# 4013A
# Operation Manual

S/N：9004013A02 REV：B

**SAFETY SYMBOLS**

**Direct current (DC)**

**Alternating current (AC)**

**Both direct and alternating**

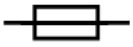

**Three-phase alternating current**

**Protective earth (ground)**



**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 Mains.

# EC DECLARATION OF CONFORMITY

We **Prodigit Electronics Co., Ltd.** declares under our own responsibility that the product

Digital Power Meter

(Model No.: 4013A)

satisfies all the technical relations application to the product within the scope of council:

**Directive: 2014/30/EU; 2014/35/EU; 2015/863/EU; 2012/19/EU**

The above product is in conformity with the following standards or other normative documents

**Harmonized Standard：**

EN 61010-1: 2010+A1:2019

EN IEC 61010-2-030:2021+A11:2021

EN 61326-1:2013

EN 61326-2-1:2013

**Reference Basic Standards：**

**Emission:**

EN 55011: 2016+A1: 2020 Class A

EN 55032: 2015+A1:2020

EN 61000-3-2: 2014

EN 61000-3-3: 2013

**Immunity:**

EN 61000-4-2: 2009

EN 61000-4-3: 2006+A2:2010

EN 61000-4-4: 2012

EN 61000-4-5: 2014+A1:2017

EN 61000-4-6: 2014

EN 61000-4-8: 2010

EN 61000-4-11: 2020

**Company Name : Prodigit Electronics Co., Ltd.**

**Company Address : 8F, No.88, Baojhong Rd., Sindian District, New Taipei City,Taiwan.**

Person is responsible for marking this declaration:

PRODIGIT INSTRUMENT PROFESSIONAL

**Manufacturer/Importer**

Signature: Dean Wang

Date: 2022/10/20 Name: Dean Wang

R&D Assistant Manager

# UK Declaration of Conformity

We Prodigit Electronics Co., Ltd. declares under our own responsibility that the product

Digital Power Meter

(Model No.: 4013A)

Satisfies all the technical relations application to the product within the scope of council:

**Directive:** Electromagnetic Compatibility Regulations 2016; Electrical Equipment (Safety) Regulations 2016; the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The above product is in conformity with the following standards or other normative documents

**Harmonized Standard：**

BS EN 61010-1:2010+A1:2019 ;BS EN IEC 61010-2-030:2021+A11:2021

BS EN 61326-1: 2013 ; BS EN 61326-2-1: 2013

**Reference Basic Standards：**

**Emission:**

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R&D Assistant Manager

PRODIGIT
INSTRUMENT PROFESSIONAL

# Material Contents Declaration

**(材料含量宣称)**

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

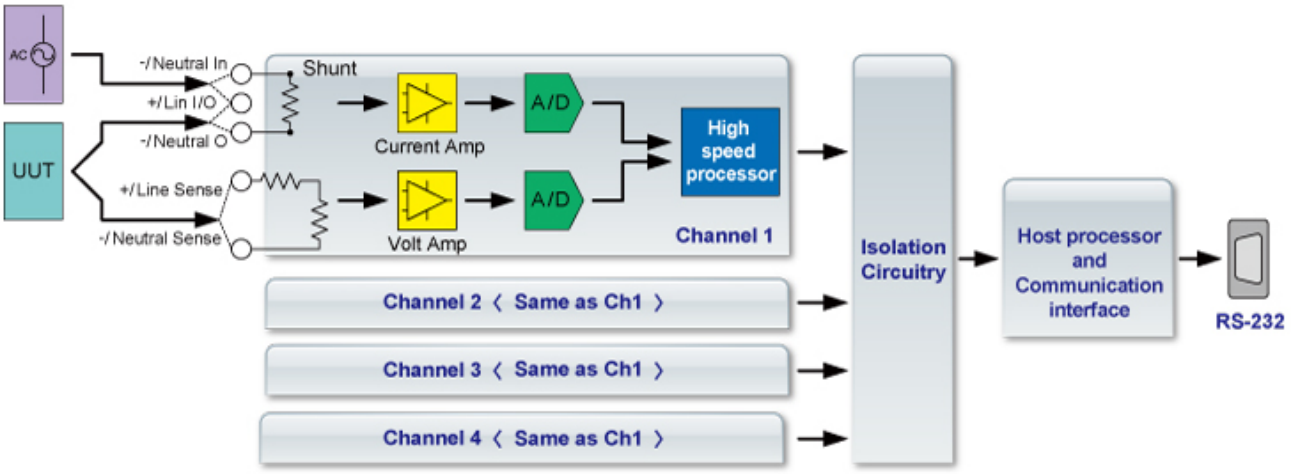
# 4013A Digital Power Meter manual Contents

