

# CP-300 SERIES

## DIGITAL POWER METER

# OPERATION MANUAL





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# CONTENT

## 1. GENERAL DISCRIPTION

- 1.1 Equipment Check List..... 1-1
- 1.2 Accessories(optional)..... 1-1

## 2. SPECIFICATIONS

- 2.1 Features..... 2-1
- 2.2 Basic Specification..... 2-2

## 3. PANEL DESCRIPTIONS

- 3.1 Description of CP-310 Front Panel..... 3-1
- 3.2 Description of CP-320A/CP-350 Front Panel..... 3-3
- 3.3 REAR PANEL DESCRIPTIONS..... 3-6

## 4. OPERATION

- 4.1 General ..... 4-1
- 4.2 Block diagram..... 4-2

## 5. COMMUNICATION OPERATION

- 5.1 Introductions ..... 5-1
- 5.2 Setting RS-232 parameters ..... 5-1
- 5.3 Cabling the CP-300 series to a Host ..... 5-1
- 5.4 Disable RS-232 communication..... 5-2

## 6. REMOTE PROGRAMMING REFERENCE GUIDE

- 6.1 Command Summary:..... 6-1
- 6.2 Programming syntax branch diagram..... 6-2
- 6.3 Statements command..... 6-2
- 6.4 Queries command..... 6-3

## 7. APPLICATION

- 7.1 Using PT to extend the voltage rate..... 7-1
- 7.2 Using CT to extend the current rate..... 7-2
- 7.3 Input power measurements for Electric/Electronic Productions..... 7-3
- 7.4 Power sources productions..... 7-3
- 7.5 High frequency resistance load productions..... 7-3

# SECTION 1: GENERAL DISCRIPTION

## 1.1 Equipment Check List

The following items comprise a complete instrument:

- \* User Manuel
- \* AC Line Power Cord
- \* AC Male Plug with Power Cord for connect to Source terminal
- \* AC Female Socket with power cord for connect to LOAD terminal
- \* Hook Terminal x 4
- \* Spare 0.2A fuse
- \* Traceable Calibration Certificate

## 1.2 Accessories (optional)

The following options are available:

- \* CPA-SERIES: Universal Test Adapter
- \* CPR-200: Rack Mount Kit for 19' inch cabinet

## SECTION 2: SPECIFICATIONS

### 2.1 Features:

- Basic  $\pm 0.1\%$  accuracy
- Close case software calibration
- Simultaneous display of four values
- RS-232 interface provided as standard
- 3.3 sampling rate per second
- Frequency measured function
- Averaging of 3 measured data points
- GPIB/IEEE488 interface provided optional
- Input Binding Post terminals suffer High current capability
- Four display windows for good visual data

## 2.2 Basic specification

Line measure	: Single phase, two conductor (1Ø2W)
Values measured	: Voltage, current, Active power, Power factor, reactive power, apparent power, frequency.
Measurement ranges	: Voltage, current and active power see separate table of ranges and resolution Frequency : 10Hz~100KHz
Operating principle	: Voltage and current : True RMS Power : Analog multiplier circuit.
Range selection	: Auto or manual (remote via RS-232)
Sampling rate	: 3.3 times/sec
Input impedance	: Voltage : approx $1M\Omega$ Current : approx $10m\Omega$ (CP-310, CP-320A) approx $5m\Omega$ (CP-350)
Maximum allowable input	: Voltage : 650Vrms Current : 20A RMS 50A peak (CP-310, CP-320A) 50A RMS 125A peak (CP-350)
Maximum common mode voltage	: Voltage and current input terminals : 600Vrms
Crest factor	: 3
Input method	: Voltage : resistance divider Current : shunt
Input terminals	: Large binding posts.
Effective input range	: 5% to 100% of the set range.
Temperature Coefficient	: Less than $\pm 0.05\%$ f.s/°C
Averaging function	: Displays computed average (fix 3 measured).

### Computing Function

Apparent power	Reactive power	Power factor
$VA=VXA$	$VAR=\sqrt{(VA^2-W^2)}$	$PF=W/(VA)$

Computing Range : VA, VAR : Voltage and current range

PF : Zero to unity leading or lagging.

Computing Accuracy : VA, VAR :  $\pm 0.05\%$  of rated value

PF :  $\pm 0.001$





## Frequency measurement function

Operating principle	: Reciprocal counting method.
Measurement range	: 5% to 100% set range (10Hz~100KHz)
Auto Range	: 450Hz/10KHz/100KHz
Accuracy	: $\pm 1$ DGT of the range
Measurement cycle	: 3.3 times/sec
Display Range	: 10.00Hz~99999Hz (5 digits)

## Interface

RS-232 :

Baud Rate	: 1200,2400,9600 bps
Transmission system	: Start-stop synchronization. 8 bit, 1 stop bit, none parity

Accuracy (at  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , power factor 1, warm-up time at least 30 minutes)

## Power Range and Resolution

### CP-310

V \ A	0.2000A	2.000A	20.00A
150.0V	30.00W	300.0W	3000W
300.0V	60.00W	600.0W	6000W
500.0V	100.0W	1000W	9999W

Frequency	V.A	Power
10Hz~45Hz	$\pm 0.15\%$	$\pm 0.2\%$
45Hz~66Hz	$\pm 0.1\%$	$\pm 0.1\%$
66Hz~450Hz	$\pm 0.1\%$	$\pm 0.12\%$
450Hz~5KHz	$\pm 0.15\%$	$\pm 0.2\%$

**CP-320A**

V \ A	0.2000A	2.000A	20.00A
30.00V	6.000W	60.0W	600.0W
300.0V	60.00W	600.0W	6000W
500.0V	100.0W	1000W	9999W

Frequency	V.A	Power
10Hz~45Hz	±0.15%	±0.2%
45Hz~66Hz	±0.1%	±0.1%
66Hz~450Hz	±0.1%	±0.12%
450Hz~5KHz	±0.15%	±0.2%
5KHz~20KHz	±0.12%	±0.5%
20KHz~50KHz	±0.2%	±1%
50KHz~100KHz	±0.6%	---

