntax : [PRESet :] RISE {SP}{NR2}{ ; |NL}
 [PRESet :] RISE ? { ; |NL}

Purpose : Set and read the RISE SLEW-RATE

Description :

- 1.The definition of RISE SLEW-RATE is load level change or dynamic load can be programmed of RISE and FALL are completely independent.
- 2.The value of RISE has to be included the number of the decimal point, otherwise the command will not be available.
- 3.The least significant number is the 3th behind the decimal point.
- 4.33611F Series will set to the maximum value of the model automatically when the set RISE is over the specification of Load.
- 5.The unit is (m)A/uS.

FALL

Syntax : [PRESet :] FALL {SP}{ ; |NL}
 [PRESet :] FALL ? { ; |NL}

Purpose : Set and read the FALL SLEW-RATE

Description :

- 1.The definition of FALL SLEW-RATE is load level change or dynamic load can be programmed of RISE and FALL are completely independent.
- 2.33611F Series will set to the maximum value of the model automatically when the FALL which has been set is over the specification of Load.
- 3.The unit is (m)A/uS .

PERI or PERD

Syntax : [PRESet :] PERI | PERD : HIGH | LOW {SP}{ NR2}{ ; |NL}
 [PRESet :] PERI | PERD : HIGH | LOW ? { ; |NL}

Purpose : Set and read the TLOW and Thigh of DYNAMIC when loading

Description :

1. A period of loading waveform of DYNAMIC is combined by TLOW and THIGH.
2. The value of TLOW and THIGH have to be included the number of the decimal point, otherwise the command will not be available.
3. The least significant number is the 5th behind the decimal point.
4. 33611F Series will set the value of TLOW or THIGH automatically when the value which has been set is over the maximum of the Load.
5. The unit is mS.

LDONv

Syntax : [PRESet :] LDONv {SP}{NR2}{ ; |NL}
 [PRESet :] LDONv ? { ; |NL}

Purpose : Set and Read the voltage of LOAD ON

Description : This command is for setting the Load voltage value of LOAD ON.

LDOFfv

Syntax : [PRESet :] LDOFfv{SP}{ NR2}{ ; | NL}
[PRESet :] LDOFfv ? { ; | NL}

Purpose : Set and read the voltage of LOAD OFF

Description : This command is for setting the Load voltage value of LOAD OFF.

CURR : HIGH | LOW

Syntax : [PRESet :] CC | CURR : HIGH | LOW{SP}{ NR2}{ ; | NL}
[PRESet :] CC | CURR : HIGH | LOW ? { ; | NL}

Purpose : Set and read the current of HIGH | LOW

Description : This command is for setting the required Load current. And this command must be followed the next notices :

1. The required value of current must be included the number of the decimal point, otherwise the command will not be available.
2. The least significant number is the 5th behind the decimal point.
3. 33611F Series will set the maximum value of current of the Load automatically when the value which has been set is over the maximum of the Load.
4. The value of LOW has to be smaller than HIGH.
5. The unit is A

CP : { HIGH | LOW }

Syntax : [PRESet :] CP : { HIGH | LOW}{SP}{ NR2}{ ; | NL}
[PRESet :] CP : { HIGH | LOW } ? { ; | NL}

Purpose : Set and read the value of Watt

Description : This command is for setting the required value of Watt, and the unit is W

CR | RES : { HIGH | LOW }

Syntax : [PRESet :] CR | RES : { HIGH | LOW}{SP}{ NR2}{ ; | NL}
[PRESet :] CR | RES : { HIGH | LOW } ? { ; | NL}

Purpose : Set and read the value of Resistance

Description : This command is used for setting the required value of Load Resistance.

And this command must be followed the next notices:

1. The required value of resistance must be included the number of the decimal point, otherwise the command will not be available.
2. The least significant number is the 3rd behind the decimal point.
3. 33611F Series will set to the maximum value of the model automatically when the value of Resistance which has been set is over the specification of Load.
4. The Resistance value which has been set of LOW has to be smaller than HIGH.
5. The unit is Ω .

CV : { HIGH | LOW }

Syntax : [PRESet :] CV : { HIGH | LOW}{SP}{ NR2}{ ; | NL}
[PRESet :] CV : { HIGH | LOW } ? { ; | NL}

Purpose : Set and Read the value of Load Voltage

Description : This command is used for setting the required Load Voltage. And this command must be followed the next notices:

1. The required value of resistance must be included the number of the decimal

- point, otherwise the command will not be available.
2. The least significant number is the 5th behind the decimal point.
 3. 33611F Series will set to the maximum value of the model automatically when the value of Voltage which has been set is over the specification of Load.
 4. The Voltage value which has been set of LOW has to be smaller than HIGH.
 5. The unit is Voltage (V)

OCP:START

Syntax : [PRESet :] OCP:START {SP}{NR2}{ ; |NL}
 [PRESet :] OCP:START ? { ; |NL}

Purpose : Set and read the initial value of OCP test

Description : This command is used for setting the required initial value (I-START) of OCP test

OCP:STEP

Syntax : [PRESet :] OCP:STEP {SP}{NR2}{ ; |NL}
 [PRESet :] OCP:STEP ? { ; |NL}

Purpose : Set and read the increasing value of OCP test

Description : This command is used for setting the increasing value(I-STEP) of OCP test

OCP:STOP

Syntax : [PRESet :] OCP:STOP {SP}{NR2}{ ; |NL}
 [PRESet :] OCP:STOP ? { ; |NL}

Purpose : Set and read the maximum value of OCP test

Description : This command is used for setting the maximum value (I-STOP)of OCP test.

VTH

Syntax : [PRESet :] VTH {SP}{NR2}{ ; |NL}
 [PRESet :] VTH ? { ; |NL}

Purpose : Set and read the value of the Threshold Voltage

Description : This command is used for setting the Threshold Voltage. That is the OCP/OPP of this Load model when the output voltage of appliance is lower or equaled to the VTH

OPP:START

Syntax : [PRESet :] OPP:START {SP}{NR2}{ ; |NL}
 [PRESet :] OPP:START ? { ; |NL}

Purpose : Set and read the initial value of OPP test

Description : This command is used for setting the initial value(P-START) of OPP Test

OPP:STEP

Syntax : [PRESet :] OPP:STEP {SP}{NR2}{ ; |NL}
 [PRESet :] OPP:STEP ? { ; |NL}

Purpose : Set and read the increasing value of OPP test

Description : This command is used for setting the increasing value (P-STEP)of OPP Test

OPP:STOP

Syntax : [PRESet :] OPP:STOP {SP}{NR2}{ ; |NL}
[PRESet :] OPP:STOP ? { ; |NL}

Purpose : Set and read the maximum value of OPP test

Description : This command is used for setting the maximum value (P-STOP)of OPP test

TCONFIG

Syntax : [PRESet :] TONFIG {NORMAL|OCP|OVP|OPP|SHORT}{ ; |NL}
[PRESet :] TONFIG ? { ; |NL}

Purpose : Set and read the function of Dynamic test

Description : There are four options of this command. Those are NORMAL mode 、 OCP test 、 OPP test and SHORT test.

STIME

Syntax : [PRESet :] STIME {SP}{NR2}{ ; |NL}
[PRESet :] STIME ? { ; |NL}

Purpose : Set and read time of the short-circuit test

Description : This command is used for setting time of the short-circuit test. If time set to 0, it means that have no the time limit and continue to be short –circuited. The unit is milli-second (ms)

OCP

Syntax : OCP?

Purpose : Set read OCP testing current.

Description : This command is used for setting OCP test read OCP current.

OPP

Syntax : OPP?

Purpose : Set read OPP testing watt.

Description : This command is used for setting OPP test read OPP watt.

4-6-2 、LIMIT Set and read the top and bottom of the Load judgment NG limit

[LIMit :]CURRent : { HIGH | LOW } or IH | IL

Syntax : [LIMit] : CURRent : { HIGH | LOW } { SP } { NR2 } { ; | NL }
 [LIMit] : CURRent : { HIGH | LOW } ? { ; | NL }
 [IH | IL] { SP } { NR2 } { ; | NL }
 [IH | IL] ? { ; | NL }

Purpose : To set the upper/lower limit value of threshold current.

Description : This command is to set the lower limit value of threshold current. When load sink current is lower than this lower limit value or higher than the upper limit value, NG indicating light will come on to indicate "NO GOOD" .

[LIMit :]POWER : { HIGH | LOW } or WH | WL

Syntax : [LIMit] : POWER : { HIGH | LOW } { SP } { NR2 } { ; | NL }
 [LIMit] : POWER : { HIGH | LOW } ? { ; | NL }
 [WH | WL] { SP } { NR2 } { ; | NL }
 [WH | WL] ? { ; | NL }

Purpose : To set the upper/lower limit value of threshold power (W).

Description : This command is to set the upper/lower limit value of threshold power (WATT). When power (WATT) is lower than this lower limit value or higher than the upper limit value, NG indicating light will come on to indicate "NO GOOD" .