# Chapter 1 Introduction

## 1-1. General Description

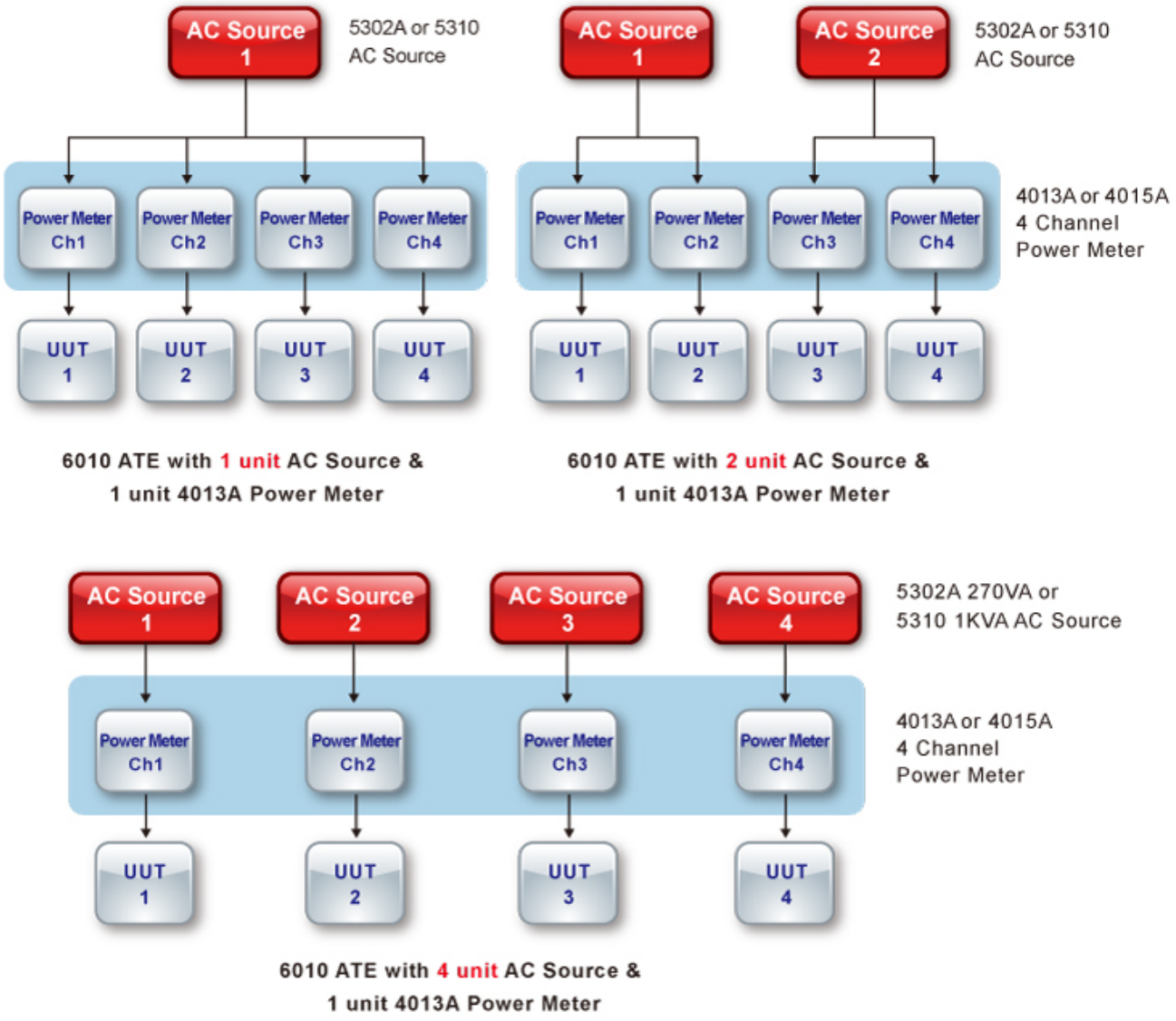
- 4013A Digital Power Meter is designed to measure the power line parameters of AC / DC and DC / DC power supply. It is suitable for AC / DC Adapter, Charger, Quick Charger, LED Driver and DC / DC Converter. It is also suitable for uninterruptible power supply (UPS), Regulators AVR, Inverter, batteries, AC / DC power supply / components ... and other applications.

- 4013A digital power meter contains 1 to 4 channels digital power meters, each power meter has a group of high-speed 12-Bits A / D Converter, sampling and converting the voltage and current signals respectively. After the conversion, the data is calculated by a high-speed 16-Bits processor. After the calculation is completed, the data is transmitted to the host processor and provide the relevant information through the RS-232 interface.