**CP-350**

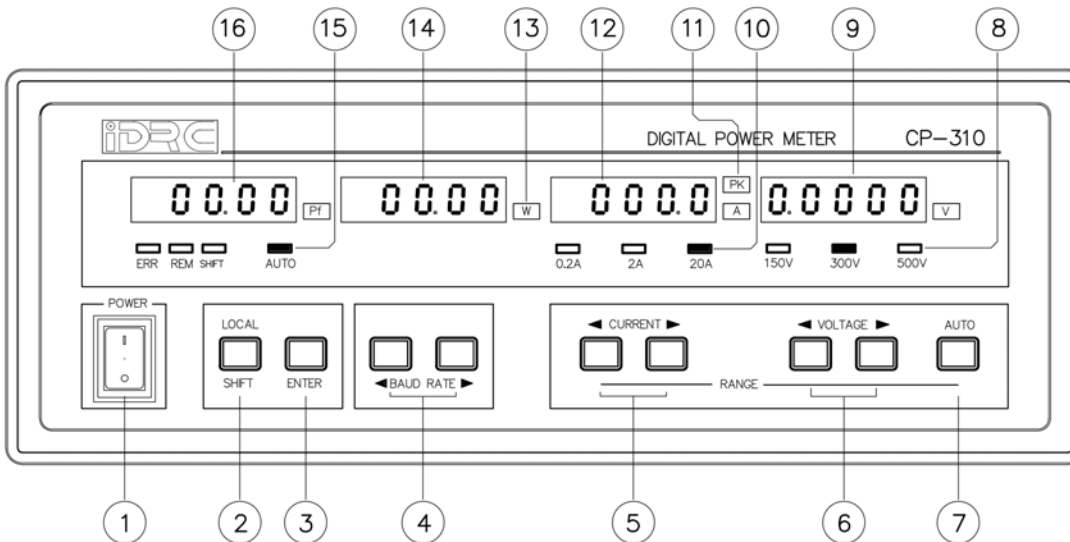
V \ A	0.5000A	5.000A	50.00A
150.0V	75.00W	750.0W	7.500W
300.0V	150.0W	1.500W	15.00W
600.0V	300.0W	3.000KW	30.00KW

Frequency	V.A	Power
10Hz~45Hz	±0.15%	±0.2%
45Hz~66Hz	±0.1%	±0.1%
66Hz~450Hz	±0.1%	±0.12%
450Hz~5KHz	±0.15%	±0.2%



# SECTION 3 : PANEL DESCRIPTIONS :

## 3.1 Description of CP-310 Front Panel :



( 1) POWER : Power Control On/Off Switch

\* When POWER turn on, all the 7-segment displays with dot LED and LED annunciators will light about 1 second, then will display model name and which versions about 1 second. After above step then functions going to working.

CAUTION: Check right AC line voltage applied before POWER ON

( 2) SHIEFT : Local Function and RS232 Baud Rate Setting Function

\* Local function is when CP-320A/CP-350 under RS232 remote control, Press SHIFT key then 'REM' LED annunciator is off and return to Local operation by panel.

\* RS232 baud rate setting function is When 'REM' LED annunciator is off, Press SHIFT key then 'SHIFT' LED annunciator is on; Press FUNCTION (BAUD RATE) keys to setting RS232 baud rate then confirm save by AVG (ENTER) key.

( 3) ENTER : Save Baud Rate data under 'SHIFT' function is work

( 4) BAUD RATE : Change Baud Rate under 'SHIFT' function is work

( 5) CURRENT : Current Range selection

\* Each of the current range choices which can view increment by right key or decrement by left key and the 'AUTO' LED annunciator will dark.

( 6) VOLTAGE : Voltage Range selection

\* Each of the current range choices which can view increment by right key or decrement by left key and the 'AUTO' LED annunciator will dark.

( 7) AUTO : Auto Selection of Voltage and Current Range

\* In AUTO mode, the 'AUTO' LED annunciator will light. Each of the current/voltage range will automatically choices which range increment when data great than maximum of each range or decrement when data less than 10% of each range.

\* POWER on default is AUTO

( 8) VOLTAGE RANGE LED ANNUNCIATORS: 150V /300V/500V Ranges

( 9) VOLTAGE DATA DISPLAY : Display of Voltage Data

\* All data is True RMS (Root Mean Square).

(10) CURRENT RANGE LED ANNUNCIATORS: 0.2A/2A/20A Ranges

(11) PEAK CURRENT LED ANNUNCIATORS: Peak current indicator

\* 'Peak' LED annunciators will light When the peak of current waveform is great than 2.5 times of each current range, But that can not change current range.

(12) CURRENT DATA DISPLAY: Display of Current Data

\* All data is True RMS (Root Mean Square).

(13) WATT LED annunciators: Display Unit of Watt

(14) WATT DATA DISPLAY: Display Unit of Watt Data

\* All data is True RMS (Root Mean Square).

(15) STATUS LED ANNUNCIATOR: 5 Status condition indicator

\*\*'AUTO' LED annunciator will change by 'AUTO' key is press.

\*\*'SHIFT' LED annunciator will change by SHIFT key is press.

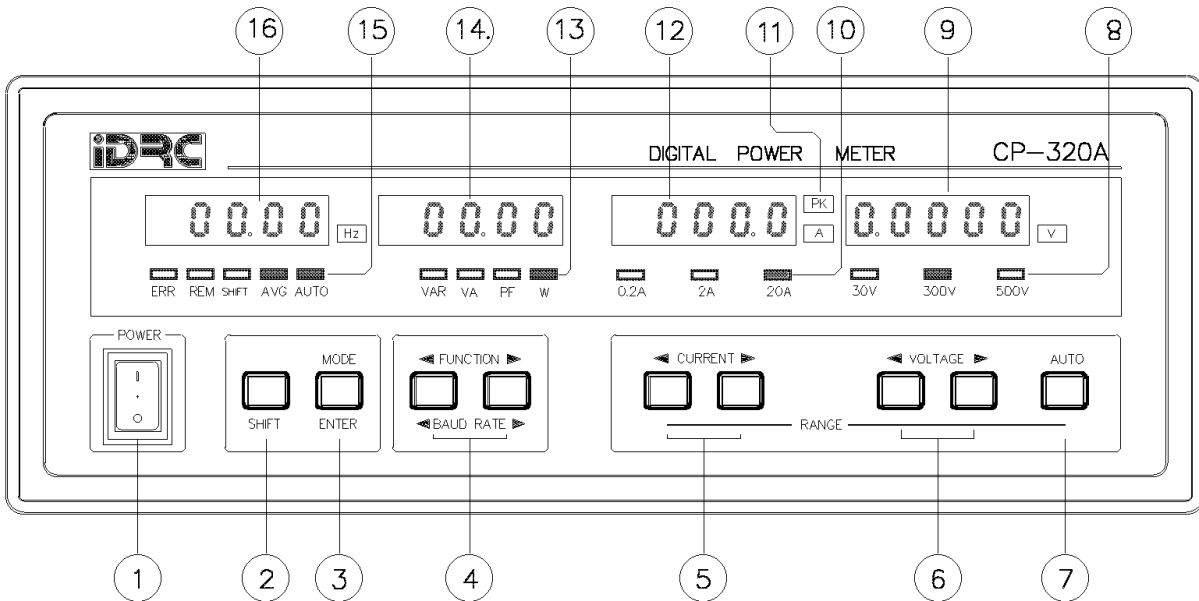
\*\*'REM' LED annunciator will light when remote by RS232 control.

