

## DIGITAL MICROPROCESSOR MULTIFUNCTION TRMS POWER METER + HARMONICS ANALYSER

### Model KM 7200 C

#### UNIQUE FEATURES :

- 3 Displays at one time : 3 V, 3 A, W, Var, WH, VarH, PF, Hz ( 12 parameters ).
- Applicable Standard : DIN IEC 688
- Suitable for : 1 2 W ; 1 3 W ; 3 3 W ; 3 4 W systems
- 10 Years Power- Off Memory for WH & VarH
- With RS - 485 or RS - 232 Communications Ports, Modbus RTU Output.
- Software for Load & Harmonics Analysis (optional)
- Harmonics : Analyses Voltage & Current Harmonics upto 31<sup>st</sup> Harmonics.
- Displays Voltage & Current Harmonics upto 15<sup>th</sup> Harmonics
- User friendly programming.
- 4 Units Hi - Lo set



#### SPECIFICATIONS :

##### INPUT :

- Input Voltage Range : Normal Voltage 110 V, Effective Range 85 ~ 150 V.
- Normal Voltage 220 V, Effective Range 160 ~ 300 V AC.
- Input Voltage Over Range : Normal AC 110 V, Voltage Over 500 V Continuous.
- Input Current Range : Normal Current 5 A, Effective Range 0 ~ 7.5 A,
- Normal Current 1 A, Effective Range 0 ~ 1.5 A.
- Input Current Over Range : Normal AC 5 A, Current Over 15 A Continuous.
- Input Frequency : 45 Hz ~ 70 Hz.
- Input Burden : Voltage 0.25 VA / Unit, Current 0.25 VA / Unit, at 50 / 60 Hz

##### OUTPUT :

- DC Current : 0 - 20 m A D C
- DC Voltage : 0 -10 V DC
- Digital Output Load : RS 485 Output, Isolate Type with MODBUS RTU mode.
- 4800, 9600, 19200 Baud Rate, User Selectable.
- Load resistance drive : output drive 10V DC maximum
- Load resistance drive : output drive 5 mA maximum
- Output Protection : Without Damage for Output Open or Short Circuit
- Output Response Time : 1 Sec.

#### Model KM 7200 C

INPUT (V)		INPUT (C)		OUTPUT		SETTING FUNCTION		AUX. POWER	
A	55 ~ 300V	A	1A	F	RS485 modbus	A	4 Units Hi-Lo set	C	DC 24V
C	300 ~ 600V	B	5A	O	4 Units Analog			F	AC 85~265V
				M	4 Units Analog+RS485				DC 100~300V
				Q	Full function				
Y	SPECIAL	Y	SPECIAL	N	NONE	N	NONE	Y	SPECIAL
				Y	SPECIAL	Y	SPECIAL		

In 3 4 system Voltage ( INPUT ( V ) ): is Line - Neutral Voltage

When ordering Specify code number and variable ( e.g.7200 C - A - B - N - N - F )

Code number : Model - Input Voltage - Input Current - Output - Setting - auxiliary power.

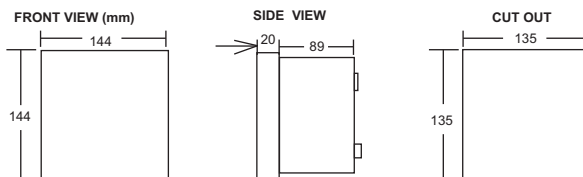
#### PERFORMANCE :

- Accuracy : V, A, W, =  $\pm 0.2\%$  Fs + 2 Counts at 23°C  $\pm 3^\circ\text{C}$ .
- Var, WH, VarH, PF =  $\pm 0.4\%$  RO + 2 Counts,
- Hz =  $\pm 0.02\%$  Fs + 1C at 23°C  $\pm 3^\circ\text{C}$ ., Thd =  $\pm 2\%$
- Display Range : V, A, W, Var, PF, Hz, 0.56" Super Red LED
- 4 Digits = 0~9999 Counts,
- PT, CT User Selectable.
- WH; VarH, 0.56" Super Red LED,
- 6 Digits = 0 ~ 999999 Counts.

- Response Time : 1 Sec.
- Dielectric Strength : AC 2.8KV / Min, Input/Power/Case, DIN IEC 688.
- Impulse : 6 KV 1.2x50 S, ANSI C37.90a / 1983. DIN IEC 255 -4.
- Stability : 0.2% / Year.
- Operation Condition : -10°C ~ +55°C; 20 ~ 95% RH Non-Condensed.
- Storage Condition : -40°C ~ +75°C; 20 ~ 95% RH Non-Condensed.
- Power Supply : AC 85~265V and DC 100~300V Power .
- Mounting : Panel Flush Mounting.

In this meter, the initial page of the instrument displays 3 Power Parameters at one time (3V, 3A, W, Var, WH, VarH, PF, Hz, (3 parameters per page). Then next 3 pages shows Voltage Harmonics i.e. The 1st, 3rd, 5th, 7th, 9th, 11th, 13th & 15th order of harmonics & the % Total Voltage Harmonics Then next 3 pages display the current Harmonics i.e. 1st, 3rd, 5th, 7th, 9th, 11th, 13th, 15th order of Harmonics & the percentage of Total Current Harmonics.

#### DIMENSION :



All Specifications are subject to change without prior notice



An ISO 9001:2008 Company

**MULTIFUNCTION  
POWER METER**

**MODEL  
DMPWH 7200-C**

**OPERATION MANUAL**

# Microprocessor Multifunction Power Meter MODEL DMPWH-7200-C

## Features :

- 3 Displays at one time : 3 V, 3 A, W, Var, WH, VarH, PF, Hz (12 parameters).
- Applicable Standard : DIN IEC 688
- Suitable for : 1 j 2 W ; 1 j 3 W ; 3 j 3 W ; 3 j 4 W systems
- 10 Years Power- Off Memory for WH & VarH
- With RS - 485 or RS - 232 Communications Ports, Modbus RTU Output.
- Software for Load & Harmonics Analysis (optional)
- Harmonics : Analyses Voltage & Current Harmonics upto 31st Harmonics.  
Displays Voltage & Current Harmonics upto 15th Harmonics
- User friendly programming.