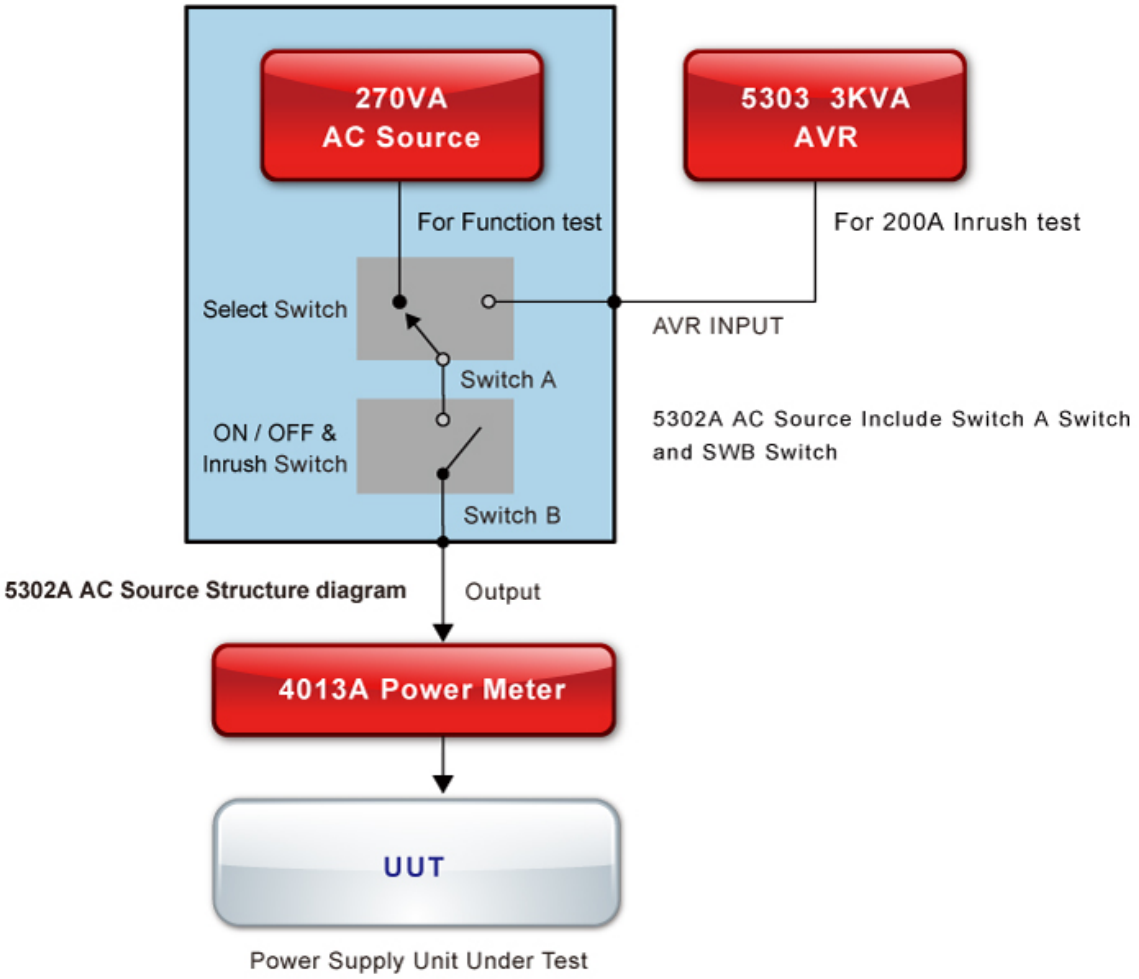

4013A Structure diagram

- 4013A digital power meter can be used with Prodigit 6010 ATE for Charger / Adapter or any system integration. It can use with Prodigit model 5302A 270VA AC Source or model 5310 1KVA AC Source and model 5303 3KVA AVR or any AC/DC Source for AC/DC voltage, current, power parameters measurement that measured with the DC Load and then further measure the test unit's efficiency and get the related information.
- For AC / DC power supplies with output power within 30W, needs 4 units to be tested simultaneously, only one 5302A or 5310 AC Source is needed, if the output power> 30W but less than 60W, you can choose 2 units 5302A or 1 unit 5310 1KVA AC Source. 6010 ATE architecture is very flexible, it can use one 4013A 4 Channel Power Meter with 1 unit AC Source to test 4 units test unit power supply, and allow to use 2 units AC power supply or 4 units AC power supply, as shown below ...




The configuration diagram of 6010 ATE using 4013A 4 Channel Power Meter

The 4013A digital power meter performs Inrush Current measurements typically with 5302A 270VA AC Source and 5303 3KVA AVR or other AC/DC Source. The 5303 3KVA AVR provides up to 200Apeak of instantaneous current, the 5302A 270VA AC Source output can select an external 5303 3KVA AVR when the Inrush Current test is in progress. The output switch 5302A 270VA AC Source can be programmed to be turned on or off at any angle and the Inrush Current measured by the 4013A Power Meter.




**The Configuration diagram of 6010 ATE with 5302A/4013A**

## 1-2. Features

- Suitable for 305V 20A, 6000W AC/DC Power Measurement
- Voltage Range：30 / 305 Vrms
  40 / 400Vdc
- Current Range：0.02 / 0.2 / 2 / 20Arms、200Arms（for Inrush）
  0.02 / 0.2 / 2 / 20Adc、200Adc（for Inrush）
- Measure AC / DC voltage, AC / DC current, AC / DC power, power factor, frequency, and Inrush Current
- Measuring frequency range DC, 40~70Hz
- Meter update rate can be programmed 0.1s, 0.5s, 1s, 2s, 5s,10s and cycle
- Inrush Delay：0~9999ms can be programmed to get accurate Inrush Current measurement
- Measuring module: 1 ~ 4CH, standard is 4 channels option 1, 2, 3 Channel is available
- The built-in internal low-pass filter (50KHz) can eliminate unnecessary high-frequency interference

## 1-3. Accessories

1. 4013A Operation Manual .....1 PC
2. Power Cord ……..1 PC
3. RS232 Cable …….....1 PC

## 1-4. Input Specifications

| | **AC Input Rating** |
|---|---|
| Voltage range | 100~230Vac±10% |
| Frequency range | 47-63Hz |
| Fuse | 1A/250V(5×20 mm) |
| Dimension | 440W × 398D × 44.45Hmm |
| Weight | 6 kg |

Table 1-1 Line input specification

## 1-5. Output Specifications

| **MODEL** | 4013A |
|---|---|
| **No. of Input Channel** | 4 |
| **ACV meter (Vrms)** | 30V / 305V |
| Resolution | 16-bit |
| Accuracy | ± 0.5% of (Reading + Range) |
| **ACA meter (Arms)** | 20mA / 200mA / 2A / 20A / 200A(for Inrush) |
| Resolution | 16-bit |
| Accuracy | ±0.5% of (Reading + Range) / ±2% of (Reading + Range) for Inrush |
| **ACW meter** | 0.6W / 6W / 60W / 600W / 6000W |
| Resolution | 32-bit |
| Accuracy | ± 0.5% of (Reading + Range) |
| **DCV meter** | 40V / 400V |
| Resolution | 16-bit |
| Accuracy | ± 0.5% of (Reading + Range) |
| **DCA meter** | 20mA / 200mA / 2A / 20A / 200A(for Inrush) |
| Resolution | 16-bit |
| Accuracy | ±0.5% of (Reading + Range) / ±2% of (Reading + Range) for Inrush |
| **DCW meter** | 0.8W / 8W / 80W / 800W / 8000W |
| Resolution | 32-bit |
| Accuracy | ± 0.5% of (Reading + Range) |
| **PF meter** | ± 0.01~1.00 |
| Resolution | 0.01 |
| Accuracy | 1% of (Reading + Range) |
| **Frequency meter** | 40~70Hz |
| Resolution | 0.1Hz |
| Accuracy | ± 0.1Hz |
| **Inrush Delay** | 0~9999ms |
| **Meter Meas.Rate Interval time** | 100mS / 200mS / 500mS / 1S / 5S /10S |
| **Low Pass Filter(V & A)** | 50KHz |
| **Interface** | RS-232 ( 921600 bps ) |

Table 1-2 4013A specifications

Note * : Operating temperature range is 0~40℃, All specifications apply for 25℃±5℃, Except as noted

# Chapter 2 Installation

## 2-1.Inspection

The 4013A digital power meter was carefully inspected before shipment. If instrument damage has occurred during transport, please inform Prodigit's sales and service office or representative.

## 2-2.Check line fuse

This product is fitted with a mains input fuse. If it needs to be replaced please adhere to the following procedure.

CAUTION

BEFORE replacing the fuse you must switch off the unit and mains power outlet and disconnect the plug of the AC Power cable from the input socket.

WARNING

If prior to exchanging the fuse, there is any abnormal noise or odour do not use the unit. Please inform your local sales office to organise repair of the unit.

To avoid the risk of fire or electronic shock the fuse must only be replaced with same type and rating as the original. Any replacement fuse used should meet your national safety standards. Any use of improper fuse or shorting the Fuse holder would be extremely dangerous and would be strictly prohibited.

2-2.1 Check the rating of the mains input fuse. Replace only with the correct type and rating. The fuse type and rating is T1.0/250V (5*20mm).