\*\*'ERR' LED annunciator will light RS232 remote messages was wrong.

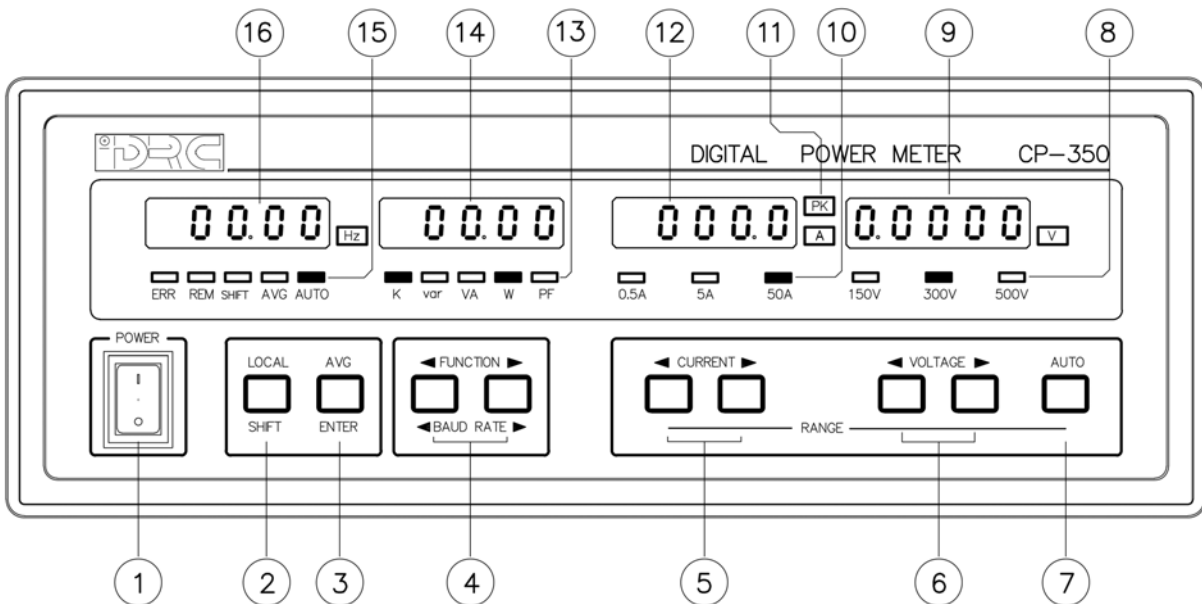
(16) POWER FACTOR DATA DISPLAY: Display of Power Factor (PF) Data

### 3.2 Description of CP-320A/CP-350 Front Panel :

#### CP-320A FRONT PANEL



#### CP-350 FRONT PANEL



( 1) POWER : Power Control On/Off Switch

\* When POWER turn on, all the 7-segment displays with dot LED and LED annunciators will light about 1 second, then will display model name and which version about 1 second. After above step then functions going to working.

**CAUTION:** Check right AC line voltage applied before POWER ON

( 2) SHIFT : Local Function and RS232 Baud Rate Setting Function

- \* Local function is when CP-320A/CP-350 under RS232 remote control, Press SHIFT key then 'REM' LED annunciator is off and return to Local operation by panel.
- \* RS232 baud rate setting function is When 'REM' LED annunciator is off, Press SHIFT key then 'SHIFT' LED annunciator is on; Press FUNCTION (BAUD RATE) keys to setting RS232 baud rate then confirm save by AVG (ENTER) key.

( 3) MODE : Average or Normal Mode, Sampling rate

- \* Under Normal mode, display power data's are 3.3 times per Second. Power datas includes Voltage data, Current data and Function (W/PF/VA/VAR) data and 'AVG' LED annunciator will dark.
- \* Under Average mode, display power datas after average 3 times display datas and 'AVG' LED annunciator will light .
- \* No influent Frequency sampling rate.
- \* POWER on default is Normal Mode

( 4) FUNCTION : Selection Data of W/PF/VA/VAR to Display

- \* W=Watt, PF=Power Factor, VA=Apparent Power and VAR= Reactive Power.
- \* POWER on default is Watt function

( 5) CURRENT : Current Range selection

- \* Each of the current range choices which can view increment by right key or decrement by left key and the 'AUTO' LED annunciator will dark.

( 6) VOLTAGE : Voltage Range selection

- \* Each of the current range choices which can view increment by right key or decrement by left key and the 'AUTO' LED annunciator will dark.

( 7) AUTO : Auto Selection of Voltage and Current Range

- \* In AUTO mode, the 'AUTO' LED annunciator will light. Each of the current/voltage range will automatically choices which range increment when data great than maximum of each range or decrement when data less than 10% of each range.
- \* POWER on default is AUTO

( 8) VOLTAGE RANGE LED ANNUNCIATORS :

CP-320A is 30V /300V/500V Ranges

CP-350 is 150V/300V/500V Ranges

( 9) VOLTAGE DATA DISPLAY : Display of Voltage Data

\* All data is True RMS(Root Mean Square).

(10) CURRENT RANGE LED ANNUNCIATORS :

CP-320A is 0.2A/2A/20A Ranges

CP-350 is 0.5A/5A/50A Ranges

(11) PEAK CURRENT LED ANNUNCIATORS : Peak current indicator

\* 'Peak' LED annunciators will light When the peak of current waveform is great than 2.5 times of each current range, But that can not change current range.

(12) CURRENT DATA DISPLAY : Display of Current Data

\* All data is True RMS(Root Mean Square).

(13) FUNCTION LED ANNUNCIATOR: Display Unit of W/PF/VA/VAR and 'K'

\* 'K'= Kilo,'K' LED annunciator will light according to voltage and current range and W/VA/VAR function is selected. CP-350 only

\* POWER on default is 'W' LED annunciator will light

(14) FUNCTION DATA : Display one of W/PF/VA/VAR Function Data

\* All data is True RMS (Root Mean Square).

(15) STATUS LED ANNUNCIATOR: 5 Status condition indicator

\*'AUTO' LED annunciator will change by 'AUTO' key is press.

\*'AVG' LED annunciator will change by Mode key is press.

\*'SHIFT' LED annunciator will change by SHIFT key is press.

\*'REM' LED annunciator will light when remote by RS232 control.