## MODEL :

DMPWH —  —  —  —  —  Harmonics

INPUT		INPUT/C		OUTPUT		SETTING FUNCTION		AUX. POWER	
A	55 ~ 300V	A	1A	F	RS-485 modbus	A	4 Units Hi-Lo set	C	DC 24V
C	300 ~ 600V	B	5A	O	4 Units Analog			F	AC 85~265V
Y	SPECIAL	Y	SPECIAL	M	4 Units Analog+RS-485	N	NONE		DC 100~300V
				P	Print Function+RS-485	Y	SPECIAL		
				Q	Full Function				
				N	NONE				
				Y	SPECIAL			Y	SPECIAL

3φ 4W Voltage Line-Neutral

## Specifications :

### INPUT :

- Input Frequency : 45Hz ~ 70Hz.  
 Input Burden : Voltage 0.25VA/Unit, Current 0.25VA/Unit, as 50/60Hz.  
 Input Range : Normal Voltage 110V, Effective Range 85~150V. Normal Voltage 220V, Effective Range 160 ~ 300V AC.  
 Normal Current 5A, Effective Range 0 ~ 7.5A. Normal Current 1A, Effective Range 0 ~ 1.5A.  
 Input Over : Normal AC 5A, Current Over 15A Continuous : 50A 10 Sec/Hour : 400A 0.5 Sec/Hour.  
 Normal AC 110V, Voltage Over 500V Continuous : 1200V 10 Sec/Hour.

### OUTPUT :

**DC Current** : 0 - 20 mA DC

**Load resistance drive** : output drive 10 VDC maximum

Output	Load Resistance
0 - 10 mA :	1000 Ω
0 - 20 mA :	500 Ω
4 - 20 mA :	500 Ω

**DC Voltage** : 0 - 10 V DC

**Load resistance drive** : output drive 5mA maximum

Output	Load Resistance
0 - 5 V :	1 KΩ
1 - 5 V :	1 KΩ
0 - 10 V :	2 KΩ

Output Protection : Without Damage for Output Open or Short Circuit.

Output Response Time : ≤ 1 Sec.

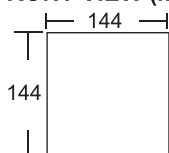
Digital Output Load : RS-485 Output, Isolate Type with MODBUS RTU mode., 4800,9600,19200 Baud Rate, User Selectable.

## INSTALLATION & PERFORMANCE :

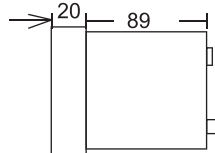
- Accuracy : V· A· W· = ±0.2% Fs+2 Counts at 23°C ±3°C. Var· WH· VarH· PF = ±0.4%RD+2 Counts, Hz = ±0.02% Fs+1C at 23°C ± 3°C., Thd = ±2%
- Display Range : V· A· W· Var· PF· Hz, 0.56" Super Red LED 4 Digits = 0~9999 Counts, PT· CT User Selectable. WH; VarH, 0.56" Super Red LED, 6 Digits = 0 ~ 999999 Counts.
- Response Time : ≤ 1 Sec.
- Dielectric Strength : AC 2.8KV / Min, Input/Power/Case, DIN IEC 688.
- Impulse : 6 KV 1.2x50 uS, ANSI C37.90a / 1983. DIN IEC 255 -4.
- Stability : ≤ 0.2% / Year.
- Temperature Coefficient : ≤ 100ppm / °C from 0 ~ 60°C,
- Operation Condition : -10°C ~ +55°C 20 ~ 95% RH Non-Condensed.
- Storage Condition : -40°C ~ +75°C 20 ~ 95% RH Non-Condensed.
- Power Supply : AC 85~265V and DC 100~300V of Power .
- Mounting : Panel Flush Mounting.

In this meter, the initial page of the instrument displays 3 Power Parameters at one time (3V, 3A, W, Var, WH, VarH, PF, Hz, (3 parameters per page). Then next 3 pages shows Voltage Harmonics i.e. The 1st, 3rd, 5th, 7th, 9th, 11th, 13th & 15th order of harmonics & the % Total Voltage Harmonics. Then next 3 pages display the current Harmonics i.e. 1st, 3rd, 5th, 7th, 9th, 11th, 13th, 15th order of Harmonics & the percentage of Total Current Harmonics.

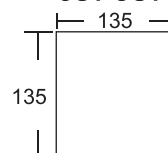
### FRONT VIEW (mm)