2-2.2 The AC line fuse is located below the AC line recepitacle (see Fig 2-1). Use A small screwdriver to remove the fuse holder. Replace the failed fuse.

2-2.3 Refit the fuse holder and connect the power cord.

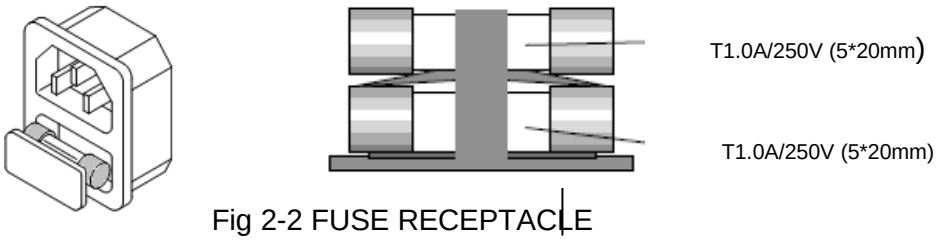



Fig 2-2 FUSE RECEPTACLE

## 2-3.Grounding requirements


Shock Hazard

The unit is grounded via the AC Input. It must be ensured that the correct mains lead with earth pin is used. Correct grounding of your electrical system infrastructure according to national standards must also be observed.

## 2-4.Environmental reduirements

2.4.1 Indoor use.
2.4.2 Installation category I.
2.4.3 Pollution degree 2.
2.4.4 Altitude up to 2000 meter.
2.4.5 Relative humidity 80%.
2.4.6 Ambient temperature 0℃~ 40℃.
2.4.7 2.4.7 The ideal operating temperature is 25°C ± 5°C.

## 2-5.Repair and correct serving

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.

## 2-6.Clean

Use a soft or slightly damp cloth to clean this product.

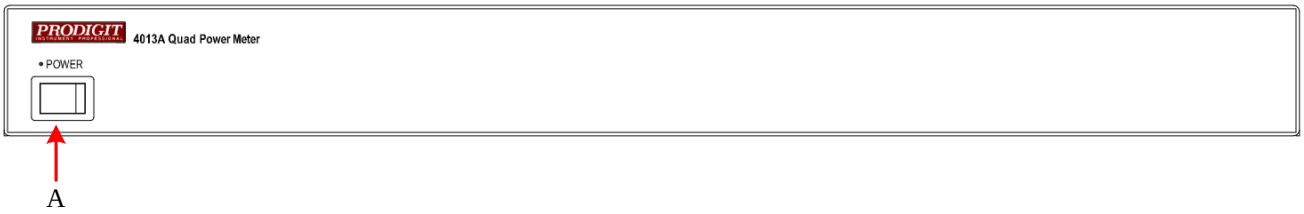

- BEFORE you clean the unit, switch the mains power off and disconnect the input lead.
- Please do NOT use any organic solvent capable of changing the nature of the plastic such as benzene or acetone.
- Please ensure that no liquid is allowed to penetrate this product。

## 2-7. RS232 interface function

4013A digital power meter has offered a RS-232(FEMALE) to connect the device on the rear panel of 4013A; this connection device connects the port with computer RS-232 to join by way of one of one.

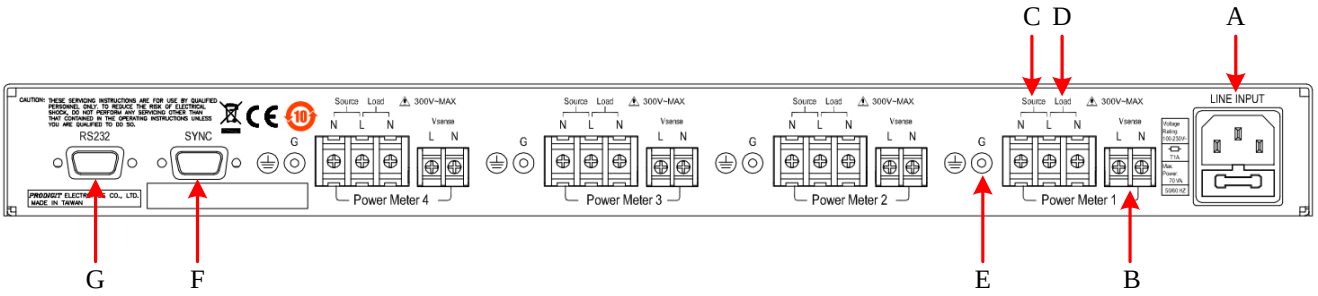
# Chapter 3 Panel description and Dimensions