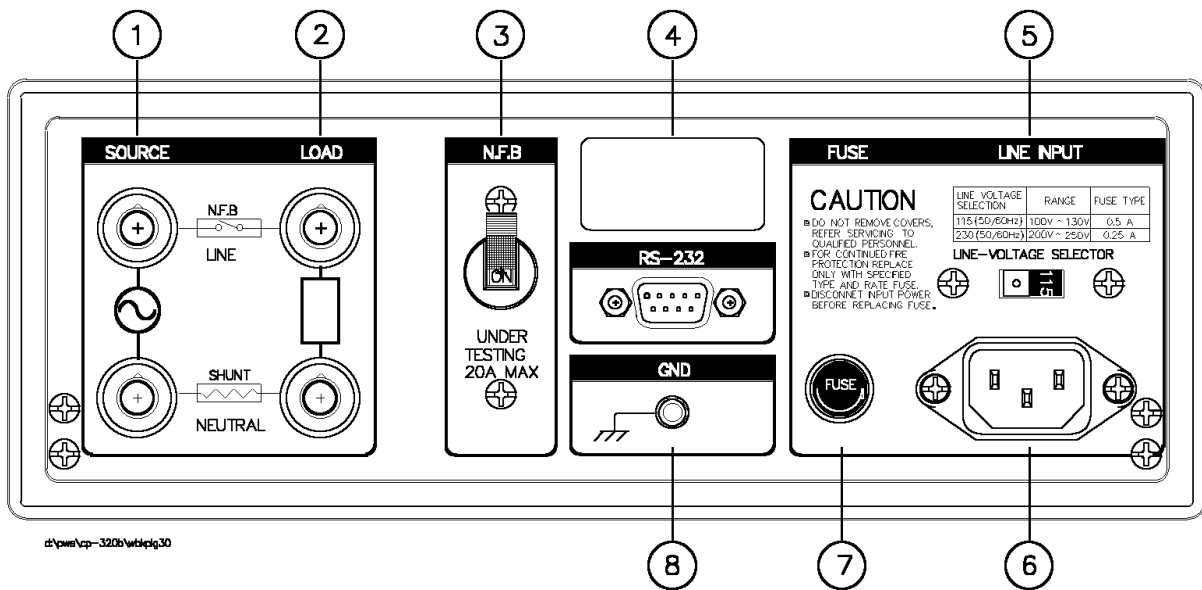
\*'ERR' LED annunciator will light RS232 remote messages was wrong.

(16) FREQUENCY DATA DISPLAY: Display of Frequency Data

\* Stand alone working with another three displays to make sure sampling rate is fastly.



### 3.3 REAR PANEL DESCRIPTIONS:



#### ( 1 ) SOURCE : Source terminals Binding Post Connectors

- \* Source terminals Connection to AC Source for variable AC voltage input of the LOAD terminals.
- \* Red binding post connect to AC cable 'Line' side(white wire).
- \* Black binding post connect to AC cable 'Neutral' side(Black wire).

**CAUTION: AC LINE VOLTAGE DO NOT EXCEED THE MAXIMUM OF RATE INPUT.**

500V AC MAX. ON CP-310 AND CP-320A.

600V AC MAX. ON CP-350.

#### ( 2 ) LOAD : Load terminals Binding Post Connectors

- \* LOAD terminals connect to the AC input of UUT (Unit Under TEST).
- \* Red bindings post connect to AC cable 'Line' side (white wire).
- \* Black binding post connect to AC cable 'Neutral' side (Black wire).

**CAUTION: UUT CURRENT DO NOT EXCEED THE MAXIMUM OF RATE LOAD CURRENT.**

20A AC MAX. ON CP-310 AND CP-320A.

50A AC MAX. ON CP-350.

( 3) POWER : Power Breaker switch

- \* Power Breaker switch will turn off when LOAD terminals current exceed the maximum of rate Load current.

- \* Power Breaker switch control the LOAD terminals AC power on/off

CAUTION: POWER BREAKER RATE CURRENT AS SHOW FOLLOWING:

20A AC MAX. ON CP-310 AND CP-320A.

50A AC MAX. ON CP-350.

( 4) RS-232 : RS-232 9 pins D-connector

( 5) LINE VOLTAGE SELECTOR : Line voltage selector switch

- \* AC line is 100V to 130V, set 115V location

- \* AC line is 200V to 260V, set 230V location

( 6) AC LINE SOCKET : AC line input socket with EMI filter

- \* Connect to a three wire power cord.

CAUTION: TO AVOID SHOCK HAZARD FOR INTERNATIONAL SALE, LINE VOLTAGE

SELECTOR CONSCULT SET TO 230V. PLEASE SETTING YOUR AERA LINE VOLATGE IN ADVENCE.

( 7) FUSE : Fuse holder

- \* Fuse is Slow Blow type

- \* Fuse rate is 0.5A when line voltage is 115V range

Fuse rate is 0.25A when line voltage is 230V range

CAUTION: FOR CONTUNUED FIRE PROTECTION REPLACE ONLY WITH SPECIFIED TYPE AND RATE FUSE. DISCONNENET INPUT POWER BEFORE REPLACING FUSE.

( 8) GND: GROUND TERMINAL

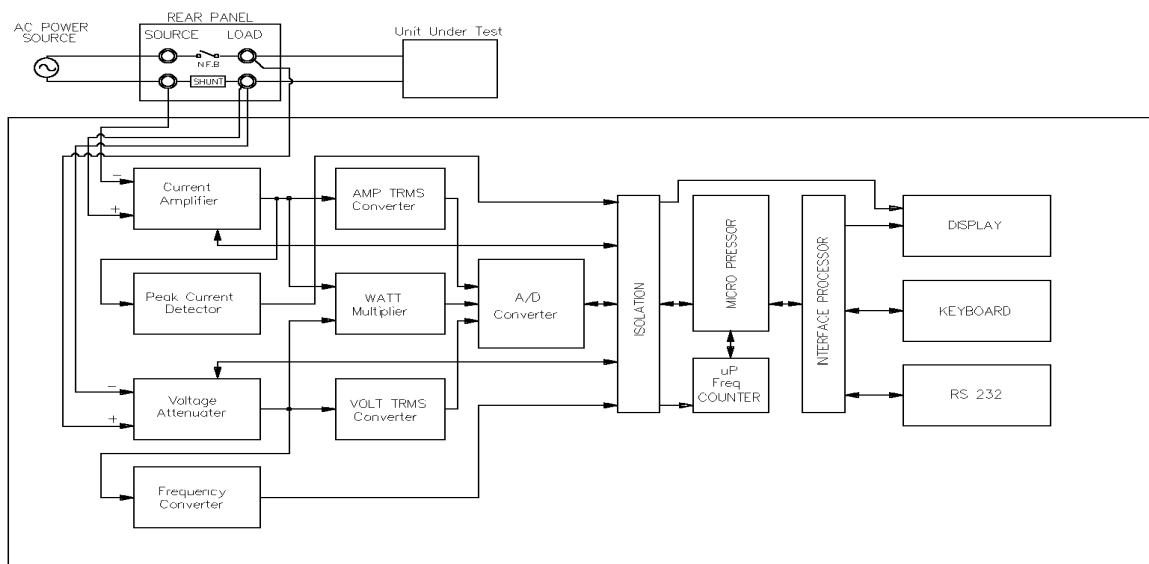
# SECTION 4 : OPERATION

## 4.1 General :

A functional description is referenced the block diagram as follow, and is intended to assist the user in gaining a general understanding of CP-300 series operation.