[LIMit :]VOLTage : { HIGH | LOW } or VH | VL

Syntax : [LIMit] VOLTage : { HIGH | LOW } { SP } { NR2 } { ; | NL }
 [LIMit] VOLTage : { HIGH | LOW } ? { ; | NL }
 [VH | VL] { SP } { NR2 } { ; | NL }
 [VH | VL] ? { ; | NL }

Purpose : To set the upper/lower limit value of threshold voltage.

Description : This command is to set the upper/lower limit value of threshold voltage. When input voltage is lower than the lower limit value or higher than the upper limit value, NG indicating light will come on to indicate "NO GOOD" .

[LIMit :]SVH | SVL

Syntax : [LIMit :] { SVH | SVL } { SP } { NR2 } { ; | NL }
 [LIMit :] { SVH | SVL } ? { ; | NL }

Purpose : To set the upper/lower limit value of short current.

Description : This command is to set the upper/lower limit value of short current. When short current is lower than the lower limit value or higher than the upper limit value, NG indicating light will come on to indicate "NO GOOD" .

4-6-3 · STAGE Set and read the status of Load

[STATe :] LOAD{SP}{ON | OFF}

Syntax : [STATe :] LOAD{SP}{ON | OFF}{ ; | NL}

[STATe :] LOAD ? { ; | NL}

Purpose : Set and read the status of Sink Current or not

Description : This command is used for setting the status of Sink Current . When setting it to ON, the Load is going to sink current from appliance. When setting it to OFF, the Load would not act.

[STATe :] MODE {SP}{CC | CR | CV | CP}

Syntax : [STATe :] MODE {SP}{CC | CR | CV | CP}{ ; | NL}

[STATe :] MODE ? { ; | NL}

Purpose : Set and read the mode of LOAD

Description : Load is acting under these four modes as the following TABLE 4-9. When reading the Loading Operation mode, the return value 0 | 1 | 2 | 3 are meant to be CC | CR | CV | CP

	CC (0)	CR (1)	CV (2)	CP (3)
33611F	V	V	V	V

Table 4-9 module for each Series

[STATe :] SHORT{SP}{ON | OFF}

Syntax : [STATe :] SHORT {SP}{ON | OFF}{ ; | NL}

[STATe :] SHORT ? { ; | NL}

Purpose : Set and read the short-circuit test of Load

Description : This command is for setting the Load to make a short-circuit test. While setting for the ON, the V+, V- pin of Load like short-circuit status.

[STATe :] PRESet {SP}{ON | OFF}

Syntax : [STATe :] PRESet {SP}{ON | OFF}{ ; | NL}

[STATe :] PRESet ? { ; | NL}

Purpose : Set the upper or lower digit multi-function meter to display the programming load level.

Description : This command is for select the left 5 digit LCD display to show current setting or DWM.

Pres ON : To select the LCD display to shows current setting

Pres OFF : To select the LCD Display is "DWM"

[STATE :] SENSE{SP}{ON | OFF | AUTO}

Syntax : [STATE :] SENSE{SP}{ON | OFF | AUTO} ; |NL}
 [STATE :] SENSE ? { ; |NL}

Purpose : Set and read the Load voltage to read whether is carried by the VSENSE or not.

Description : This command is for setting the Load voltage to read whether is carried by VSENSE or INPUT Connector. When setting for ON, the voltage is got from VSENSE, and setting for OFF, the voltage is got from INPUT Connector. In 33611F Series, the optional are ON and AUTO. So, if setting for AUTO, it means the voltage is got and read from VSENSE. But if no voltage is inputted from VSENSE, the voltage will be inputted from INPUT Connector.

[STATE :] LEVEL {SP}{HIGH | LOW} or LEV {SP}{HIGH | LOW}

Syntax : [STATE :] LEVEL {SP}{HIGH | LOW} ; |NL
 [STATE :] LEVEL ? { ; |NL}
 [STATE :] LEV{SP}{HIGH | LOW} ; |NL
 [STATE :] LEV ? { ; |NL}

Purpose : Set and read the LOW and HIGH of Load

Description : LEV LOW is a low level value of current on CC mode. It is a low level value of resistance on CR mode. It is a low level value of voltage on CV mode. It is a low level value of power on CP mode.

[STATE :] DYNAMIC{SP}{ON | OFF}

Syntax : [STATE :] DYNAMIC{SP}{ON | OFF} ; |NL
 [STATE :] DYNAMIC ? { ; |NL}

Purpose : Set and read whether the status is Dynamic or Static of Load

Description : 1. DYN ON , set for a DYNAMIC Load
 2. DYN OFF, set for a STATIC Load

[STATE :] CLR

Syntax : [STATE :] CLR { ; |NL}

Purpose : Clear the error flag of 33611F Series which during the period of working

Description : This command is for clearing the contents in the register of PROT and ERR. After implementation, the contents of these two registers will be "0".

[STATE :] NG ?

Syntax : [STATE :] NG ? { ; |NL}

Purpose : Query if there have NG flag in this 33611F Series

Description : Set command NG ? to show the NG status. Set for "0" the LCD of NG(NO GOOD) will be put out .Set for "1" the LCD will be lit. -

[STATe :] PROTeCt ?

Syntax : [STATe :] PROTeCt ? { ; | NL }

Purpose : Query if there have protection flag which had been set in this 33611F Series

Description : 1.PROT? means the status of Protection of 33611F Series. "1" means OPP occurred."4"means OVP. "8" means OCP. Table 4-10 shows the corresponding number of protection status

2.Use command CLR to clear the register of PROT status to be "0"

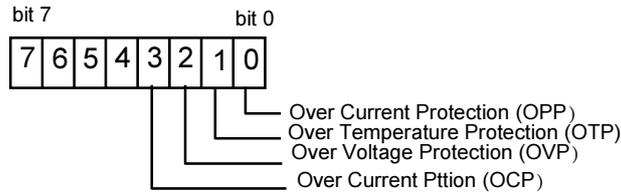


Table 4-10 register of PROT status

[STATe :] CCR {AUTO | R2}

Syntax : [STATe :] CCR {AUTO | R2} { ; | NL }

Purpose : Set the CC MODE RANGE to be forced to switch to RANGE II

Description : It will switch the RANGE position automatically when setting for AUTO Set R2 when implementing RANGE II

[STATe :] NGEABLE {ON | OFF}

Syntax : [STATe :] NGEABLE {ON | OFF} { ; | NL }

Purpose : To set the GO/NG check function enable or disable.

Description : To set the function of NG judgment opens when POWER ON. When setting for POWER OFF, the function of NG judgment will not be implemented.

[STATe :] POLAR {POS | NEG}

Syntax : [STATe :] POLAR {POS | NEG} { ; | NL }

Purpose : Set for the display of the voltage meter shows the pole is contrary or not

Description : Set the display of the voltage meter shows the pole. If it shows POS, that means the pole is not contrary. If the pole is contrary , it will show NEG

[STATe :] START

Syntax : [STATe :] START { ; | NL }

Purpose : Set for Load to implement the test.

Description : Set for Load to implement the test , and according to TEST CONFIG(TCONFIG) , the Load will start to test the items and parameters which are required

[STATe :] STOP

Syntax : [STATe :] STOP { ; | NL }

Purpose : Set for Load to stop the test

4-6-4 、SYSTEM Set and Read the Status of 33611F Series

[SYStem :] RECall{ SP }m{ ,n }

Syntax : [SYStem :] RECall{ SP }m{ ,n }{ ; | NL }

Purpose : Recall the status of Loading which had been saved in the Memory

Description : This command is for recalling the status of Load which had been saved in the Memory .

m(STATE)=1~10 , n(BANK)=1~15 .

If the operating module is other Series, omit "n" and it will be operated in the BANK which has been shown on the display.

For Example

RECALL 2 , 15 → Recall the status of Loading which had been saved in the 2nd and 15th BANK of the memory

REC 3 → Recall the status of Loading which had been saved in the 3rd of memory. If 33611F Series is operated , it will be operated in the BANK which has been shown on the display.

[SYStem :] STORe{SP}m{n}

Syntax : [SYStem :] STORe{SP}m{n}{ ; | NL }

Purpose : Save the status of Loading to the Memory

Description : This command is for saving the status of Loading to the Memory.

m(STATE)=1~10 , n(BANK)=1~15 .

If 33611F Series is operated, omit "n" and it will be operated in the BANK which has been shown on the display

For Example

STORE 2 , 15 → Save the status of Loading which had been saved in the 2nd and 15th BANK of memory.

STOR 3 → Save the status of Loading to the 3rd memory . If it is operated with 33611F Series, BANK will be set the BANK which shows on the display.

	33611F
BANK(n)	15
STATE(m)	10
TOTAL STATE	150

[SYStem :] NAME ?

Syntax : [SYStem :] NAME ? { ; |NL}

Purpose : Read the model number of Load

Description : This command is for reading the model number of Load.