### SIDE VIEW



### CUT OUT

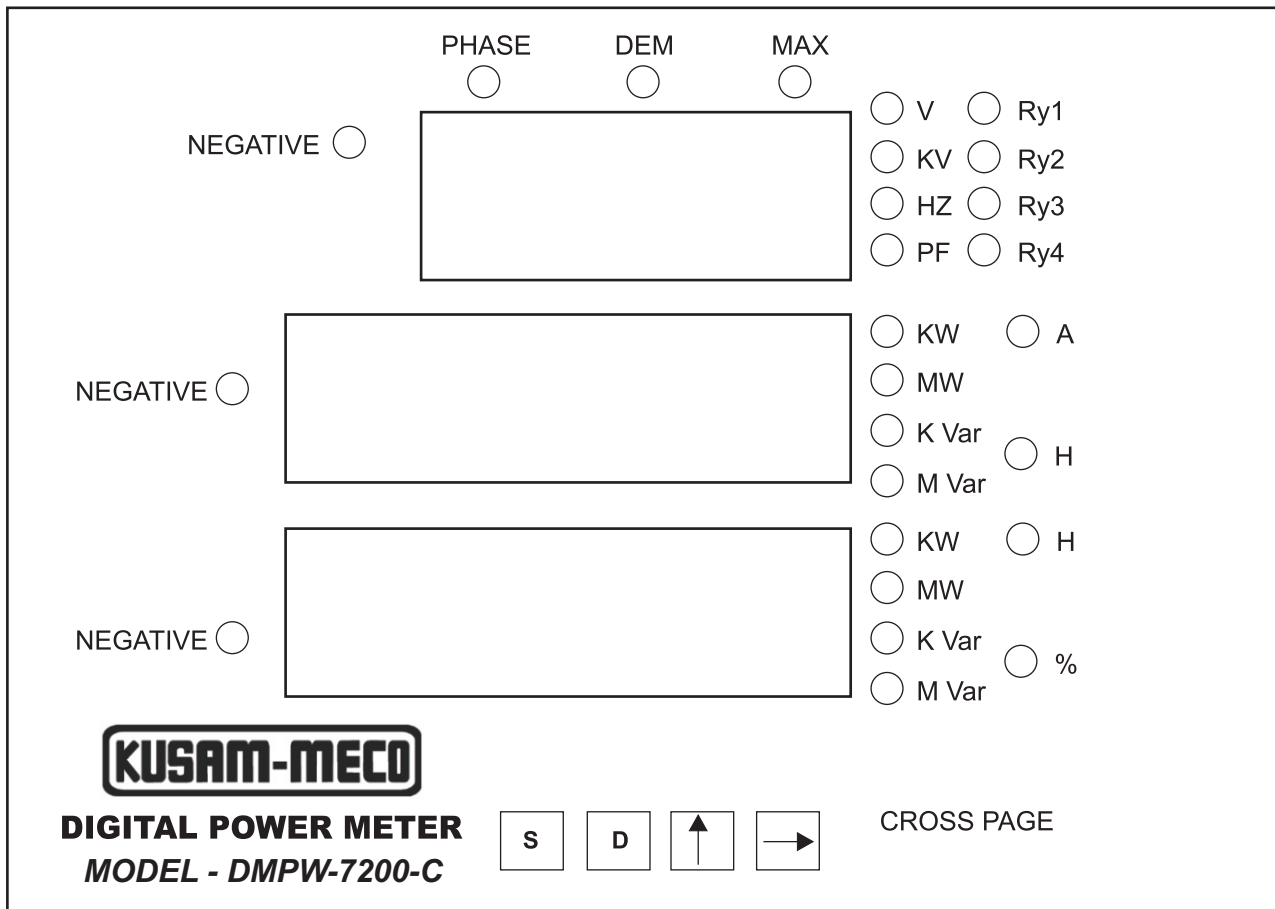




***MICROPROCESSOR MULTIFUNCTION POWER METER-  
DMPW-7200-C***

<b>1. Panel Operation.....</b>	<b>1</b>
<b>2. Display Description.....</b>	<b>2</b>
<b>3. Number Setting.....</b>	<b>3</b>
<b>4. Printing Function.....</b>	<b>5</b>
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<b>6. Time Setting.....</b>	<b>8</b>
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# 1. Panel Operation :



## Function :

**S** : SELECT BIT  
**D** : DATA

↑ : UP (change number)  
 → : RIGHT (shift digit)



## "S" Button :

1. **S** (to enter setting mode) ' and display 01 data.
2. **D** (to enter 01 setting function) ' then press D to 02 (setting data).
3. As entering setting value ' perform ↑ and → to change setting value.
4. On mode 01 "Wait", operate **S** to select each function point 01,02,...,09.
5. Or press **D** only ' order sequence is : 01 ~ setting value ~ 02 ~ setting value ~ 03 ~ setting value ~ 04 ~ setting value ~ and so on.



"↑ →" : Cross Pages (First Page ↔ Fourth Page)

## 2. Display Description :

### *First Page Basic Display*



RV (L-L Voltage)
A1 (R Phase Current)
W (Total Watt)
<b>S</b> <b>D</b>  

### *Second Page*

RV (L-L Voltage)
SV (L-L Voltage)
TV (L-L Phase Voltage)
<b>S</b> <b>D</b>  



Line Voltage

### *Third Page*



RV (L-N Voltage)
SV (L-N Voltage)
TV (L-L Voltage)
<b>S</b> <b>D</b>  

When 3P4W, Phase Voltage display shines



### *Fourth Page*

A1 ( R Phase Current)
A2 (S Phase Current)
A3 (T Phase Current)
<b>S</b> <b>D</b>  



### *Fifth Page*

W1 ( R Watt)
W2 (S Watt)
W3 (T Watt)
<b>S</b> <b>D</b>  



### *Sixth Page*

HZ (Frequency)
<b>S</b> <b>D</b>  

### *Seventh Page*



PF (Power Factor)
W (Total Watt)
Var (Total Var)
<b>S</b> <b>D</b>  

### *Eighth Page*

WH (Watthour)
-WH (Watthour)
<b>S</b> <b>D</b>  



Light ●

### *Ninth Page*



VarH (Varhour)
-VarH (Varhour)
<b>S</b> <b>D</b>  

●



### *Tenth Page*

Thd (V/KV)
Voltage Total harmonics
Voltage Total harmonics Percentage
<b>S</b> <b>D</b>  

### *Eleventh Page*

Thd (A)
Current Total harmonics
Current Total harmonics Percentage
<b>S</b> <b>D</b>  

### *Twelfth ~ Fifteenth Page*

H-01 ~ 13 (V/VK)
Voltage 1.5.9.13 times Harmonics
Voltage 3.7.11.15 times Harmonics
<b>S</b> <b>D</b>  

1. Sixteenth ~ nineteenth pages is current single harmonic display value.
2. Note unit mark lights of display.

DEM ●

Demand Remaining time

Remaining Demand

Present Demand

S D ↑ →

DEM ●

Maximum Demand

Target Demand

Demand Forecast

S D ↑ →

DEM ● MAX ●

Historical Max Demand

Year/Mon/Day

Hour/Sec/Min

S D ↑ →

### 3. Number Setting :

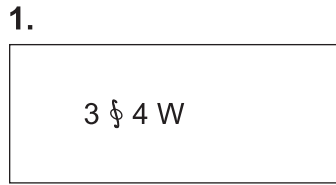
3.1 Enter 01 ~ 09 functions and setting Value, press " ↑ & → " to change setting value.