If need more detailed circuit diagram and Trouble-shooting information for maintenance, please reference 'SERIVCE MANUAL' or contact to your nearest IDRC authorized service center or IDRC International Dept.

## 4.2 Block diagram :



**CAUTION:** NEVER REMOVE THE PLUG FROM THE INSTRUMENT TERMINALS WHILE THE CITCUIT UNDER TEST IS ENERGISED.

# SECTION 5 : COMMUNICATION OPERATION

## 5.1 Introductions :

The CP-300 series is provided RS-232 interfaces as standard. The interface sockets are fitted on the rear panel of the instrument, and be controlled by a computer via RS-232 cable.

IEEE488 interface is optional, and can be easily install by user.

## 5.2 Setting RS-232 parameters :

In order for the CP-300 series and host to communicate via the RS-232 interface, the RS-232 parameters of the CP-300 series must match those of host. Factory defaults RS-232 parameters are:

- \* Parity = None
- \* Number of data bit = 8 (7 data bits plus 1 parity bit)
- \* Number of Stop Bit = 1
- \* Baud rate = 2400

Please proceed as follows to select the appropriate baud rate for the CP-300 series:

(1) Press SHIFT key then 'SHIFT' LED annunciator is on that mean's the CP-300 series under baud rate setting function.

(2) Press BAUD RATE (FUNCTION) keys to scroll to the desired baud; then press ENTER key to set the selected baud rate.

NOTE : RS-232 PARAMETERS ONLY BUAD RATE CAN BE CHANGE

## 5.3 Cabling the CP-300 series to a Host :

The CP-300 series communicates with a host thought a DB-9 interface connector on the rear panel of the CP-300 series.

To connect the CP-300 series with an IBM PC/AT DB-9 connector, Use both 9 pins cables connected end-to-end, a cable intended for interconnecting two IBM

PC/ATs can be used.

After cabling is complete, turn the meter back on, and you are now ready to operate the CP-300 series over RS-232 interface.

The RS232 connector is a DB-9(9 ways male plug) located on the rear panel,

**Protocol of RS232 DB-9 connector as below:**

Pin Number	CP-300 Function	RS232 Definition	IBM PC/AT---- CP-300 series
1	Unused	(CD)	
2	R*D	Received data	R*D(2) ----- T*D(3)
3	T*D	Transmit data	T*D(3) ----- T*D(2)
4	Unused	(DTR)	
5	SG	Signal ground	SG (5) ----- SG (5)
6	Unused	(DSR)	
7	Unused	Request to send	
8	Unused	Clear to send	
9	Unused	(RI)	

**5.4 Disable RS-232 communication:**

The CP-300 series will work in the Local mode until it receives a valid command from the RS-232 interface (it enabled) and thereafter it will only work via the RS232 until "SHIFT" key is pressed.

# SECTION 6 :

## REMOTE PROGRAMMING REFERENCE GUIDE

### 6.1 Command Summary:

This section summarizes the remote commands avail to program the CP-300 series power meter.

NOTE: All the command string/character must be uppercase.

NOTE: The following conventions are used for remote command syntax.

{ } : 'Braces' enclose parameters within a command sting,  
character must be enter.

[ ] : 'Square brackets' indicates OPTIONAL keywords or parameters,  
character may be enter.

\* : 'Line' symbol equal the word of 'OR' means.

? : 'Question mark' is query command,

#### Statements command

V{1\*2\*3} ; Voltage range command

A{1\*2\*3} ; Current range command

R{0\*1} ; Auto/Maul range command

F{1\*2\*3\*4} ; Functions command -----> not for CP-310

E{0\*1} ; Mode(Event rate) command -----> not for CP-310

#### Queries command

?V ; Query the Voltage data

?A ; Query the Current data

?W ; Query the Watt data

?P ; Query the P.F. data

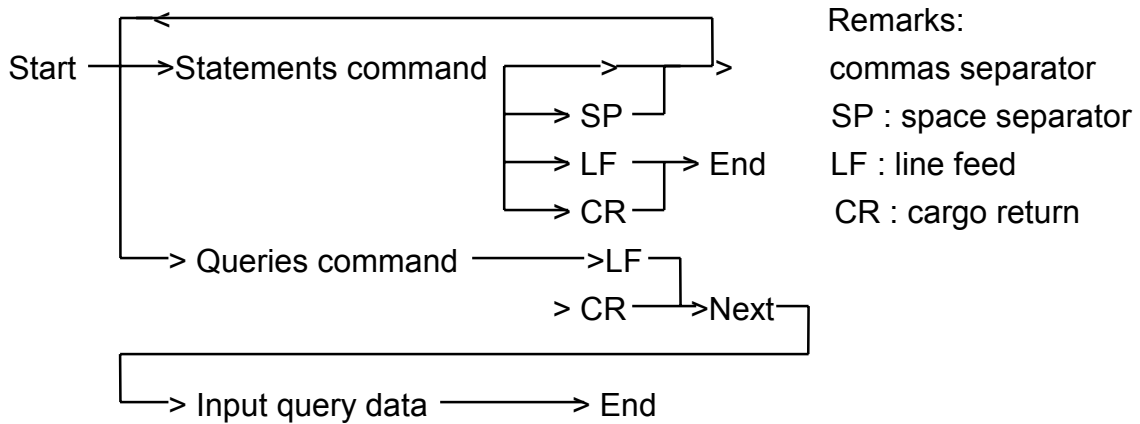
?S ; Query all the data

?F ; Query the Frequency data -----> not for CP-310

?VA ; Query the VA data -----> not for CP-310

?VR ; Query the VAR data -----> not for CP-310

## 6.2 Programming syntax branch diagram:



Remarks:

commas separator

SP : space separator

LF : line feed

CR : cargo return

Example:	RIGHT	WRONG
Command string = 'V1; A1; R0'		'V1A1R0'
Command string = 'V2 A3; R0'		'? V; A1; R0'
Command string = 'V3; A2? V'		'V2? A? V'
Command string = 'V2 A3? P'		

## 6.3 Statements command:

V{1\*2\*3} Select the voltage range:

'V1' change voltage to lowest range.

'V2' change voltage to Middle range.

'V3' change voltage to highest range.

A{1\*2\*3} Select the current range:

'A1' change current to lowest range.

'A2' change current to Middle range.

'A3' change current to highest range.

R{0\*1} Enable or disable auto ranging for the voltage and current

'R0' enable auto range.

'R1' disable auto range.