MODEL
33611F
33621F
33622F
33623F
33624F
33625F
33626F
33627F
33671F
33672F
33673F
33674F
33675F

Table 4-11 MODEL NUMBER

[SYStem :] REMOTE

Syntax : [SYStem :] REMOTE { ; |NL}

Purpose : Command to enter the REMOTE status (only for RS232)

Description : This command is for controlling the RS232

[SYStem :] LOCAL

Syntax : [SYStem :] LOCAL { ; |NL}

Purpose : Command to exit the REMOTE status (only for RS232)

Description : This command is for finishing the RS232

4-6-5 、 MEASURE Measure the actual current and voltage value of Load

MEASure : CURRent ?

Syntax : MEASure : CURRent ? { ; | NL }

Purpose : Read the current which is loading of Load

Description : Read the five numbers of current meter, and the unit is Ampere(A)

MEASure : VOLTage ?

Syntax : MEASure : VOLTage ? { ; | NL }

Purpose : Read the voltage which is loading of Load

Description : Read the five numbers of current meter, and the unit is Voltage(V)

MEASure : POWer ?

Syntax : MEASure : POW ? { ; | NL }

Purpose : Read the power which is loading of Load

Description : Read the five numbers of current meter, and the unit is Watt (W)

Chapter 5 Applications

This chapter describes the application information of 33611F Series Electronic Load.

5-1. Local sense connections

Fig 5-1 illustrates a typical set up with the electronic load connected to the DC power supply. Local sensing is used in application where lead lengths are relatively short, or where load regulation is not critical.

The 5 digit voltage Meter of 33611F Series Electronic load measures the voltage of DC INPUT Terminal automatically; load leads should be bundled or tie-wrapped together to minimize inductance.

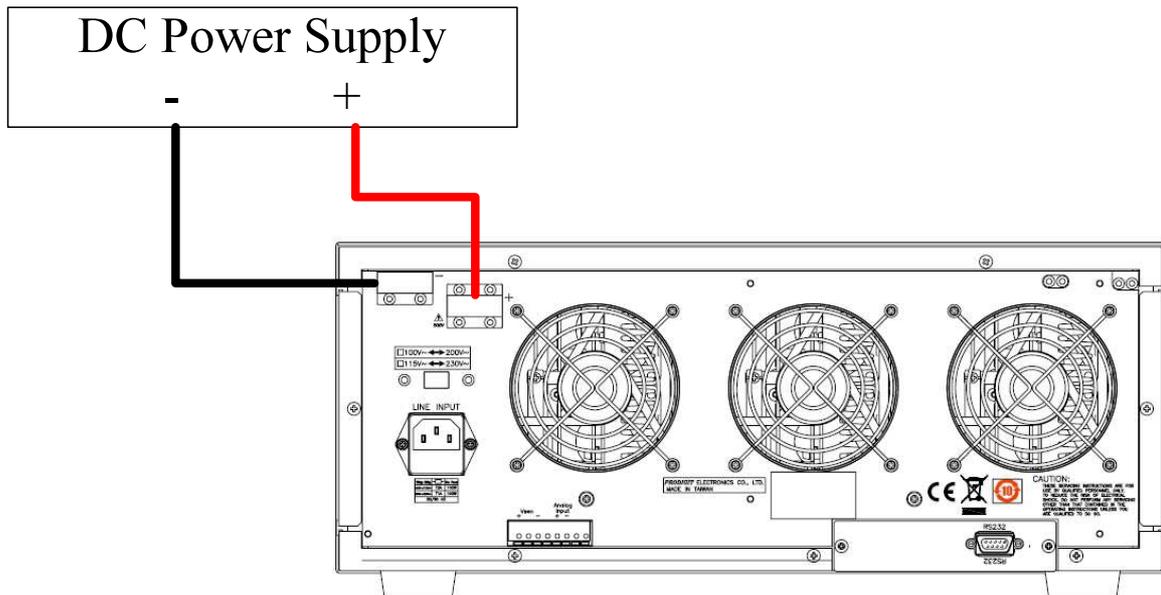


Fig 5-1 Local voltage sense connections

5-2. Remote sense connections

Fig 5-2 illustrates a typical set up with the electronic load connected for remote sense operation. The remote Vsense cables of the electronic load are connected to the output of the power supply. Remote sensing compensates for the voltage drop in applications that require long lead lengths.

The 5 digit voltage Meter of 33611F Series electronic load measures the voltage of Vsense input Terminal automatically, so the high accuracy 5 digit voltage Meter can measure the specific points voltage of the power supply's output voltage.

Load leads should be bundled or tie wrapped together to minimize inductance.

The diagram illustrates the remote voltage sense connection setup. A DC Power Supply is connected to the electronic load. The negative terminal (-) of the power supply is connected to the negative output terminal of the load. The positive terminal (+) of the power supply is connected to the positive output terminal of the load. Additionally, the positive terminal (+) of the power supply is connected to the Vsense+ terminal of the load's remote sense input. The negative terminal (-) of the power supply is connected to the Vsense- terminal of the load's remote sense input. The load also has an Analog Input terminal with four terminals (+, -, +, -). The diagram shows the internal components of the load, including three fans, a line input, and various safety and regulatory markings.

Fig 5-2 Remote voltage sense connections

5-3. Constant Current mode application

The Constant Current mode is very suitable to test the LOAD REGULATION, CROSS REGULATION, OUTPUT VOLTAGE and DYNAMIC REGULATION of the power supply testing, and test the DISCHARGE CHARACTERISTIC, LIFE CYCLE of the battery testing.

1. Static mode: (Fig 5-3)

Major application:

- a. Voltage source testing.
- b. Power supply load regulation testing
- c. Battery discharge testing

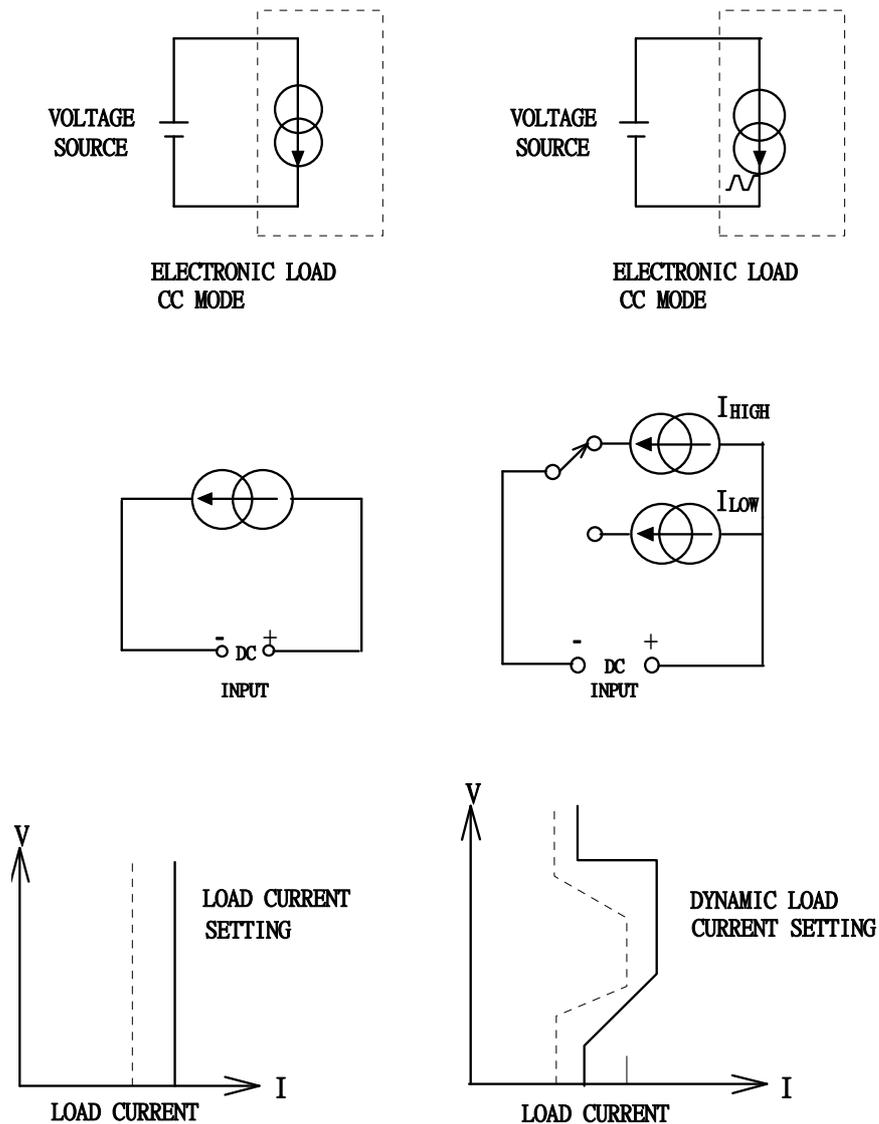


Fig 5-3 constant mode application

2. Dynamic mode:

i. Built-in Pulse generator: (Fig 5-4)

Major application:

- a. Power supply load transient response testing
- b. Power recovery time testing
- c. Pulse load simulation
- d. Power component testing

Description:

The maximum Rise/Fall current slew rate or minimum Rise/fall time is the time required for the load input to change from 10% to 90% or from 90% to 10% of the programmed High to Low load level.