## 3-1. 4013A Front Panel



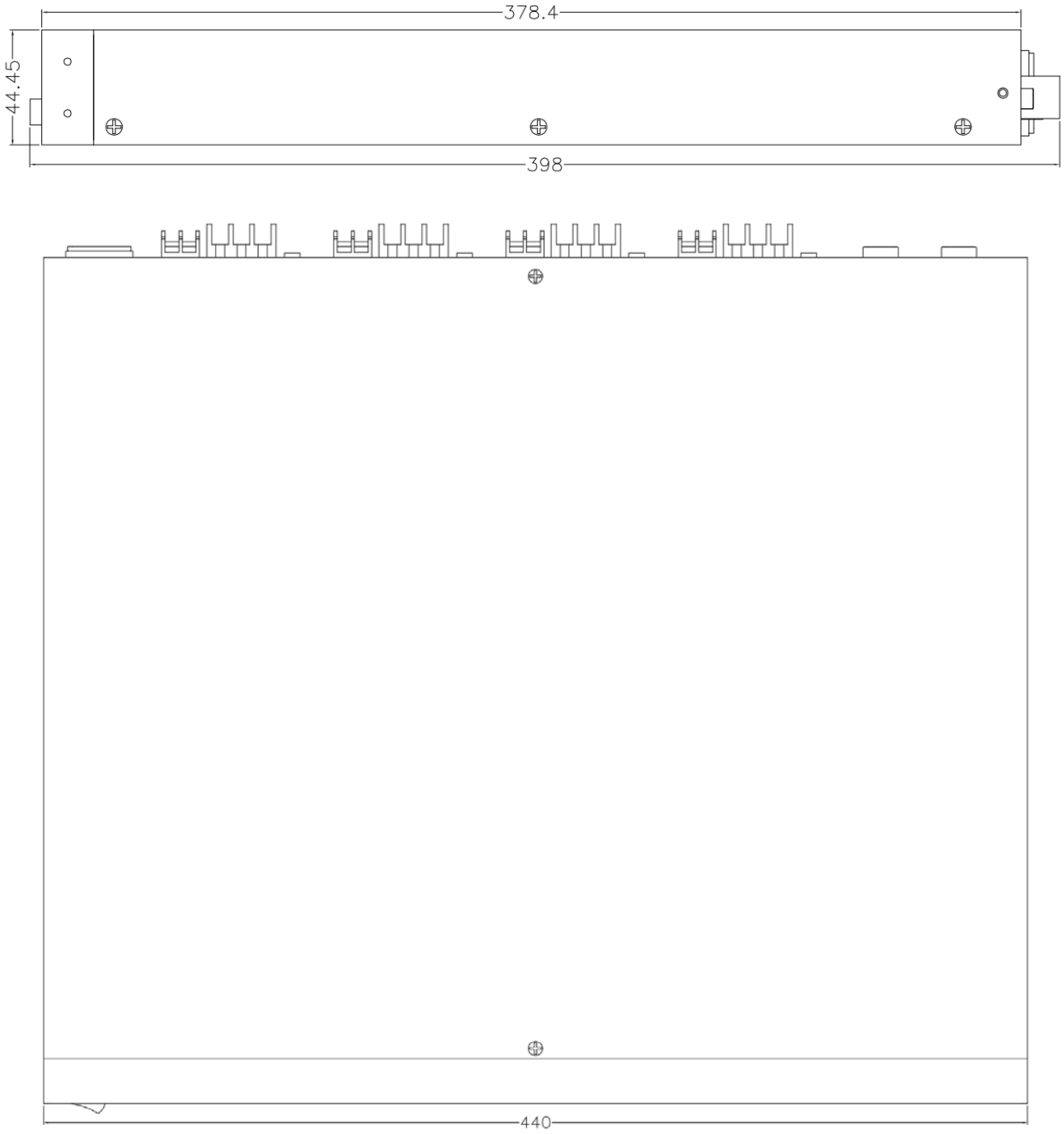

A. POWER：4013A Power Switch

## 3-2. 4013A Rear Panel




A. LINE INPUT：Line input receptacle.
B. Vsense：Vsense input terminal.
C. Source：AC/DC Power Source input terminal.
D. Load：Load terminal.
E. Source ground.
F. SYNC：Power ON/OFF synchronous signal Input) and ac on signal, the input signal waveform refer to Appendix 1.
G. RS-232 interface port. (Baud Rate 921600 bps)。

## 3-3. 4013A Dimensions



# Chapter 4 Remote control programming operation

## 4-1.RS232 Setup

The RS232 interface of the 4013A is set up as follows.

Baud-rate ：921600 bps
Parity ：NO
Data bit ：8 bit
Stop bit ：1 bit
Handshaking ：Hardware (RTS/CTS)
Data Format ：Hex Format

The RS232 Interface connector of 4013A rear panel, RS232 is shown in Fig4-1.

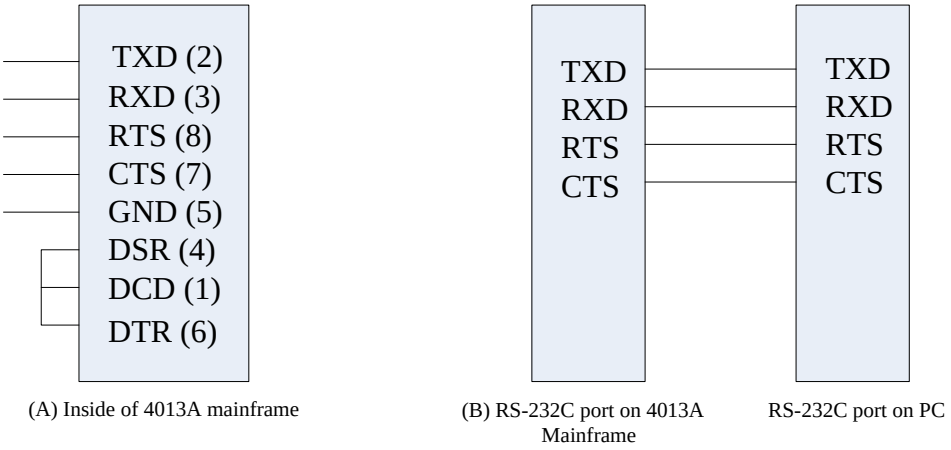



Fig 4-1 PC RS232 Interface connection of rear panel

## 4-2.4013A programming command list

| Functions | Descriptions | Syntax |
|---|---|---|
| **Setting** | Setting Normal/Inrush current mode<br>(00=Normal mode, 01=Inrush current mode) | 0x60 xx 0A |
| | Setting AC/DC Power Mode<br>(00=AC Mode, 01=DC Mode) | 0x61 xx 0A |
| | Setting V-Range<br>(00=30Vac/40Vdc, 01=300Vac/400Vdc) | 0x62 xx 0A |
| | Setting I-Range<br>(00=0.02A, 01=0.2A, 02=2A, 03=20A, 04=200A) | 0x63 xx 0A |
| | Setting M-RATE meter update rate<br>(00=one cycle, 01=0.1S, 02=0.5S, 03=1S, 04=2S, 05=5S, 06=10S) | 0x65 xx 0A |
| | Clear WS and Elapsed Time<br>(00=Clear KWH & Time, 01=Only Clear KWH Data) | 0x66 xx 0A |
| | Setting select CH1~CH4 digital power meter<br>(01=CH1, 02=CH2, 04=CH3, 08=CH4, 0F=CH1~4) | 0x67 xx 0A |
| | Setting low pass filter（50KHz）enable/disable<br>(00=Disable, 01=Enable) | 0x68 xx 0A |
| | Setting internal/external synchronous<br>(00=Internal, 01=External) | 0x69 xx 0A |
| | Setting Inrush current measure enable/disable<br>(00=Disable, 01=Enable) | 0x6A xx 0A |
| | Setting Inrush current delay time<br>(0x0000~0x03E7 = 0~9999 ms) | 0x6B xx xx 0A |
| | Setting reset | 0x6C 0A |