NOTE: The frequency function always select auto range.

F{1\*2\*3\*4} Function selection -----> not for CP-310

'F1' select watt function to display.

'F2' select PF(power factor) function to display.

'F3' select VA(apparent watt) function to display.

'F4' select VAR(Reactive watt) function to display.

E{0\*1} Select Event sampling rate -----> not for CP-310

'E0' select average mode, display after average 3 times dates.

'E1' select Normal mode, display 3.3 times data per second.

NOTE: The frequency function always select normal mode.

## 6.4 Queries command :

Command Syntax:

<NR2-4> : Four numeric digits with a decimal point.

When data is over each range will display <UUUUU>

When data is not valid will display <----->

Example: '0.423' , '55.28' , '.1000' , '123.4' , '5678.'

'UUUUU' , '-----'

<NR2-5> : Five numeric digits with a decimal point.

When data is over each range will display <UUUUUU>

Example: '042.35' , '528.10' , '1234.5' , '67890.'

'UUUUUU'

<UNIT> : Query Function unit under selected.

There are ' WT' , ' VA' , ' VR' , ' PF' and

'KWT' , 'KVA' , 'KVR' for CP-350 only

<LF> : Line Feed

?V : Query the Voltage data

Query format : <NR2-4>< V ><LF> ;For example '115.0 V '

?A : Query the Current data

Query format : <NR2-4>< A ><LF> ;For example '0.200 A '

?W : Query the Watt data

Query format : <NR2-4>< WT><LF> ;For example '200.0 WT'

Query format : <NR2-4><KWT><LF> ;For example '0.200KWT'(cp350 only)

?P : Query the P.F. data

Query format : <NR2-4>< PF><LF> ;For example '.995 PF'

?F : Query the Frequency data ----->not for CP-310

Query format : <NR2-5>< Hz><LF> ;For example '060.00Hz'

?VA : Query the VA data ----->not for CP-310

Query format : <NR2-4>< VA><LF> ;For example '200.0 VA'

Query format : <NR2-4><KVA><LF> ;For example '0.200KVA(cp350 only)

?VR : Query the VAR data ----->not for CP-310

Query format : <NR2-4>< VR><LF> ;For example '200.0 VR'

Query format : <NR2-4><KVR><LF> ;For example '0.200KVR'(cp350 only)



?S : Query all the data

Query format : CP-310 only

<NR2-4><V><NR2-4><A><NR2-4>< WT><NR2-4>< PF><LF>

; For example '115.0V1.000A115.0 WT0.875 PF'

Query format : Not for CP-310

<NR2-4><V><NR2-4><A><NR2-4><UNIT><NR2-5><Hz><LF>

; For example '115.0V1.000A115.0 WT60.00Hz'

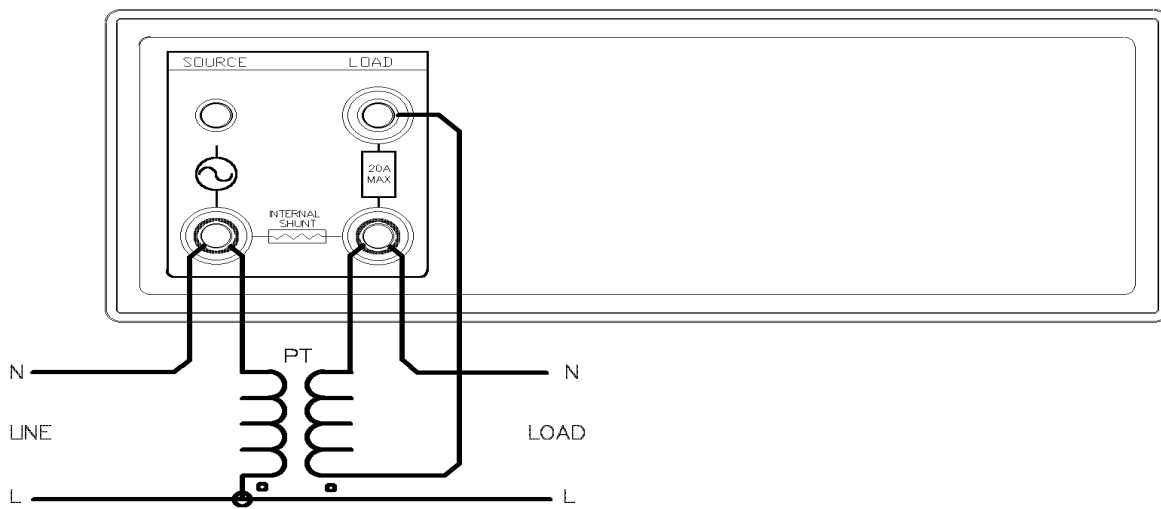
; For example '230.0V10.00A02.30KWT50.00Hz'

# SECTION 7 : APPLICATION:

## 7.1 Using PT to extend the voltage range:

Potential Transformer (PT's) are used to extend the voltage range of the CP-300 series. PT's are available in many division ratios, e.g., 10:1, 100:1, 1000:1. When using a PT's with the CP-300 series, the operator must multiply the voltage and power reading by the ratio of the PT used. The PT connections are shown as following figure.

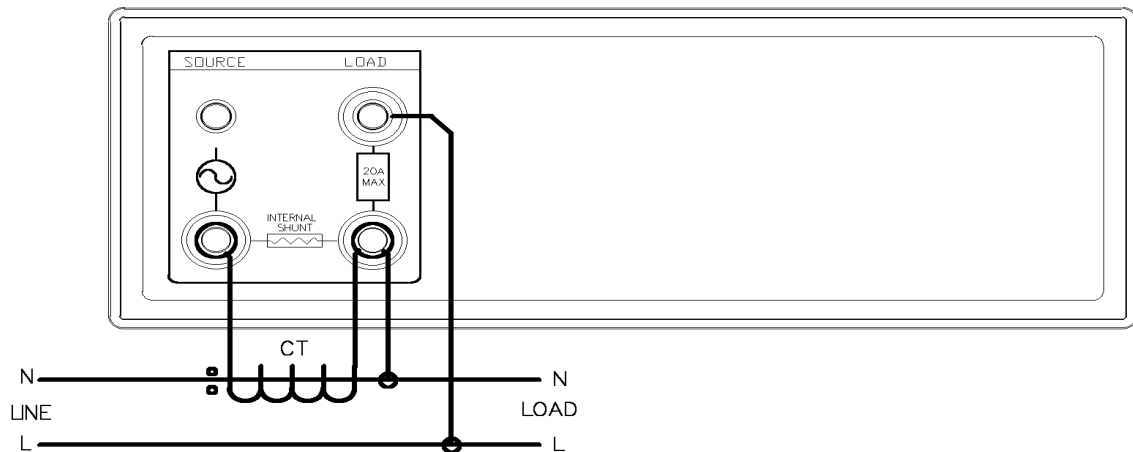
**NOTE:** The bandwidth and ratio accuracy of the PT will affect the overall voltage and power measurement accuracy.]