$$\text{Rise slew rate} = | I_{\text{low}} - I_{\text{high}} | / T_a \text{ (mA/us)}$$

$$\text{Fall slew rate} = (I_{\text{high}} - I_{\text{low}}) / T_b \text{ (mA/us)}$$

$$\text{Rise time} = T_a = | I_{\text{low}} - I_{\text{high}} | / \text{Rise slew rate}$$

$$\text{Fall time} = T_b = (I_{\text{high}} - I_{\text{low}}) / \text{Fall slew rate}$$

ii. Analog programming input: (Fig 5-4)

Major application:

- a. Simulate real load condition
- b. Battery discharge testing

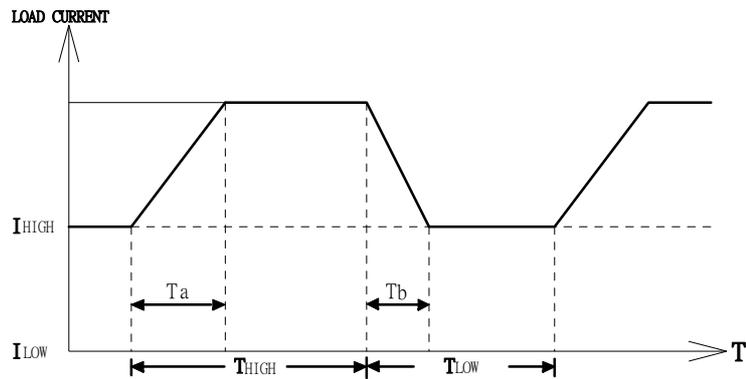


Fig 5-4 Dynamic load current with independent programmed Rise/Fall slew rate

5-4. Constant Voltage mode application

Major application:

- a. Current source testing.
- b. Power supply current limit characteristic testing

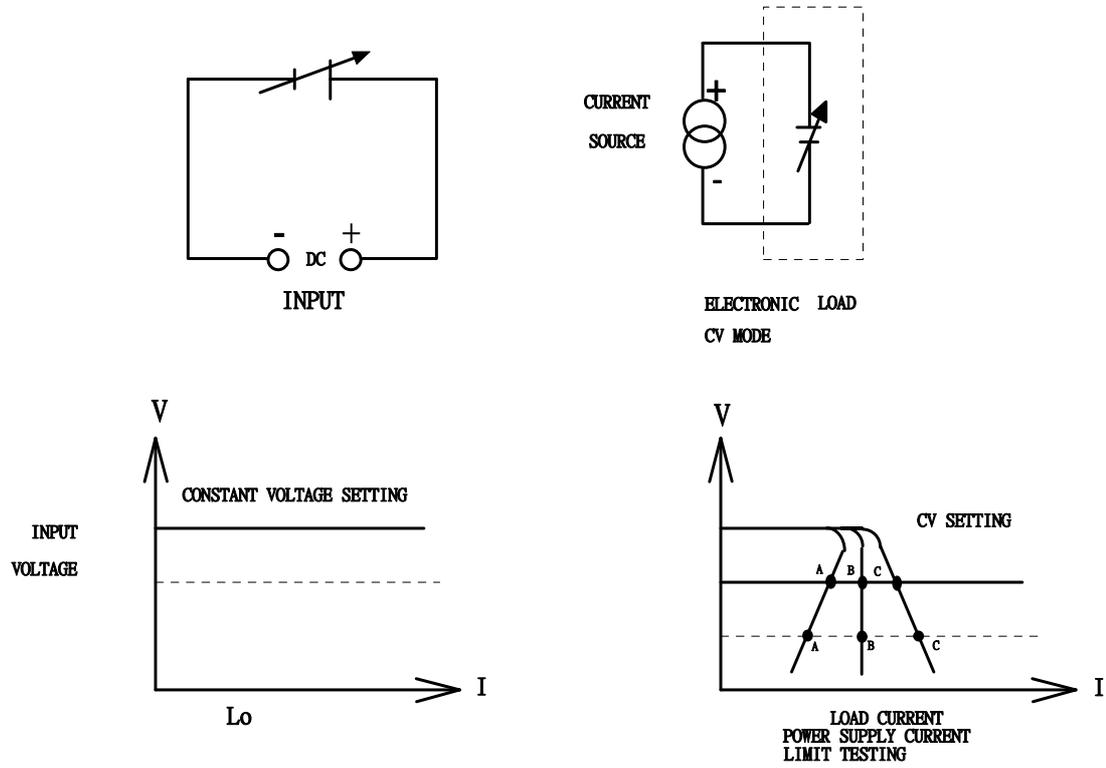


Fig 5-5 Constant Voltage mode application

5-5. Constant Resistance mode application

Major application:

- a. Voltage source or Current source testing
- b. Power resistor simulation.

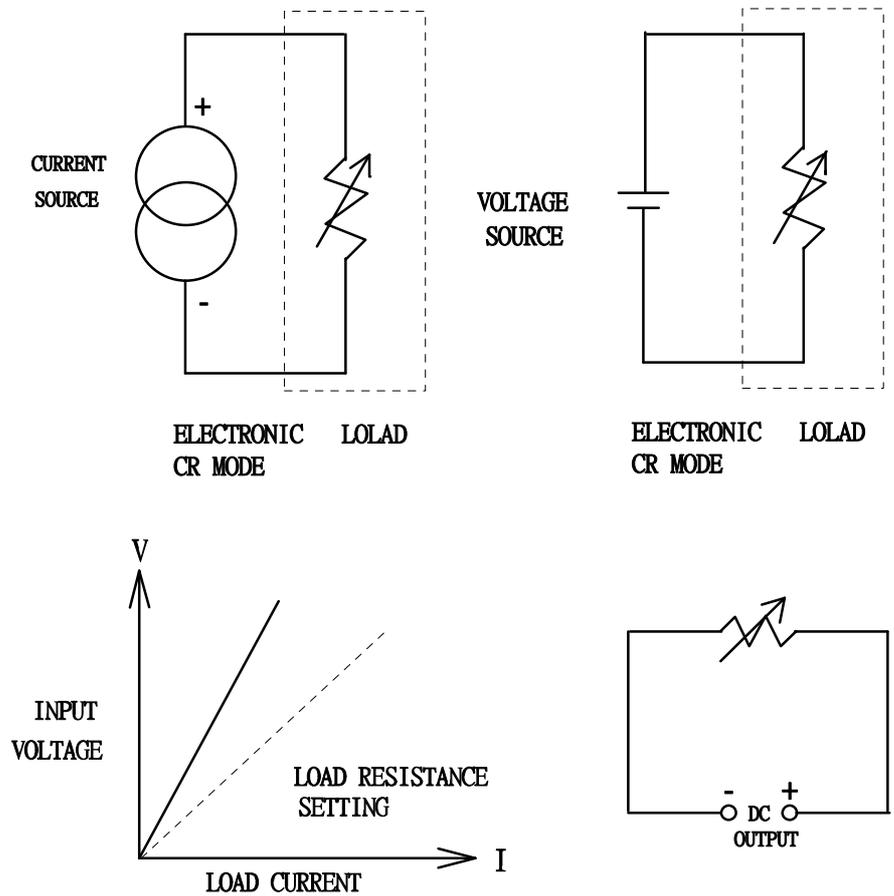


Fig 5-6 Constant Resistance mode Application

5-6. Constant Power mode application

The Constant Power mode is designed for Battery's energy capacity evaluation and testing.

Primary or secondary battery is the power source for every portable electronics products, such as notebook computer, video camera, etc. The output voltage of battery will start to drop (Fig 5-7a) according to the output current and usage duration time (Fig 5-7b), however, it should provide a stable power output regardless of output voltage (Fig 5-7c), therefore, the energy capacity (output power x time) is one of the most important factor to evaluate a battery.

The CP mode of 33611F Series electronic load is designed to test the above characteristics of a battery, it can sink constant power load for a battery, the load current will increase automatically in accordance to the output voltage drop of battery, the load power will be the same to the load power setting of CP mode (Fig 5-7d), the 33611F Series CP mode electronic load with time record can be used to evaluate the energy capacity or discharge life time of a battery.

Moreover, the real power could be a dynamic loading condition, the 33611F Series CP mode can be operated in Dynamic power load as well, setting the STA/DYN to DYN on the front panel or remote programming, 33611F Series can sink dynamic power waveform to test the dynamic characteristics of battery (Fig 5-7e).