Table 4-1 Setting command list

| | | |
|---|---|---|
| Query | Query project number | 0x27 0A |
| | Query firmware version | 0x28 0A |

Table 4-2 Query command list

| | | |
|---|---|---|
| Measurement | Query output voltage reading | 0x00 0A |
| | Query output current reading | 0x01 0A |
| | Query inrush current reading | 0x02 0A |
| | Query load power reading | 0x03 0A |
| | Query VA reading | 0x04 0A |
| | Query PF reading | 0x05 0A |
| | Query freauency reading | 0x06 0A |
| | Query elapsed time reading | 0x07 0A |
| | Query peak current reading | 0x08 0A |
| | Query accumulated energy | 0x0A 0A |

Table 4-3 Measurement command list

## 4-3.Remote command feedback data descriptions

1. Setting command feedback data format：
   Setting command 0x60~0x66.
   Feedback 10 bytes data format, at last byte is the 0x0A.
   First 2 bytes is the range flag and status flag.

| Range | Status | CH1 ACK | , | CH2 ACK | , | CH3 ACK | , | CH4 ACK | END |
|---|---|---|---|---|---|---|---|---|---|
| 1Byte | 1Byte | 0x06 | 0x2C | 0x06 | 0x2C | 0x06 | 0x2C | 0x06 | 0x0A |

   Setting command 0x67~0x6C.
   Feedback 2 bytes data format, at last byte is the 0x0A.

| ACK | END |
|---|---|
| 0x06 | 0x0A |

2. Query command feedback data format：
   Query command 0x27~0x28.
   Feedback 3 bytes data format, at last byte is the 0x0A.

| Data1 | Data2 | END |
|---|---|---|
| 0x00~0xFF | 0x00~0xFF | 0x0A |

3. Measurement command feedback data format：
   Measurement command 0x00~0x0A.
   Feedback 14~38 bytes data format, at last byte is the 0x0A.
   First 2 bytes is the range flag and status flag.

| Range | Status | CH1 Data | , | CH2 Data | , | CH3 Data | , | CH4 Data | END |
|---|---|---|---|---|---|---|---|---|---|
| 1Byte | 1Byte | N Byte | 0x2C | N Byte | 0x2C | N Byte | 0x2C | N Byte | 0x0A |

Range Flag

| B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|---|---|---|---|---|---|---|
| **Mode** | **---** | **V Range** | **Inrush** | **I Range** | | | |
| 0=AC<br>1=DC | --- | 0=30V<br>1=300V | 0=I Range<br>1=200A | 20A | 2A | 200mA | 20mA |

Status Flag

| B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|---|---|---|---|---|---|---|
| **FILTER** | **SYNC** | **OVER** | **ERROR** | **Negative Value** | | | |
| 0=Off<br>1=On | 0=INT<br>1=EXT | 1=Over | 1=Error | 1=CH4 is Negative | 1=CH3 is Negative | 1=CH2 is Negative | 1=CH1 is Negative |

4. Error command feedback data format：
   Feedback 2 bytes data format, at last byte is the 0x0A

| NAK | END |
|---|---|
| 0x15 | 0x0A |

   Feedback 10 bytes data format, at last byte is the 0x0A

| Range | Status | CH1 NAK | , | CH2 NAK | , | CH3 NAK | , | CH4 NAK | END |
|---|---|---|---|---|---|---|---|---|---|
| 1Byte | 1Byte | 0x15 | 0x2C | 0x06 | 0x2C | 0x15 | 0x2C | 0x15 | 0x0A |

## 4-4.Remote command descriptions

4-4-1 Setting Command

**0x60**
Syntax： 0x60 xx 0A
Purpose：Setting 4013A normal/inrush current mode。
Description：1) Setting normal mode：0x60 00 0A
2) Setting inrush current mode：0x60 01 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x61**
Syntax： 0x61 xx 0A
Purpose：Setting AC/DC power mode
Description：1) Setting AC power mode：0x61 00 0A
2) Setting DC power mode：0x61 01 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x62**
Syntax： 0x62 xx 0A
Purpose：Setting V-Range
Description：1) Low V-Range 0.000 ~ 30.000Vrms/40.000Vdc：0x62 00 0A
2) High V-Range 30.00 ~ 306.00Vrms/400.00Vdc：0x62 01 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x63**
Syntax： 0x63 xx 0A
Purpose：Setting I-Range
Description：1) Setting I-Range 20.000mA：0x63 00 0A
2) Setting I-Range 200.00mA：0x63 01 0A
3) Setting I-Range 2.0000A：0x63 02 0A
4) Setting I-Range 20.000A：0x63 03 0A。
5) Setting I-Range 200.00A：0x63 04 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x65**
Syntax： 0x65 xx 0A
Purpose：Setting M-RATE meter update rate
Description：1) One cycle(by frequency)：0x65 00 0A
2) 0.1s：0x65 01 0A
3) 0.5s：0x65 02 0A
4) 1s：0x65 03 0A
5) 2s：0x65 04 0A
6) 5s：0x65 05 0A
7) 10s：0x65 06 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x66**
Syntax： **0x66 xx 0A**
Purpose：Clear WS and Elapsed Time
Description：1) Clear WS and Elapsed Time：0x66 00 0A
2) Only clear WS：0x66 01 0A
Feedback 10 bytes data format：0xXX XX 06 2C 06 2C 06 2C 06 0A

**0x67**
Syntax： 0x67 xx 0A
Purpose：Setting select CH1~CH4 digital power meter
Description：

| Commamd | Data | | | | | | | | END |
|---|---|---|---|---|---|---|---|---|---|
| | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | |
| 0x67 | --- | --- | --- | --- | CH4 | CH3 | CH2 | CH1 | 0x0A |

1) Only use CH1 digital power meter：0x67 01 0A
2) Only use CH2 digital power meter：0x67 02 0A
3) Only use CH3 digital power meter：0x67 04 0A
4) Only use CH4 digital power meter：0x67 08 0A
5) Use CH1~2 digital power meter：0x67 03 0A
6) Use CH3~4 digital power meter：0x67 0C 0A
7) Use CH1~4 digital power meter：0x67 0F 0A
Feedback 2 bytes data format：0x06 0A