## 7.2 Using CT to extend the current rate:

Current Transformer (CT's) are used to extend the current range of the CP-300 series. CT's are available in many division ratios, e.g., 10:1, 100:1, 1000:1. When using a CT's with the CP-300 series, the operator must multiply the current and power reading by the ratio of the CT used. The CT connections are shown as following figure.

**NOTE:** The bandwidth and ratio accuracy of the CT will affect the overall current and power measurement accuracy.



### 7.3 Input power measurements for Electric/Electronic productions:

Applications field: Power supply, monitor, Television, Fan, Motor,  
Consumer products...

Input testing parameter: Vrms, Arms, W, PF and  
VA, VAR and Hz (not for CP-310).

**NOTE:** We recommend using CP-320A or CP310 power meter to measure lower power application fields, especially in Green Power/Monitor testing, for accuracy watt measurements.

### 7.4 Power sources productions:

Applications field: UPS, AVR, frequency converter...etc.

Input/Output testing parameter: Vrms, Arms, W, PF and VA, VAR and Hz.

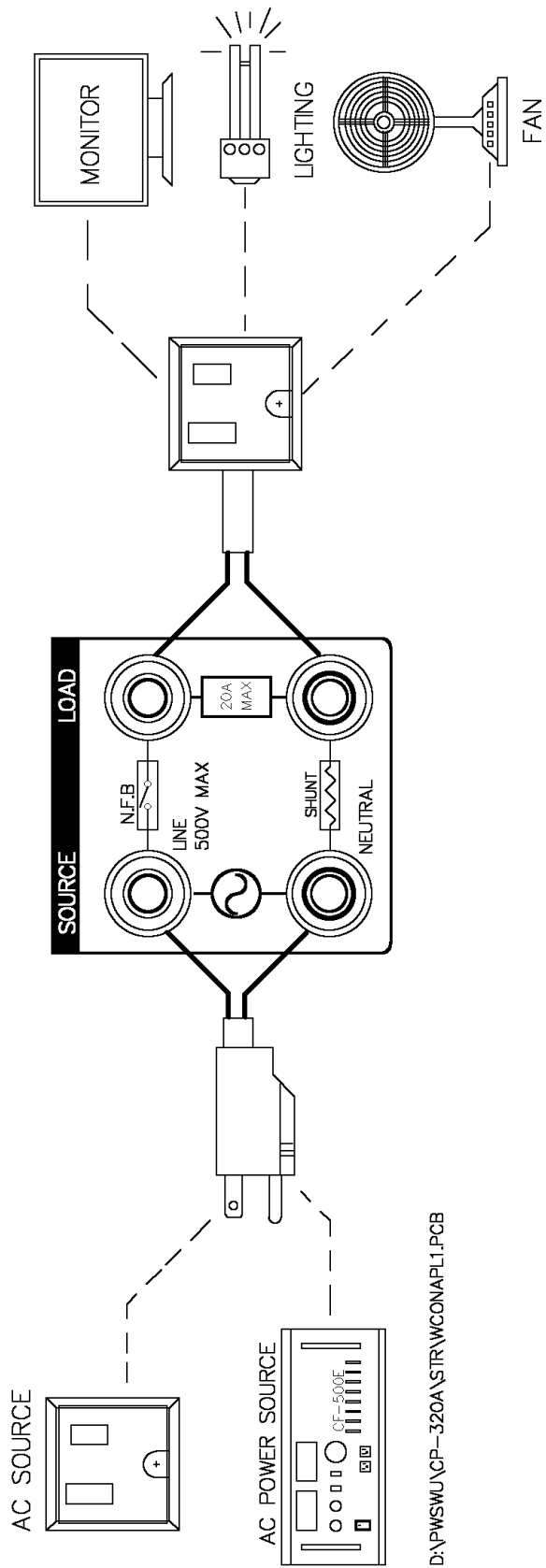
**NOTE:** 1. The LOAD is Bulb lamp, power resistor or heater ...etc.  
2.  $\text{Efficient} = (\text{Output Power} / \text{Input Power}) \times 100\%$   
3. CP-320A has wide frequency bandwidth capability. So it suit measurement in step-square waveform U.P.S., none-sine waveform A.V.R and 5KHz bandwidth's AC Source.

### 7.5 High frequency resistance load productions:(CP-320A only)

Applications field: Electronic Ballast (for fluorescent Lamp, PL Lamp.. ),  
Halogen etc.,.

Input/Output testing parameter: Vrms, Arms, W, PF and VA, VAR and Hz.

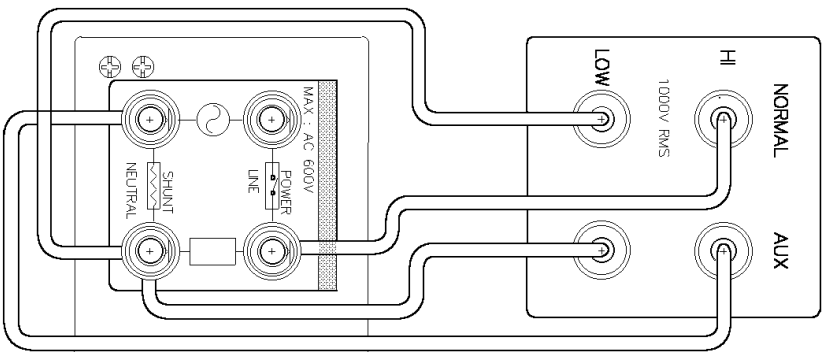
**NOTE:** 1. The LOAD is lamp for Electronic Ballast or Electronic Halogen.  
2. CP-320A watt bandwidth is 50KHz, When Load is resistance Load.  
If U.U.T. working frequency is over 5KHz, It watt is  $A \times V$  from panel display datas.