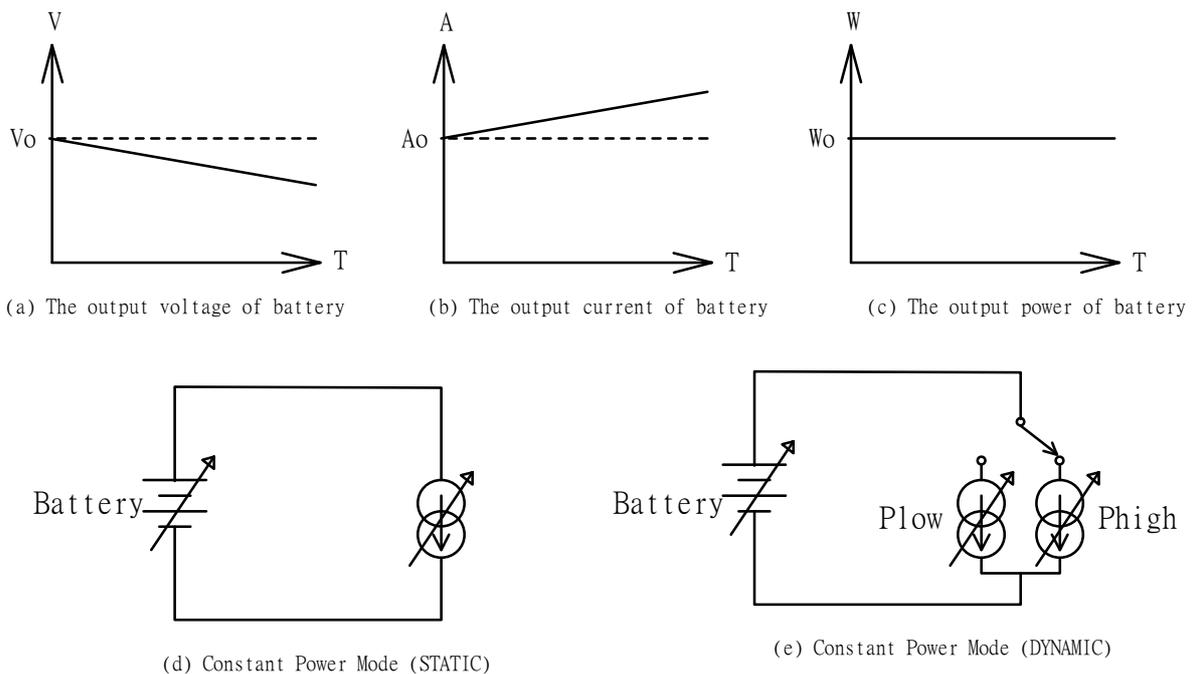


Fig 5-7 CONSTANT POWER MODE APPLICATION

5-7. Constant current source operation

The Electronic load can also be used as a high current constant current source if the following connection is made. This function can be used as a battery charger or other application. It can also combine two or more modules as one unit by parallel connection for higher current operation.

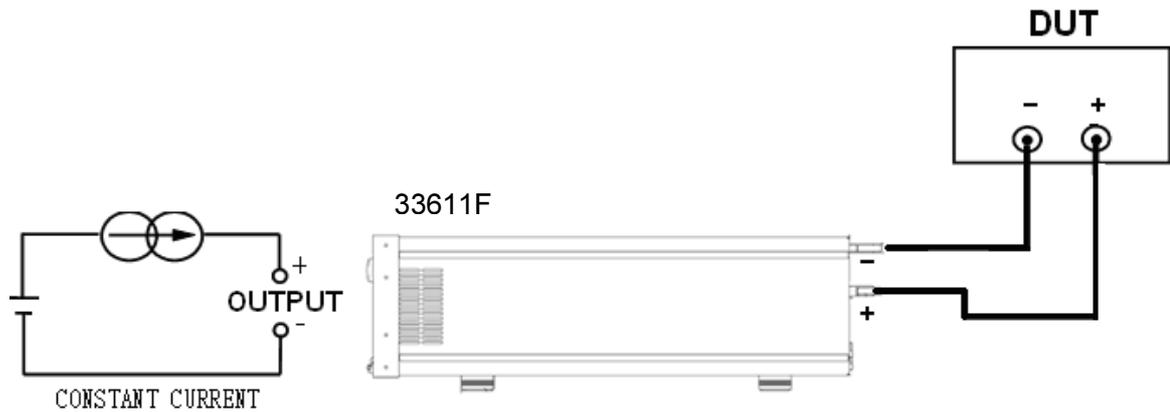


Fig 5-8 Constant current source connection

5-8. Zero-Volt loading application

As shown in Fig 5-9, the electronic load can be connected in Series with a DC voltage source which output voltage greater than 5V. so that the device under test that are connected to the electronic load can be operated down to a Zero-Volt condition, the DC voltage source provides the minimum 5V operating voltage required by the Electronic load. This application is suitable for low voltage Battery cell with high discharge current testing.

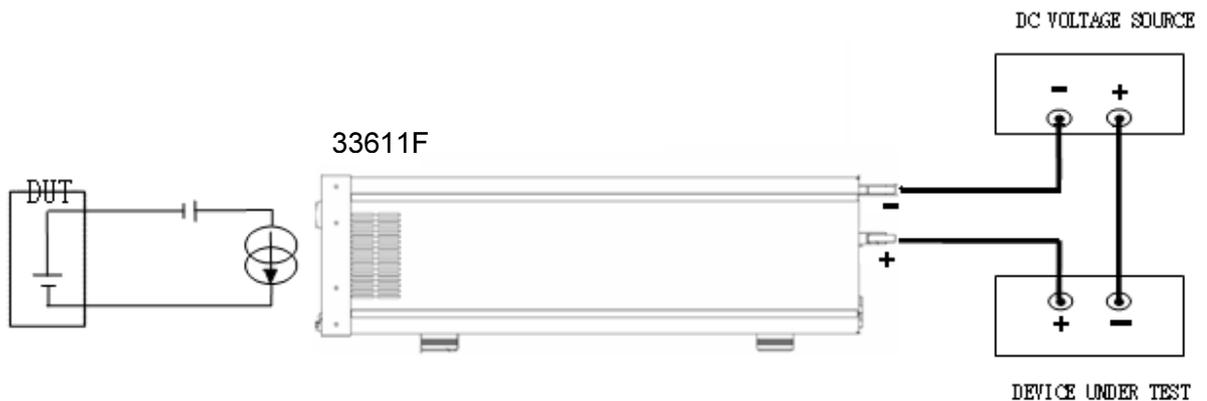


Fig 5-9 Zero-Volt loading connection

5-9. Parallel operation

When the power or current rating is not enough on the electronic load module, you can combine two or more electronic load modules as one unit by parallel two or more modules. At this time, the total load current and power is the sum of the two or more load modules also. This connection can extend the electronic load module to a higher power and current rating.

- Note:
1. The electronic load only may carry on the parallel operation under the **constant current mode**.
 2. The electronic load do not use under Series connection.

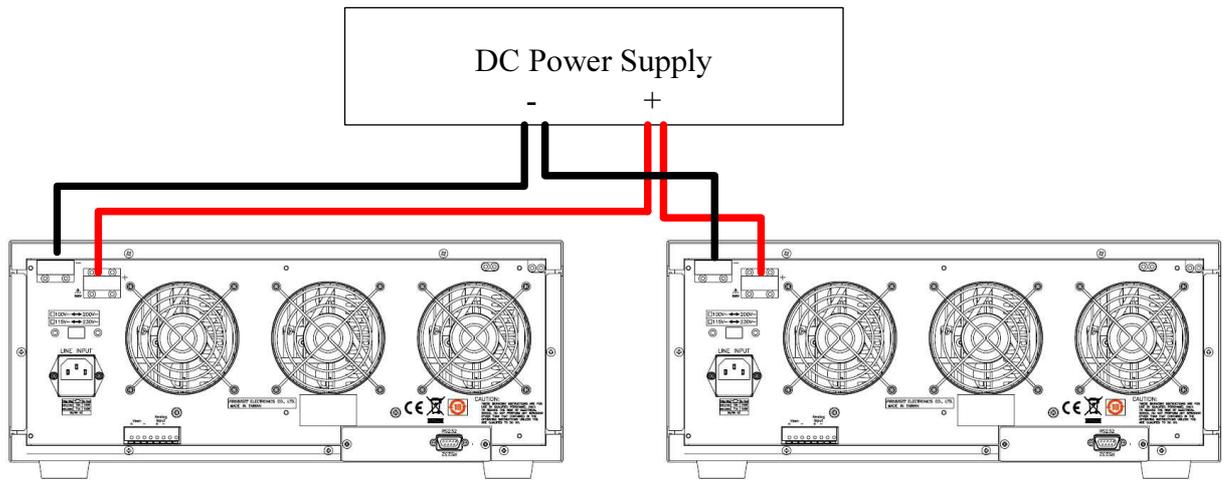


Fig 5-10 Parallel operation connection

5-10. Power Supply OCP testing

5.10.1 There is a method for power supply Over Current Protection (OCP) testing:
Power Supply OCP testing using CC mode method.

5.10.2 OCP test function Enable/Disable Key.

Press "OCP" key to enable the OCP test function and the indicator LED is lit on. The LCD display show "OCP" on right 5 digits LCD display, shows "PRESS" on middle 5 digits LCD display and shows "START" on left 5 digits LCD display.

5.10.3 There are 4 parameter for the OCP test function. The parameter as ISTAR, ISTEP, ISTOP and Vth.

Press "OCP" key again to set OCP test parameter **ISTAR**(start current point) When OCP test function is enabled. Press OCP key again to next parameter by the sequence of **ISTEP**, **ISTOP**, **Vth** and disable, press another key also can to exit the setting and save the setting. The OCP test parameter description as following.