Press "S", enter setting value condition, 01 display shines, then press "D", the screen shows as follows :

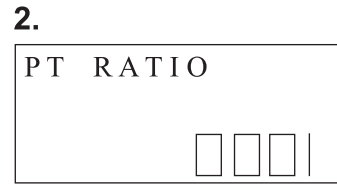
S Function Setting	Button	Range & Instruction of Functions
01 PW	→	Among 3P4W~1P2W~1P3W~3P3W cyclic switch
02 PT	→↑	Show1 PT equals to one multiple (enter 02 condition, press " → " to display)
03 U-unit	→	Unit mark of "V" , "KV" will vary.
04 U-dot	→	The decimal of first V line will vary.
05 CT	→↑	Show 1 CT equals to one multiple (enter 05 condition ' press " →" to display)
06 A-dot	→	The decimal of second A line will vary
07 W-unit	→	Unit mark of "KW" - "MW" , "KVar" - "MVar" will vary.
08 W-dot	→	The decimal of second & third W, Q line will vary.
09 Special function	→↑	00-99 press "D" again to enter below function.
06 Baud	→	Baud among 9600-19200-38400 -1200-2400-4800 cyclic switch.
07 Address	→↑	Modbus conventional address 1~254 (99 is for factory testing)
15 History data saving interval time	→↑	History data set 2-999 minutes per interval to save data. Save one-hour, set to 060 minutes.
16 Set time	→↑	Calibrate present time
17 Set demand interval time	→↑	Set basic time (1-60 min)
18 Set demand W / VA	→	Select demand unit as V A or W
19 Clear printing data	→↑	Key in password
25 Set target demand	→↑	0 ~ 9999
26 Set maximum demand	→↑	0 ~ 9999
28 Clear maximum demand	→↑ D	Key in correct password, enter D to clean history maximum demand and occurred time.
50 Alarm Function		Please see alarm function setting description
51 Alarm / Demand Control	→↑ D	Press "D" to assure, "S" to cancel setting, " → or ↑ " to change setting. N/DE need to save.
52 Harmonic ODD/ALL select	→	Select ODD / ALL accounting
60 Analogy Output Setting	→↑	Analogy output setting
87 Change password	→↑	Key in old password and new codes twice (except zero)
99 Save altered data	→↑ D	Key in correct password to save
43 Auto cross pages	→↑	Auto cross pages per 5 seconds
44 Print	→↑	To print

Ps : 09-16 and 09-28 functions need to be set personally. Inner setting password is 88 (password alterable)

3.2 First operate S to enter into setting statute, 00 (display) winks ' then press D to enter 01 function, afterward perform D' and pictures are shown as follows :



Operate →, 1§2 W , 1§3 W , 3§3 W , 3§4 W are selectable.



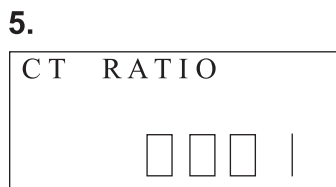
Operate →, twinkling digit, ↑ (change its digit value)



Operate →, to select V or K V



Operate →, to select the position of radix point.



Operate →, twinkling digit, ↑ (change its digit value)



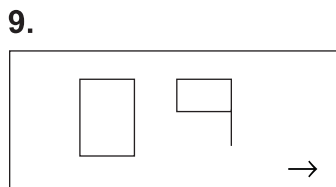
Operate →, select the position of radix point.



Operate →, select KW, MW or Q. Change in-phase.



Operate →, select the radix point W, Var, WH, VarH. Change in-phase.



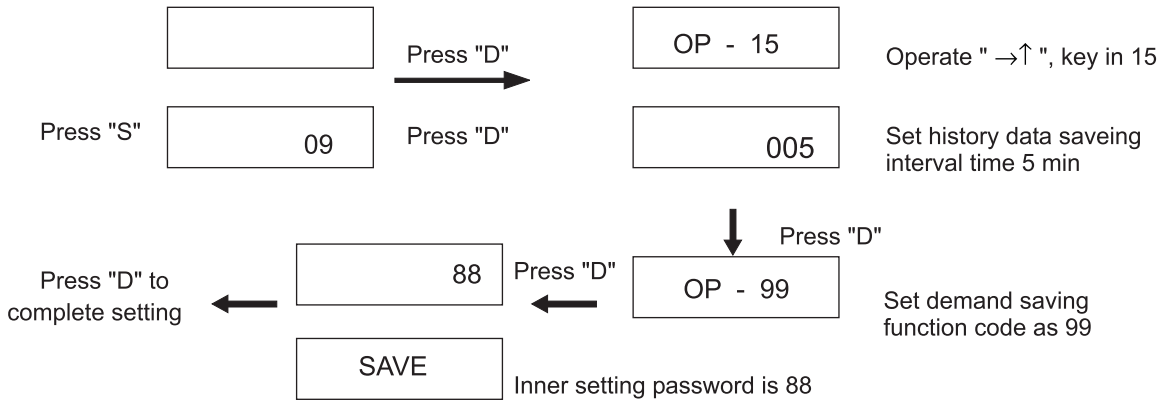
Press D to enter special function.