**0x68**
Syntax： 0x68 xx 0A
Purpose：Settinf low pass filter（50KHz）enable/disable
Description：1) Low pass Filter（50KHz）disable：0x68 00 0A
2) Low pass filter（50KHz）enable：0x68 01 0A
Feedback 2 bytes data format：0x06 0A

**0x69**
Syntax： 0x69 xx 0A
Purpose：Setting internal/external synchronous
Description：1) Setting internal synchronous：0x69 00 0A
2) Setting external synchronous：0x69 01 0A
Feedback 2 bytes data format：0x06 0A

**0x6A**
Syntax： 0x6A xx 0A
Purpose：Setting inrush current measurement enable/disable
Description：1) Stop measuring inrush current.：0x6A 00 0A
2) Start measuring inrush current.：0x6A 01 0A
Feedback 2 bytes data format：0x06 0A

**0x6B**
Syntax： 0x6B xx xx 0A
Purpose：Setting inrush current delay time
Description：1) The delay time is 0 ~ 9999ms
2) Setting measurement inrush current delay time 10 mS：0x6B 00 0A 0A
Feedback 2 bytes data format：0x06 0A

**0x6C**
Syntax： 0x6C 0A
Purpose：Setting reset CH1~CH4 meter module
Description：Reset meter module：0x6C 0A
Feedback 2 bytes data format：0x06 0A

4-4-2 Query Command

**0x27**
Syntax： 0x27 0A
Purpose：Query project number
Description：Query project number：0x27 0A
Feedback 2 bytes data format：0x0F AD 0A

**0x28**
Syntax： 0x28 0A
Purpose：Query firmware version
Description：Query firmware version：0x28 0A
Feedback 2 bytes data format：0xXX XX 0A

4-4-3 Measurement Command

**0x00**
Syntax： 0x00 0A
Purpose：Query voltage reading。
Description：CH1~CH4 AC 100.00V(V-Range 300V/I-Range 20A)
Feedback 14 bytes data format：0x28 00 27 10 2C 27 10 2C 27 10 2C 27 10 0A

**0x01**
Syntax： 0x01 0A
Purpose：Query current reading
Description：CH1~CH4 AC 2.000A(V-Range 300V/I-Range 20A)
Feedback 14 bytes data format：0x28 00 07 D0 2C 07 D0 2C 07 D0 2C 07 D0 0A

**0x02**
Syntax： 0x02 0A
Purpose：Query inrush current reading
Description：CH1~CH4 AC100.00Apeak+/5.00Apeak-(V-Range 300V/I-Range 200A)
Feedback 22 bytes data format：0x38 00 27 10 01 F4 2C 27 10 01 F4 2C 27 10 01 F4 2C 27 10 01 F4 0A

**0x03**
Syntax： 0x03 0A
Purpose：Query power reading
Description：CH1~CH4 AC2000.00000W(V-Range 300V/I-Range 20A)
Feedback 22 bytes data format：0x28 00 0B EB C2 00 2C 0B EB C2 00 2C 0B EB C2 00 2C 0B EB C2 00 0A

**0x04**
Syntax： 0x04 0A
Purpose：Query VA reading
Description：CH1~CH4 AC2000.00000VA(V-Range 300V/I-Range 20A)
Feedback 22 bytes data format：0x28 00 0B EB C2 00 2C 0B EB C2 00 2C 0B EB C2 00 2C 0B EB C2 00 0A

**0x05**
Syntax： 0x05 0A
Purpose：Query PF reading
Description：CH1~CH4 PF1.000(V-Range 300V/I-Range 20A)
Feedback 14 bytes data format：0x28 00 27 10 2C 27 10 2C 27 10 2C 27 10 0A

**0x06**
Syntax： 0x06 0A
Purpose：Query frequency reading
Description：CH1~CH4 frequency 60.0Hz((V-Range 300V/I-Range 20A)
Feedback 14 bytes data format：0x28 00 02 58 2C 02 58 2C 02 58 2C 02 58 0A

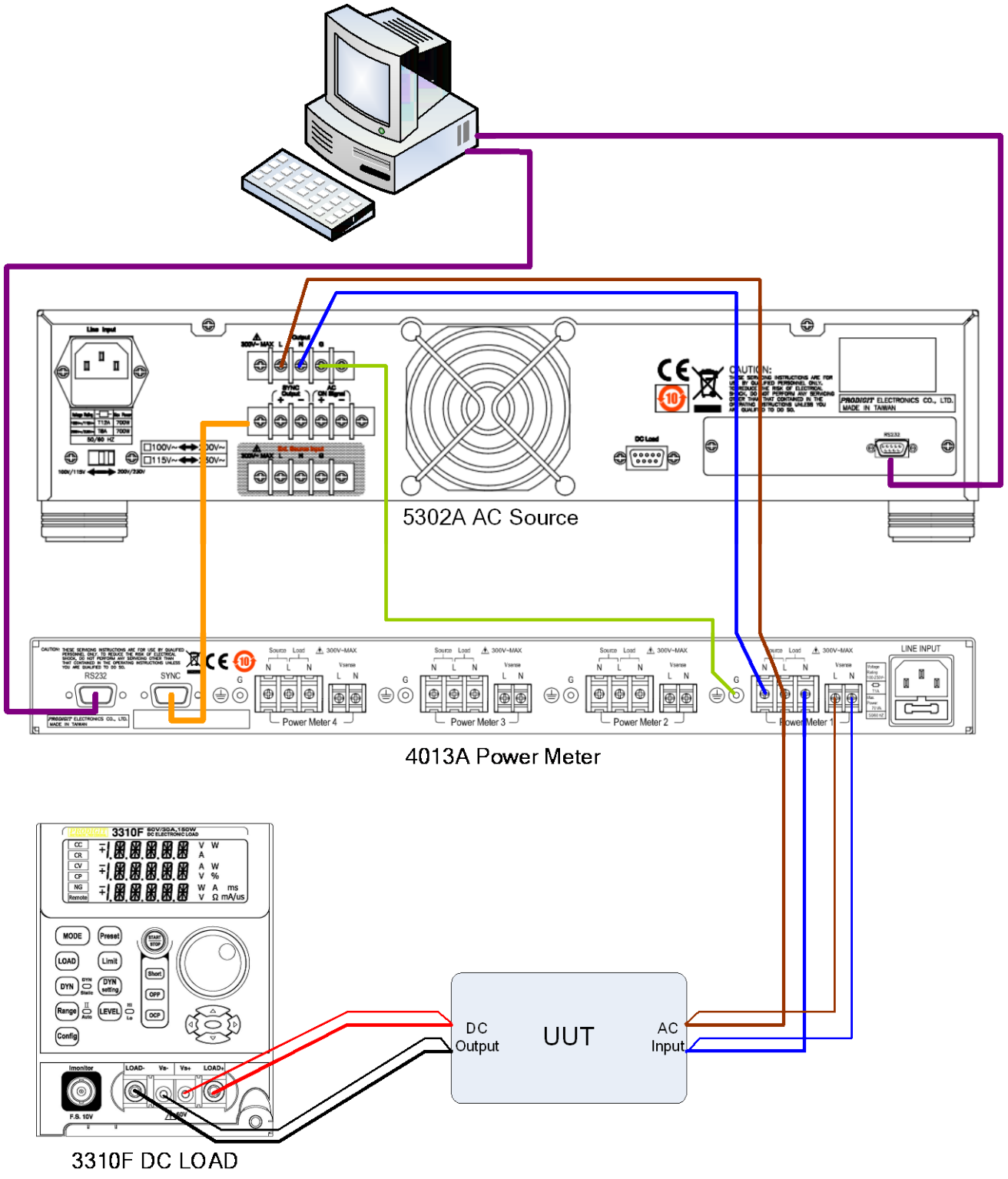
**0x07**
Syntax： 0x07 0A
Purpose：Query elapsed time reading
Description：CH1~CH4 Elapsed Time100S(V-Range 300V/I-Range 20A)
Feedback 38 bytes data format：0x28 00 00 00 00 00 00 00 64 2C 00 00 00 00 00 00 00 64 2C 00 00 00 00 00 00 00 64 2C 00 00 00 00 00 00 00 64 0A