5.10.3.1 **Istar** : setting the start current point, The LCD display shows "OCP", "ISTAR" and 0.000A(initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

5.10.3.2 **Istep** : setting the increment step current point, The LCD display shows "OCP", "ISTEP" and 0.000A(initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

5.10.3.3 **Istop** : setting the stop current point, The LCD display shows "OCP", "ISTOP" and 80.400A(33611F initial) from right to left 5 digits LCD display, the setting range is 0.000A to the full scale of the CC mode specification. The setting is by rotating the setting knob.

5.10.3.4 **Vth** : Setting threshold voltage; The LCD display shows "OCP", "Vth" and 6.00V(33611F initial) from right to left 5 digits LCD display, the setting range is 0.000V to the full scale of the Voltage specification. The setting is by rotating the setting knob.

5.10.4 START/STOP Test key.

Press START/STOP key to start or stop the OCP test by OCP test setting parameter when OCP test function is enabled.

The Load will goes to "ON" automatically when press START/STOP key to start the OCP test and the Load will goes to "OFF" automatically when press START/STOP key to stop the OCP test. The Load will stay to "ON" If load was "ON" before OCP test.

The OCP test function for test the UUT's over current protection, The OCP test will start sink current from I-START to increase ISTEP current until the UUT's output voltage drop-out lower than the threshold voltage(V-th setting), and the OCP trip point is between I_Hi and I_Lo limitation, then middle 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

Press any key to goes to normal mode of LCD display.

5.10.5 Remote control OCP

EX :

REMOTE	(Set Remote)
TCONFIG OCP	(Set OCP test)
OCP:START 3	(Set start load current 3A)
OCP:STEP 1	(Set step load current 1A)
OCP:STOP 5	(Set stop load current 5A)
VTH 0.6	(Set OCP VTH 0.6V)
IL 0	(Set current low limit 0A)
IH 5	(Set current high limit 5A)
NGENABLE ON	(Set NG Enable ON)
START	(Start OCP testing)
TESTING?	(Ask Testing? 1 : Testing , 0 : Testing End)
NG?	(Ask PASS/FAIL? , 0 : PASS , 1 : FAIL)
OCP?	(Ask OCP current value)
STOP	(Stop OCP testing)

5-11. Power Supply OPP testing

- 5.11.1 There is a method for power supply Over Power Protection (OPP) testing: Power Supply OPP testing using CC mode method.
- 5.11.2 OPP test function Enable/Disable Key.
Press “OPP” key to enable the OPP test function and the indicator LED is lit on. The LCD display show “OPP” on right 5 digits LCD display, shows “PRESS” on middle 5 digits LCD display and shows “START” on left 5 digits LCD display.
- 5.11.3 OPP test function parameter setting key.
There are 4 parameter for the OPP test function. The parameter as **Pstar**, **Pstep**, **Pstop** and **Vth**.
Press “OPP” key again to set OPP test parameter PSTAR(start power point) When OPP test function is enabled. Press OPP key again to next parameter by the sequence of PSTEP, PSTOP, Vth and disable, press another key also can to exit the setting and save the setting. The OPP test parameter description as following.
- 5.11.3.1 **Pstar** : setting the start power point, The LCD display shows “OPP”, “PSTAR” and 0.00W(initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.
- 5.11.3.2 **Pstep** : setting the increment step power, The LCD display shows “OPP”, “PSTEP” and 0.00W(initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.
- 5.11.3.3 **Pstop** : setting the stop power point, The LCD display shows “OPP”, “PSTOP” and 2400.0W(33611F initial) from right to left 5 digits LCD display, the setting range is 0.00W to the full scale of the CP mode specification. The setting is by rotating the setting knob.
- 5.11.3.4 **Vth** : Setting threshold voltage; The LCD display shows “OPP”, “Vth” and 6.00V(33611F initial) from right to left 5 digits LCD display, the setting range is 0.00V to the full scale of the Voltage specification. The setting is by rotating the setting knob.
- 5.11.4 START/STOP Test key.
Press START/STOP key to start or stop the OPP test by OPP test setting parameter when OPP test function is enabled.
The Load will goes to “ON” automatically when press START/STOP key to start the OPP test and the Load will goes to “OFF” automatically when press START/STOP key to stop the OPP test. The Load will stay to “ON” If load was “ON” before OPP test.
The OPP test function for test the UUT’s over power protection, The OPP test will start sink current from PSTART to increase PSTEP current until the UUT’s output voltage drop-out lower than the threshold voltage(V-th setting), and the OPP trip point is between P_Hi and P_Lo limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".
Press any key to goes to normal mode of LCD display.

5.11.5 Remote control OPP

EX :

REMOTE	(Set Remote)
TCONFIG OPP	(Set OCP test)
OPP:START 3	(Set start load watt 3W)
OPP:STEP 1	(Set step load watt 1W)
OPP:STOP 5	(Set stop load watt 5W)
VTH 0.6	(Set OPP VTH 0.6V)
WL 0	(Set watt low limit 0W)
WH 5	(Set watt high limit 5W)
NGENABLE ON	(Set NG Enable ON)
START	(Start OPP testing)
TESTING?	(Ask Testing? 1 : Testing , 0 : Testing End)
NG?	(Ask PASS/FAIL? , 0 : PASS , 1 : FAIL)
OPP?	(Ask OPP watt value)
STOP	(Stop OPP testing)

5-12. Power Supply SHORT testing

5.12.1 The low short resistance is implemented by drives the Power MOSFET to the maximum rated load current at SHORT ON mode and Load ON status.

5.12.2 Short test function Enable/Disable Key.

Press "SHORT" key to enable the short test function and the indicator LED is lit on. The LCD display show "SHORT" on right 5 digits LCD display, shows "PRESS" on middle 5 digits LCD display and shows "START" on left 5 digits LCD display.

5.12.3 Short test function parameter setting key.

There are 3 parameter for the SHORT test function. The parameter as TIME, V-Hi and V-Lo.

Press "SHORT" key again to set short test time when SHORT test function is enabled. Press SHORT key again to next parameter by the sequence of **TIME**, **V-Hi**, **V-Lo** and disable, press another key to exit the setting and save the setting. The short test parameter description as following.

5.12.3.1 **TIME** : setting the short test time, The LCD display shows "SHORT", "TIME" and CONTI(initial) from right to left 5 digits LCD display, the setting range is "CONTI" means continue, 100mS to 10000mS step 100mS by clockwise rotate the setting knob. The short test will be no time limitation when setting to CONTI until press "START/STOP" key to stop the short test.

5.12.3.2 **V-Hi** : Short test voltage check upper limitation setting, The LCD display shows "SHORT", "V-Hi" and 500.00V(initial) from right to left 5 digits, the V-Hi setting range from 0.00 to 500.00 step 0.001V by rotating the setting knob.

5.12.3.3 **V-Lo** : Short test voltage check lower limitation setting, The LCD display shows "SHORT", "V-Lo" and 0.00V(initial) from right to left 5 digits, the V-Hi setting range from 0.00V to 500.00V step 0.01V by rotating the setting knob.

Note. The V-Hi and V-Lo parameter is difference with the V-Hi and V-Lo in the LIMIT function.

5.12.4 START/STOP Test key.

Press START/STOP key to start or stop the short test by SHORT test setting parameter when SHORT test function is enabled.

The Load will goes to "ON" automatically when press START/STOP key to start the short test and the Load will goes to "OFF" automatically when press START/STOP key to stop the short test. The Load will stay to "ON" If load was "ON" before short test.

The SHORT test function for test the UUT's short protection, The SHORT test will sink load's full scale current(33611F 80A) until to fit in with the test condition, and the UUT's drop voltage is between V_Hi and V_Lo limitation, then left 5 digits LCD display will shows "PASS", otherwise shows "FAIL".

Press any key to goes to normal mode of LCD display.