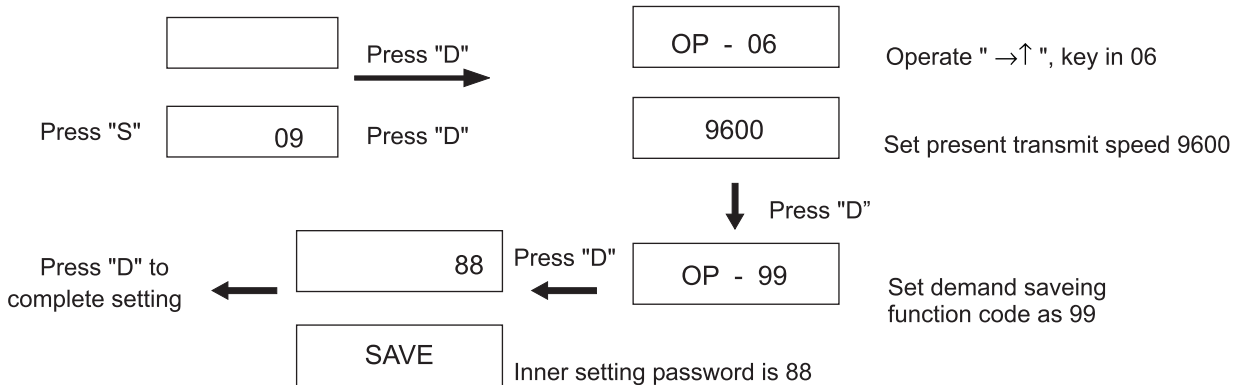
**3.3 Example Other 09 Functions Description :** press "S" (after entering 09 Function), and then press "D".

Operate "→↑", adjust display to 06, operate "D" again, display present BAUD, operate "→↑", select speed value and save.  
 Operate "→↑", adjust display to 07, operate "D" again, display present address, operate "→", select address 01 ~ 254 and save.  
 Operate "→↑", adjust display to 15, operate "D" again, show change of history data saving interval time display, key in history data saving interval time and press "D".  
 Operate "→↑", adjust display to 16, operate "D" again, show change of present time display, key in present time and press "D".  
 Operate "→↑", adjust display to 87, operate "D" again, show change display, key in old password and the same new password twice.  
 Operate "→↑", adjust display to 99, operate "D" again. Key in password, then press "D" to save 01 ~ 08 and 15 · 16 · 87 setting function of 09 Functions.

**3.3.1 Press →, enter basic display**

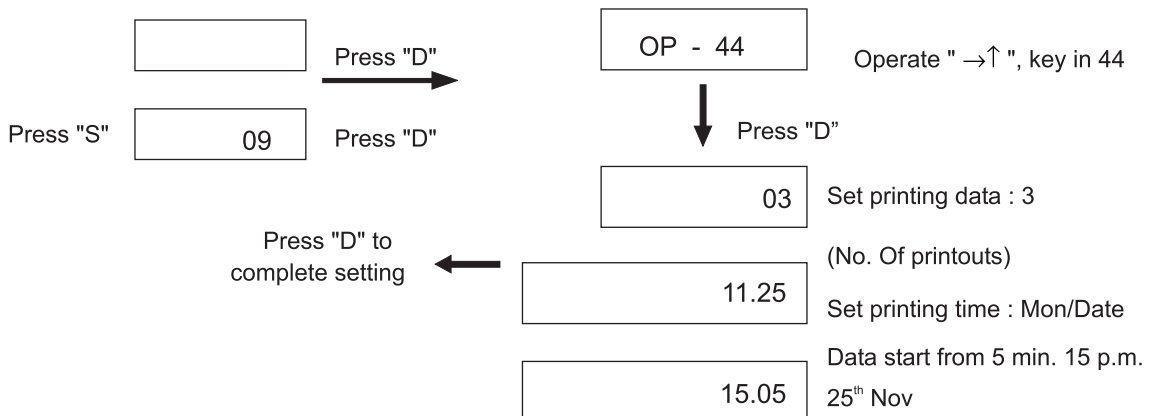


**3.3.2 Press →, enter basic display**

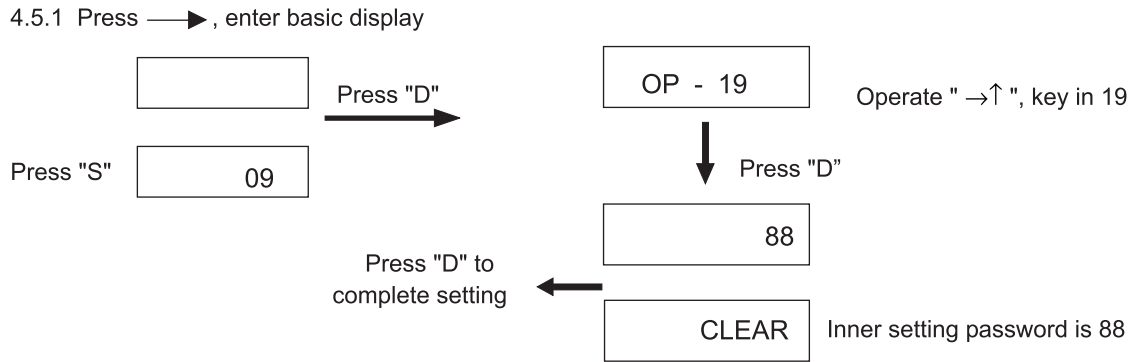


**4. Printing Function (Optional) :**

**4.1 Press →, enter basic display**



- 4.2 Press print button to show above display, press “S” to move out and won’t print, press “D” start printing from setting hour 1~999.
- 4.3 Use present time as basis to search data source and find the first qualified data (regardless of time resetting problem) to print, if data undiscoverable won’t print.
- 4.4 Electricity shutdown during operation, history data can’t save or print, or data undiscoverable won’t print.
- 4.5 Other 09 Functions Discription : press “S” (after entering 09 Function), and then press “D”.  
Operate "→↑", , adjust display to 19, then press “D”, show clear saved data display. Key in correct password, press “D” to clear.