**0x08**
Syntax： 0x08 0A
Purpose：Query peak current reading
Description：CH1~CH4 AC10.000Apeak+/5.000Apeak-(V-Range 300V/I-Range 20A)
Feedback 22 bytes data format：0x28 00 27 10 13 88 2C 27 10 13 88 2C 27 10 13 88 2C 27 10 13 88 0A

**0x0A**
Syntax： 0x0A 0A
Purpose：Query accumulated energy
Description：CH1~CH4 accumulated energy 0.50000WS(V-Range 300V/I-Range 20A)
Feedback 38 bytes data format：0x28 00 00 00 00 00 00 00 C3 50 2C 00 00 00 00 00 00 00 C3 50 2C 00 00 00 00 00 00 00 C3 50 2C 00 00 00 00 00 00 00 C3 50 0A

# Chapter 5 Applications

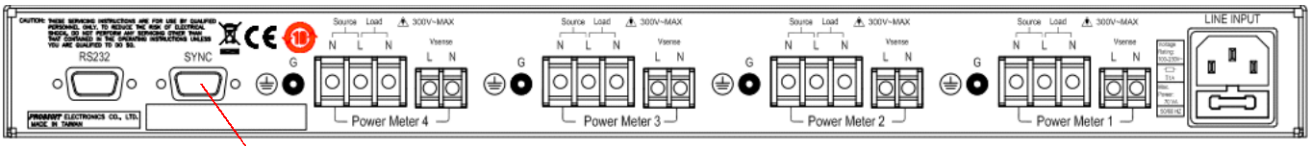
## 5-1.Measurement device connection

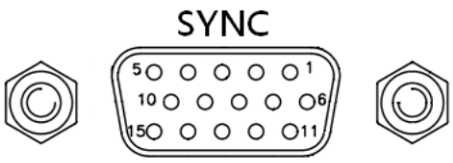


## 5-2.Inrush current mode setting procedure

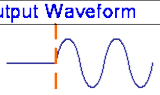
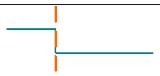
1. Setting inrush delay time
   0x6B 0x0000~0x270F (0~9999mS) 0x0A
2. Setting Inrush relay (Setting I-Range 200A)
   0x63 0x04 0x0A
3. Setting AC mode
   0x 61 0x00 0x0A
4. Setting Inrush mode
   0x 60 0x01 0x0A
5. Start Inrush test (Start Inrush trig)
   0x6A 0x01 0x0A
6. Inrush test off(Stop Inrush trig)
   0x6A 0x00 0x0A
7. Query Inrush current value
   0x02 0x0A
8. Setting normal mode (Return normal mode)
   0x60 0x00 0x0A
9. Setting current relay (Setting I-Range)
   0x63 0x00~0x03 0x0A

# Appendix 1 SYNC D-SUB HD 15P descriptions




| 4013A SYNC D-SUB HD 15PIN | |
|---|---|
| PIN 01 | Power Meter 1 AC ON SYNC(-) Input |
| PIN 02 | Power Meter 2 AC ON SYNC(-) Input |
| PIN 03 | Power Meter 3 AC ON SYNC(-) Input |
| PIN 04 | Power Meter 4 AC ON SYNC(-) Input |
| PIN 05 | none |
| PIN 06 | Power Meter 1 AC ON & Ex_V SYNC(+) Input |
| PIN 07 | Power Meter 2 AC ON & Ex_V SYNC(+) Input |
| PIN 08 | Power Meter 3 AC ON & Ex_V SYNC(+) Input |
| PIN 09 | Power Meter 4 AC ON & Ex_V SYNC(+) Input |
| PIN 10 | none |
| PIN 11 | Power Meter 1 Ex_V SYNC(-) Input |
| PIN 12 | Power Meter 2 Ex_V SYNC(-) Input |
| PIN 13 | Power Meter 3 Ex_V SYNC(-) Input |
| PIN 14 | Power Meter 4 Ex_V SYNC(-) Input |
| PIN 15 | none |

| 5302A SYNC Output Waveform | |
|---|---|
| AC OFF to ON |  |
| AC ON Signal |  |
| SYNC Output |  |

Please connect PIN 01~04 to 5302A AC Source SYNC Output(-)
PIN 06~09 to 5302A AC Source AC ON Signal(+) & SYNC Output(+)
PIN 11~14 to 5302A AC Source AC ON Signal (-)