5.12.5 Remote control SHORT

EX :

REMOTE (Set Remote)

TCONFIG SHORT (Set SHORT test)

STIME 1 (Set short time 1ms)

START (Start SHORT testing)

TESTING? (Ask Testing? 1 : Testing , 0 : Testing End)

STOP (Stop SHORT testing)

Appendix A GPIB programming Example

C Example Program

```

/* Link this program with appropriate *cib*.obj. */

/* This application program is written in TURBO C 2.0 for the IBM PC-AT compatible. The National
Instruments Cooperation (NIC) Model PC-2A board provides the interface between the PC-AT and
a PRODIGIT MPAL ELECTRONIC LOAD. The appropriate *cib*.obj file is required in each
program to properly link the NIC board to C LANGUAGE. and include the <decl.h> HEADER FILE
to C LANGUAGE. */

#include <stdio.h>
#include <dos.h>
#include <math.h>
#include "decl.h"          /* NI GPIB CARD HEADER FILE */

main()
{
    char ouster[20],rdbuf[15],spec[10];
    int i,ch,load;
/* Assign unique identifier to the device "dev5" and store in variable load. check for error. ibfind
error = negative value returned. */
    if((load = ibfind("dev5")) < 0)    /* Device variable name is load */
        {                               /* GPIB address is 5 */
            printf("\r*** INTERFACE ERROR ! ***\a\n");
            printf("\r\nError routine to notify that ibfind failed.\n");
            printf("\r\nCheck software configuration.\n");
            exit(1);
        }
/* Clear the device */
    if((ibclr(load)) & ERR);
        {
            printf("INTERFACE ERROR ! \a");
            exit(1);
        }
    clrscr();
/* Clear load error register */
        {
            outstr=chan[0];
            ibwrt(load,outstr,6);
            ibwrt(load,"CLR",3);
        }
}

```

```
    ibwrt( load,"NAME?",5);                /* Get the 33611F load specification */
    strset(rdbuf,'\0');                    /* Clear rdbuf string buffer */
    strset(spec,'\0');                     /* Clear spec string buffer */
    ibrd(load,spec,20);
    if (spec[3] == '9')
        printf("\n 33611F specification error !");
/* Set the channel 1, preset off, current sink 1.0 amps and load on commands to the load. */
    ibwrt( load,"chan 1;pres off;curr:low 0.0;curr:high 1.0;load on ",43);
    ibwrt( load,"meas:curr ?",10);
/* Get the load actually sink current from the load */
    ibrd( load,rdbuf,20);
/* go to local. */
    ibloc(load);
}
```

BASICA Example Program

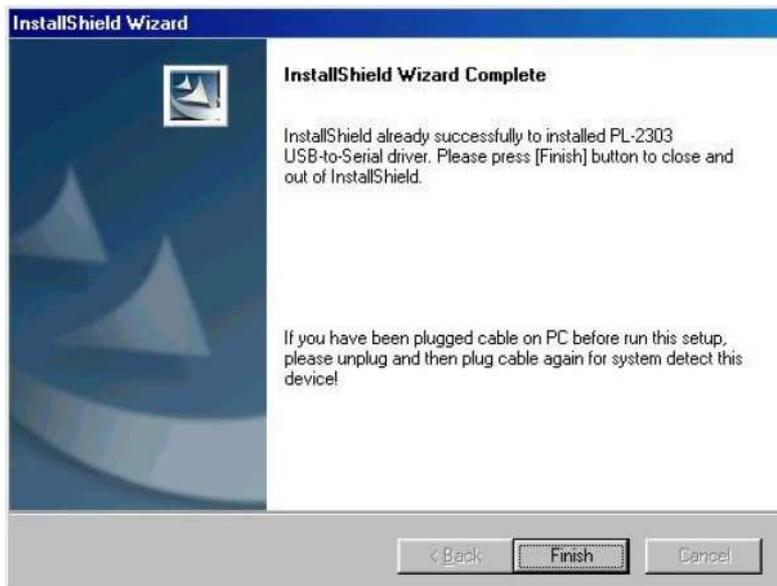
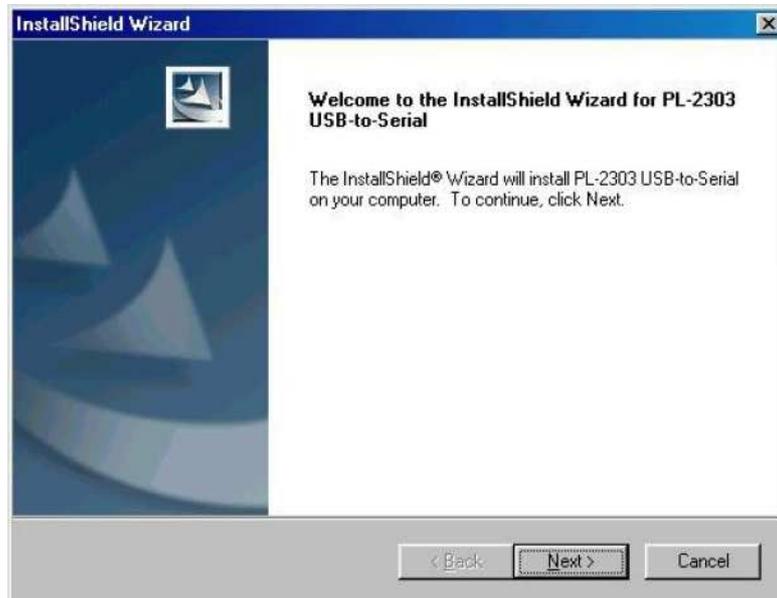
LOAD DECL.BAS using BASICA MERGE command.

```
100 REM You must merge this code with DECL.BAS
105 REM
110 REM Assign a unique identifier to the device "dev5" and store it in variable load%.
125 REM
130   udname$ = "dev5"
140   CALL ibfind (udname$,load%)
145 REM
150 REM Check for error on ibfind call
155 REM
160   IF load% < 0 THEN GOTO 2000
165 REM
170 REM Clear the device
175 REM
180   CALL ibclr (load%)
185 REM
190 REM Get the 33611F load specification
195 REM
200   wrt$ = "NAME?" : CALL ibwrt(load%,wrt$)
210   rd$ = space$(20) : CALL ibrd(load%,rd$)
215 REM
220 REM Set the preset off, current sink 1.0 amps and load on commands to the load.
225 REM
230   wrt$ = "pres off;curr:low 0.0;curr:high 1.0;load on"
240   CALL ibwrt(load%,wrt$)
245 REM
250 REM Get the load actual sink current from the load
255 REM
260   wrt$ = "meas:curr?" : CALL ibwrt(load%,wrt$)
270   rd$ = space$(20) : CALL ibrd(load%,rd$)
275 REM
280 REM Go to local
285 REM
290 CALL ibloc(load%)

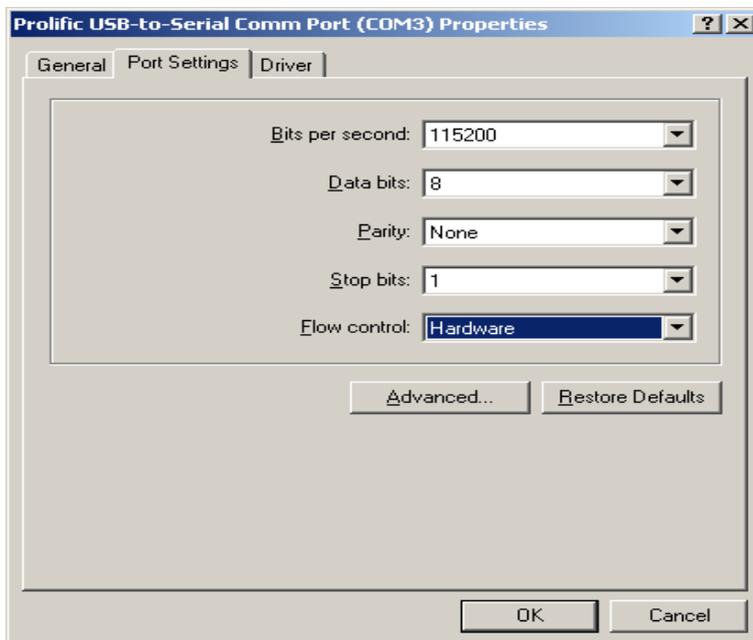
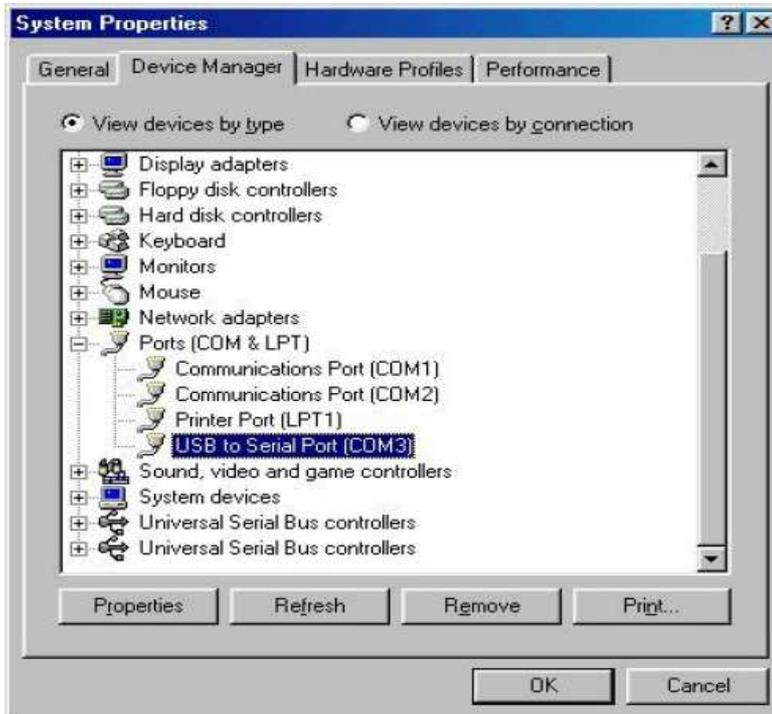
2000 REM Error routine to notify that ibfind failed.
2010 REM Check software configuration.
2020 PRINT "ibfind error !" : STOP
```


Appendix B 33611F Series USB Instruction

1. Install the USB DRIVER , select USB\SETUP\PL-2303 Driver Installer.exe



2. After the installation , connect the 33611F Series and PC with USB . Then select the item USB to Serial Port (COM3) , set the BAUD-RATE and Flow control to 115200bps and Hardware to control 33611F Series with COM3.