#### 4.6 Printing Data Form :

Month - Day Hour : Min  
 V=11.00 11.00 11.00KV  
 A=5.000 5.000 5.000A  
 W=999.9KW Q=000.0KW  
 PF=0.999 + WH=999999.9KW

#### Printing Specifications :

1. Use EPSON microprocessor instruction code
2. RS-232 communication
3. ASS II word type.
4. Print 24 or more letters each line. Paper 48mm width.
5. Clearness over 8 dots / mm.
6. High speed printing 62 mm / sec.

## 5. Alarm Function (function 09-50) (Optional) :

ON Delay Time function code is N ; OFF Delay Time function code is F

Press "S", enter 09 function, operate " →↑ " key in 50, operate "D" to show alarm setting display.

Operate "D" again, panel "RY1" shines, operate " →↑ ", adjust display as below :

1. Time delay moving point : operate " →↑ ", adjust display to 006 condition.
2. ON Delay Time & OFF Delay Time setting type, operate " →↑ ", adjust display to F condition.
3. Function code : operate " →↑ ", adjust display to 00 condition. (R phase voltage)
4. Alarm setting type : operate " →↑ ", adjust display to H condition.
5. Setting value : operate " →↑ ", adjust display to 2230 condition.

Press "S" into 09 function, operate " →↑ ", key in 99, operate "D" to enter. Key in password to save.

<u>006</u>	<u>F</u>	<u>00</u>
Time (Seconds)	OFF Delay Time	Function Code
	<u>H</u>	<u>223.0</u>
	State	Setting Data

6. 223.0 is moving point.

The display means R Phase Voltage is larger than 223.0V alarming movement.

Function CODE	NAME	REMARK
00	RV	R Phase Voltage
01	SV	S Phase Voltage
02	TV	T Phase Voltage
03	RA	R Phase Current
04	SA	S Phase Current
05	TA	T Phase Current
06	W	Watt
07	Q	Var
08	PF	Power Factor
09	Freq	Frequency

Example : Adjust second unit alarm to T Phase Current larger than 4.5A. Delay 24 sec. movement :

<u>024</u>	<u>N</u>	<u>05</u>
Time	ON Delay Time	Function Code
	<u>H</u>	<u>4.500</u>
	State	Data Setting

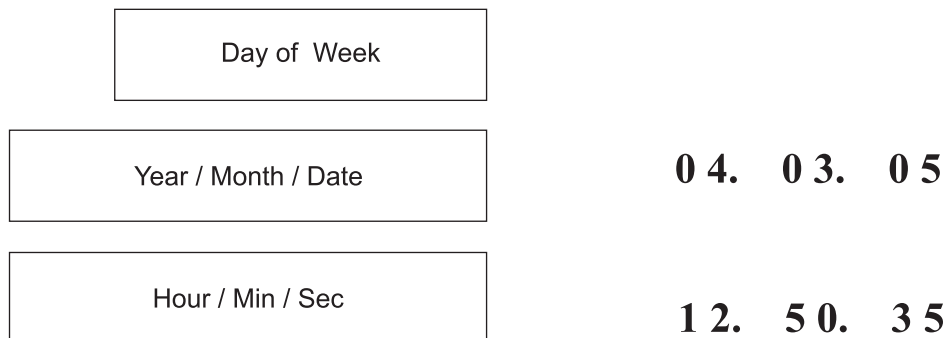
Press "S", enter 09 function, operate " →↑ " key in 50, operate "D" to show alarm setting display.

Operate "D" again, panel "RY2" shines, operate " →↑ ", adjust display as below.

1. Time delay moving point : operate " →↑ ", adjust display to 024 condition.
2. ON Delay Time & OFF Delay Time setting type, operate " →↑ ", adjust display to N condition.
3. Function code : operate " →↑ ", adjust display to 05 condition. (T phase current)
4. Alarm setting type : operate " →↑ ", adjust display to H condition.
5. Setting value : operate " →↑ ", adjust display to 4500 condition.

Press "S" move out to 09 function, operate " →↑ ", key in 99, operate "D" to enter and key in password to save.

## 6. Time Setting :



Example Time sets to Friday, Mar 5th 2004, 12:50 a.m. 35 sec.:

Press "S", enter 09 function, operate " →↑ ", key in 16, operate "D", shows time setting display, operate " →↑ " again, adjust display as above : 5 in the first row means Friday, second row means year/month/date ' third row means hour/min/sec.

## 7. Analogy Output (Optional) :

Analogy output answer value (The data is real input value, **no relation with PT, CT setting.**

Within 3 phase 4 wire, voltage value below is phase voltage):