D:\PWSW\CP-320A\STR\WCONAPL1.PCB

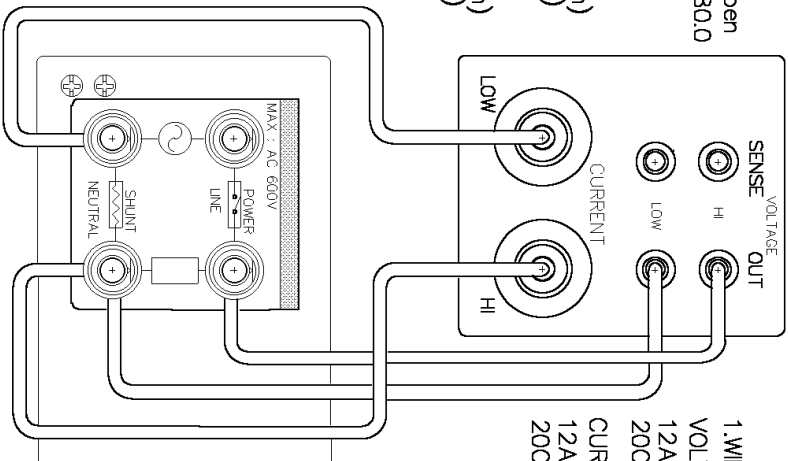
## Calibration of AC Voltage, Current and Power ( Direct input )

**FLUKE 5520A CALBRATOR**



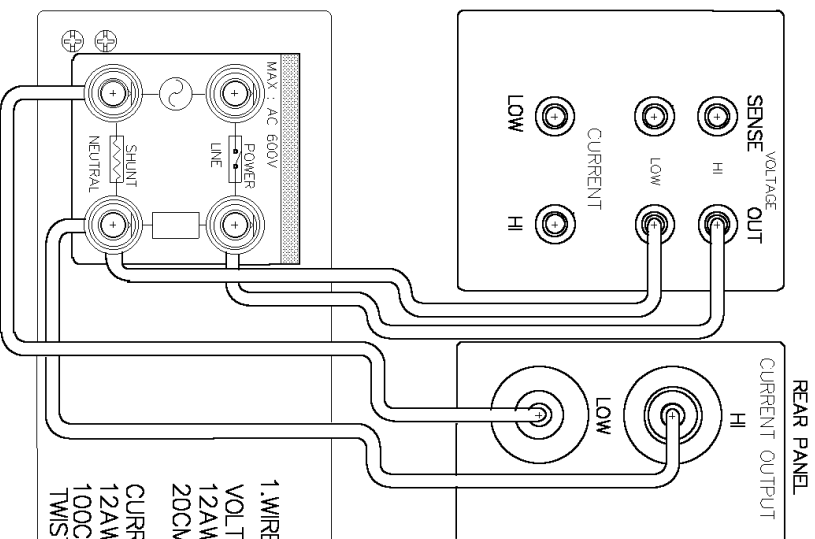
- 1. "I.O's" : open
- 2. PHASE: 180.0
- 3. PF: lead
- 4. WIRE :
- VOLTAGE
- 12AWG(Min)
- 20CM(Max)
- CURRENT
- 12AWG(Min)
- 20CM(Max)

**ROTEK 800A CALBRATOR**



- 1. WIRE :
- VOLTAGE
- 12AWG(Min)
- 20CM(Max)
- CURRENT
- 12AWG(Min)
- 20CM(Max)

**ROTEK 8000 CALBRATOR**

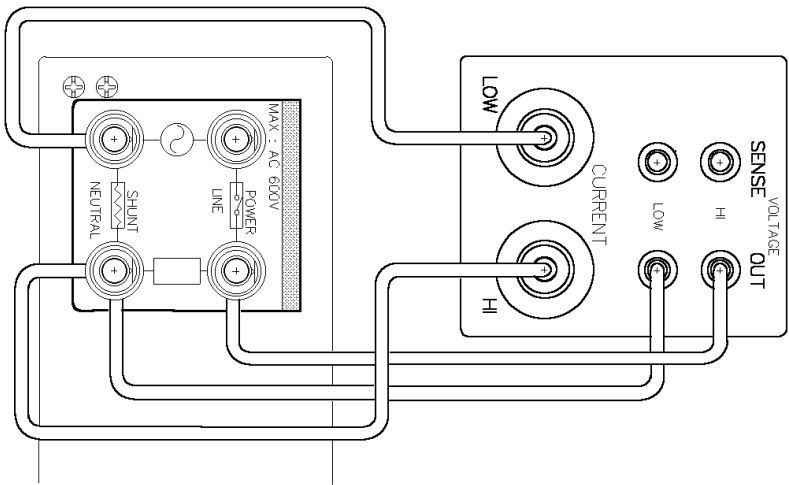


- 1. WIRE :
- VOLTAGE
- 12AWG(Min)
- 20CM(Max)
- CURRENT
- 12AWG(Min)
- 100CM(Max)
- TWIST

	CHUNG HONG ELECTRIC CO., LTD.	NO. 103, SHANG-YANG 5 ST., TAIPEI, TAIWAN	Title	POWER METER	CP-310;CP-320	Product Name	310;320;CP	Unit	mm	Scale	mm	Material		Date	12-05-1987	Sheet	13 of 200
		8866- ELECTRONIC															

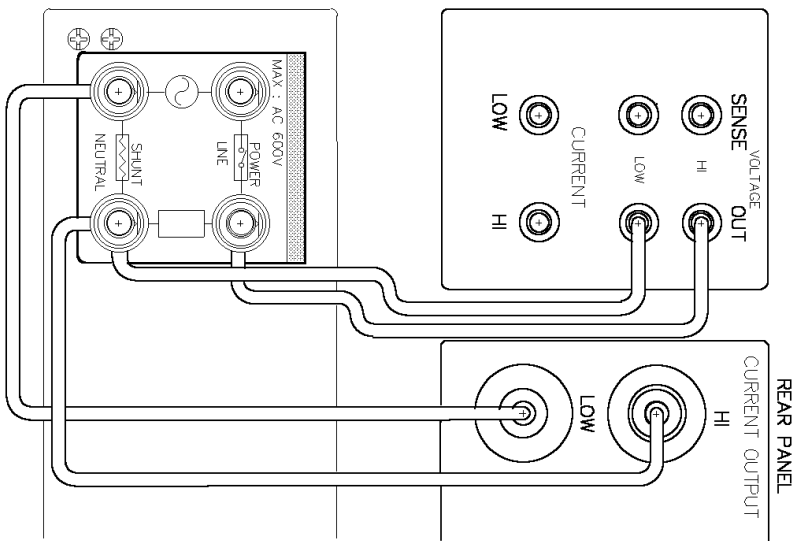
# Calibration of AC Voltage, Current and Power

## ROTEK 800A CALIBRATOR



1.WIRE :  
 VOLTAGE  
 12AWG(Min)  
 20CM(Max)  
 CURRENT  
 12AWG(Min)  
 20CM(Max)

## ROTEK 8000 CALIBRATOR



1.WIRE :  
 VOLTAGE  
 12AWG(Min)  
 20CM(Max)  
 CURRENT  
 12AWG(Min)  
 100CM(Max)  
 TWIST

CP-350

IDRC CHYNG HONG ELECTRIC CO.,LTD.	NO.0004- VING 3 ST. TACHUNG TAINAN	Title	POWER METER	Doc. Control Number	CP-350	UNIT	Scale	Material	Date	Sheet	17-11-2020
	NO. TEL:06245222 FAX:062452228										