Appendix C 33611F Series LAN Instruction

1. Connecting AC power and the network line to the 33611F Series mainframe, connect the other side of the network line to the HUB.
2. Run the ETM.EXE which bellows the path of the LAN on the CDROM drive, it will show as fig D2-1 if not , please press F5 to search again, or check the first step was succeed or not.

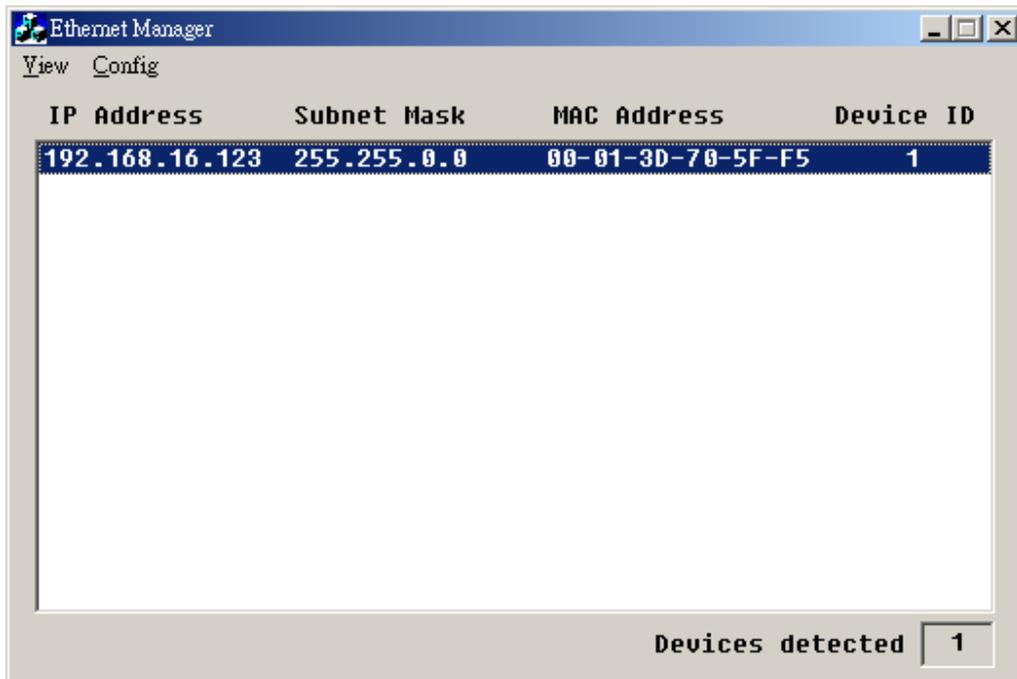


FIG D2-1

3. It will be shown the installation which has been searched on the screen , click it and select the Set IP Address bellows Config :



4. Set an useful IP Address and Subnet Mask.

5. It will be shown the Setup Device as the following figure if all steps was corrected to be run.

Controller Setup	
IP address	192.168.16.128
Subnet mask	255.255.255.0
Gateway address	0.0.0.0
Network link speed	Auto
DHCP client	Enable
Socket port of HTTP setup	80
Socket port of serial I/O	4001 TCP Server
Socket port of digital I/O	5001 TCP Server
Destination IP address / socket port (TCP client and UDP) Connection	0.0.0.0 0 Auto
TCP socket inactive timeout (minutes)	0
Serial I/O settings (baud rate, parity, data bits, stop bits)	115200 N 8 1
Interface of serial I/O	RS 232 (RTS/CTS)
Packet mode of serial input	Disable
Device ID	1
Report device ID when connected	Disable
Setup password	

Update

6. Insert the numbers as the following :

- 6.1 IP Address: **as recommended according to your network**
- 6.2 Subnet Mask: **as recommended according to your network**
- 6.3 Gateway Address: **as recommended according to your network**
- 6.4 Network link speed: **Auto**
- 6.5 DHCP client: **Enable**
- 6.6 Socket port of HTTP setup: **80**
- 6.7 Socket port of serial I/O: **4001 , TCP Server**
- 6.8 Socket port of digital I/O: **5001 , TCP Server**
- 6.9 Destination IP address / socket port (TCP client and UDP) Connection: **Auto**
- 6.10 TCP socket inactive timeout(minutes) : **Set the network disconnection after N minutes, set 0 minutes will work forever.**
- 6.11 Serial I/O settings (baud rate, parity, data, bits, stop bits): **115200, N, 8, 1**
- 6.12 Interface of serial I/O: **RS 232 (RTS/CTS)**
- 6.13 Packet mode of serial input: **Disable**
- 6.14 Device ID : **5**
- 6.15 Report device ID when connected : **Auto**
- 6.16 Setup password: **Not required**

Appendix D 33611F Series Mainframe Auto. Sequ function provide EDIT, ENTER, EXIT, TEST and STORE 5 keys operation.

Edit mode

1. Set mode, Range, current level ... Load Setting and Load ON
2. Press STORE key to store the load setting in memory bank
3. Repeat 1~2, for the sequence load setting.
4. Press EDIT key of 33611F Series mainframe.
5. Press 1~9 number key program number.
6. Press BANK up/down key to select memory bank.
7. Press STATE up/down key to select memory state.
8. Press ENTER to next step.
9. Repeat 6~8 to edit Step of sequence
10. Press STORE to confirm the step
11. LCD shows "REP." to setting repeat count.
12. Press up/down key to set repeat count of sequence loop.
13. Press STORE to confirm the sequence edit.

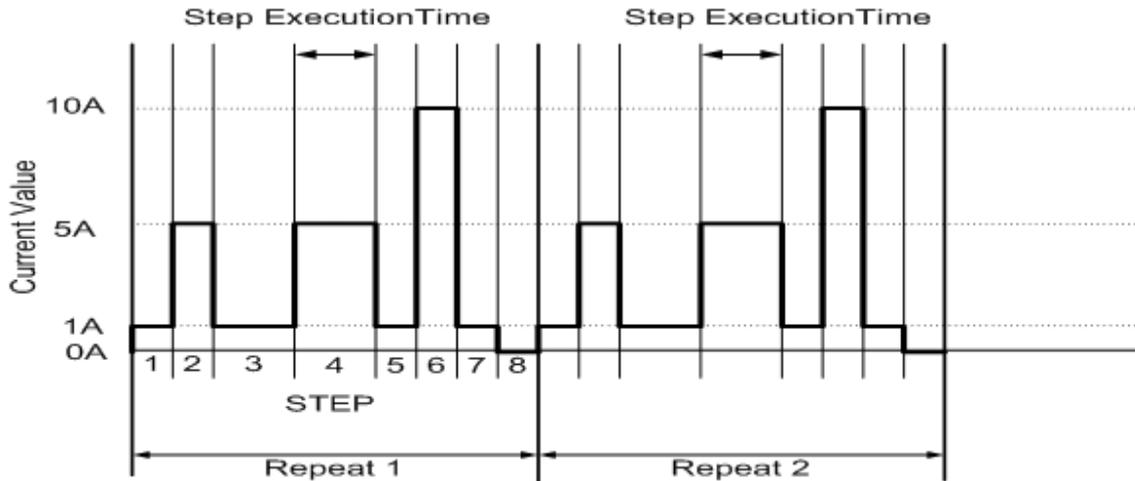
Test mode

1. Press TEST key of 33611F Series mainframe,
2. Press 1~9 number to select sequence number
3. Press ENTER to execution the sequence
4. The LCD shows "PASS" or "FAIL" after testing.

Example Sequence

In this example, we will create a program based on following Figure.

The program repeats steps 1 to 8 two times. After repeating the sequence two times, the load is turned off and the sequence ends.



Sequence Number	Step Number	Current Value	Execution Time(T1+T2)
3	1	1A	200mS
3	2	5A	200mS
3	3	1A	400mS
3	4	5A	400mS
3	5	1A	200mS
3	6	10A	200mS
3	7	1A	200mS
3	8	0A	200mS

Creating the program

1. Setting the Load current level and store to bank 3 state 1~8
2. Set the operation mode
Press the mode key to CC mode.
3. Set the range
Press RANGE key to force range 2
4. Press Load ON
5. Set the current value as step 1~8 and store to memory bank 3 state 1~8
6. Press EDIT key of 33611F Series mainframe
7. Press sequence number 3 to edit the sequence
8. Press up/down key to memory bank 3 and state 1
9. Press ENTER key to confirm the sequence memory
10. Press up/down key to setting execution time(T1+ T2)
11. Press ENTER key to confirm the sequence step
12. Repeat 7~10 to setting step 1~8
13. Press STORE key to confirm step 1~8
14. Press up/down key to 1 to repeat one times.
15. Press STORE to confirm the repeat count.

Testing Waveform