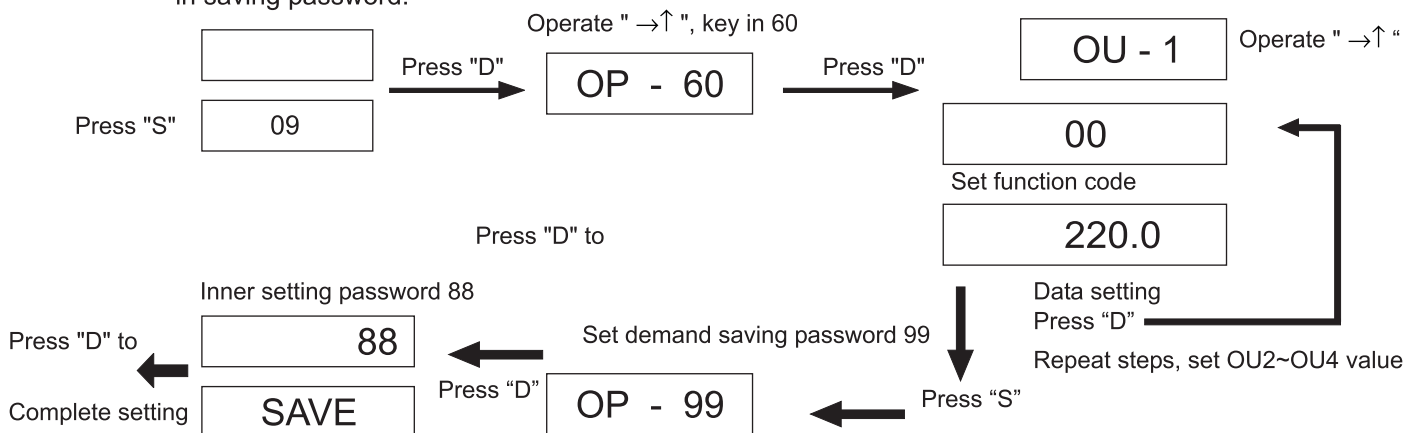
Example 1 : When RV 0~220V answers to 4~20mA

Inner setting 60 of Function 09, analogy output function specification : (Set 1~Set 4 analogy output setting)

Press "S", enter 09 function, operate " →↑ ", key in 60, operate "D" to show alarm setting display:

1. Operate "D" on the "OU-1" panel again, operate " →↑ ", to adjust display as follows.
2. Function code, operate " ↑ → ", adjust display to 0 0 condition. ® phase voltage)
3. Setting value file, operate " ↑ → ", adjust display to 2 2 0 0 condition. (Answer to 20mA)

Press "S", move out to 0 9 function, operate " →↑ ", key in 99, operate "D" to enter and key in saving password.



Function CODE	NAME	REMARK
00	RV	R Phase Voltage
01	SV	S Phase Voltage
02	TV	T Phase Voltage
03	RA	R Phase Current
04	SA	S Phase Current
05	TA	T Phase Current
06	W	Watt
07	Q	Var
08	PF	Power Factor
09	Freq	Frequency (50-5, 50-2, 50-1, 60-5, 60-2, 60-1)
10	Present Demand	Present Demand
11	Historical Max Demand	Historical Max Demand
10	Forecast Demand	Demand Forecast

**Example 2.** RA: 0~2.5A answer to 4~20mA

Inner setting 60 of Function 09, analogy output function specification: (Set 1~Set 4 analogy output setting)

Press “S”, enter 0 9 function, operate "→ ↑", key in 60, operate “D” to show alarm setting display :

1. Operate “D” on the “OU-2” panel again, operate "→ ↑" to adjust display as follows.
2. Function code, operate "↑ →", adjust display to 0 3 condition. ( R phase current )
3. Setting value file, operate "↑ →", adjust display to 2 5 0 0 condition. (Answer to 20mA)

Press “S”, move out to 0 9 function, operate "→ ↑", key in 99, operate “D” to enter and key in saving password.

<u>OU-2</u>	<u>03</u>
Analogy output Set 2	Function Code
<u>2.500</u>	
Data setting	

**Example 3.** PF: -0.5~1~0.5COS θ answer to 4~20mA

Inner setting 60 of Function 09, analogy output function specification: (Set 1~Set 4 analogy output setting)

Press “S”, enter 0 9 function, operate "→ ↑", key in 60, operate “D” to show alarm setting display :

1. Operate “D” on the “OU-3” panel again, operate "→ ↑" to adjust display as follows.
2. Function code, operate "↑ →", adjust display to 0 8 condition. ( PF )
3. Setting value file, show PF display condition. Inner setting value is -0.5 ~ 1 + 0.5 COS θ answer to 4~12~20mA  
operate "↑ →", adjust display to 2 5 0 0 condition. (Answer to 20mA)

<u>OU-3</u>	<u>08</u>
Analogy output Set 3	Function Code
<u>PF</u>	
Data setting	

**Example 4.** Frequency : 60± 5Hz answer to 4~20mA; (50-5, 50-2, 50-1, 60-5, 60-2, 60-1) / 4~20 mA Selectable

Inner setting 60 of Function 09, analogy output function specification: (Set 1~Set 4 analogy output setting)

Press “S”, enter 0 9 function, operate "→ ↑", key in 60, operate “D” to show alarm setting display :

1. Operate “D” on the “OU-4” panel again, operate "→ ↑" to adjust display as follows.
2. Function code, operate "↑ →", adjust display to 0 9 condition. ( Frequency )
3. Setting value file, operate "↑ →", adjust display to 60-5 condition. (55~60~65 answer to 4~12~20mA)

Press “S”, move out to 0 9 function, operate "→ ↑", key in 99, operate “D” to enter and key in saving password.

<u>OU-4</u>	<u>09</u>
Analogy output Set 4	Function Code
<u>60-5</u>	
Data setting	

**Example 5.** Q : -1.650~0~+1.650Var answer to 4~12~20mA

Inner setting 60 of Function 09, analogy output function specification: (Set 1~Set 4 analogy output setting)

Press “S”, enter 0 9 function, operate "→ ↑", key in 60, operate “D” to show alarm setting display :

1. Operate “D” on the “OU-4” panel again, operate "→ ↑" to adjust display as follows.
2. Function code, operate "↑ →", adjust display to 0 7 condition. ( Var )
3. Setting value file, operate "↑ →", adjust display to 1650 condition. (Answer to 20mA)

Press “S”, move out to 0 9 function, operate "→ ↑", key in 99, operate “D” to enter and key in saving password.

<u>OU-4</u>	<u>07</u>
Analogy output Set 4	Function Code
<u>1.650</u>	
Data setting	

## 8. Communication Function :

- 8.1 With one unit of RS 485 communication model (terminal 16 positive, terminal 17 negative)  
 With one unit of RS 232 communication model (terminal is 9 pins, D type connector)  
 Use ModBus RTU can connect 32 machines.

### 8.2 MODBUS :

*MODBUS-RTU MODE Protocol*

BAUD : 1200 . 2400 . 4800 . 9600 . 19200 . 38400 ;

STARTBIT = 1 · DATABITS = 8 · STOPBITS = 1 · PARITYBITS = 0

Master request reading ( 8 Byte total)				
Address	Function	Start_Address	Point	CRC16
8-Bits	8-Bits	16-Bits	16-Bits	16-Bits (Lo, Hi)
XXH	03H	XXH,XXH	XXH,XXH=N	XXH,XXH

Slaver write back ( 5+n Byte total )				
Address	Function	Byte_Count	Data	CRC16
8-Bits	8-Bits	16-Bits	Nx 8-Bits	16-Bits (Lo, Hi)
XXH	03H	XXH=N	XXH,XXH,XXH,.....	XXH,XXH

Master request writing ( 8 Byte total)				
Address	Function	Start_Address	Point	CRC16
8-Bits	8-Bits	16-Bits	16-Bits	16-Bits (Lo, Hi)
XXH	06H	XXH,XXH	XXH,XXH	XXH,XXH

Master request printing saved data reading ( 8 Byte total)				
Address	Function	Start_Num	Num	CRC16
8-Bits	8-Bits	16-Bits	16-Bits	16-Bits (lo, hi)
XXH	63H	XXH,XXH	XXH,XXH=N	XXH,XXH

Slaver write back Packet ( 38 Byte total )				
Address	Function	Now_Num	Data	CRC16
8-Bits	8-Bits	16-Bits	32-BYTE	16-Bits (lo, hi)
XXH	63H	XXH,XXH	XXH,XXH,XXH,.....	XXH,XXH

**Slaver write back Packet is innumerous ' every packet has 38 BYTES.**

Example : DMPW address is 31 ' PC reads address of 31 DMMP, from 100 (64H) start reading to 200 (C8H) data.

PC dispatches 1FH+63H+00H+64H+00H+C8H+CRCL+CRCH

DMPW will revert 1FH+63H+00H+64H+(.....data=32.....)+CRCL+CRCH

1FH+63H+00H+65H+(.....data=32.....)+CRCL+CRCH

·

(Total 200)

·

1FH+63H+01H+2CH+(.....data=32.....)+CRCL+CRCH

**UNIT : One Word (Two Byte)**

## UNIT : One Word (two Byte)

Point	Name	Note	(R:Read ' W:Write)	
1	S_V1	R phase voltage ( unsigned int)	R	
2	S_V2	S phase voltage ( unsigned int)		
3	S_V3	T phase voltage ( unsigned int)		
4	S_A1	R phase current ( unsigned int)		
5	S_A2	S phase current ( unsigned int)		
6	S_A3	T phase current ( unsigned int)		
7	S_W1	R phase power		
8	S_W2	S phase power		
9	S_W3	T phase power		
10	S_W	W		
11	S_Q	Var		
12	S_Pf	PF		
13	S_Freq	Frequency		
14	WHP	(Long) WH	R	
15				
16	WHM	(Long) WH (negative)		
17				
18	QHP	(Long) QH		
19				
20	QHM	(Long) QH (negative)		
21				
22	W,V,A Point	W . V . A POINT. $W=W*10^{(b11,b10,b9,b8)}$ ; $V=V*10^{(b7,b6,b5,b4)}$ ; $A=A*10^{(b3,b2,b1,b0)}$ :		R/W
23	Realy status W, VUnit	BIT7=RY4, BIT6=RY3; BITS5=RY2; BIT4=RY1; Bit2----(1=KV . 0=V)' bit1----(1=MW . 0=W) ' bit 0=demand (0=W/1=V*A).		R/W
24	BAUD	BAUD (0=1200 ' 1=2400 ' 2=4800 ' 3=9600 ' 4=19200 ' 5=38400 ; NORMAL 3=9600)	R/W	
25	ADDRESS	ADDRESS ( 0~99 ' NORMAL 50)	R/W	
26=1	CT	CT (0~9999)	R/W	
27	PT	PT (0~9999)	R/W	
28	Mode	(0=3P4W, 1=1P2W, 2=1P3W,3=3P3W ; NORMAL 3P4W)	R/W	
29	OV	OV CONTROL FLA : 15_OV1, 14_OV2, 13_OV3, (Phase Voltage) 12_OA1,11_OA2,10_OA3,9_OW1,8_OW2,7_OW3,6_OW,5_OQ,4_OVR, 3_OVS,2_OVT, (wire voltage) 1=ODemPresent, 0_O Demand Forecast	R	
30	DA_W_MAX	Reserve (Analogy Output Setting)	R	
31	Historical Demand	Max Demand	R	
32	Demand Year/Month	Max Demand Time (BCD)	R	
33	Demand Day/ Hour			
34	Demand Min/Sec			
35	Target Demand	Target Demand		
36	Max Demand	Rating Max Demand	R/W	
37	Demand Forecast	Forecast Demand	R	
38	Present Demand	Cumulative Demand	R	
39	Demand Time	Demand Interval Time	R/W	
40	Print Time	Print Reserve Interval Time	R/W	
41	Print W Address		R/W	

42	Week	0x00 ' 0x01~0x07	R/W
43	Year / Month	0x00~0x99 ' 0x01~0x12	R/W
44	Day / Hour	0x01~0x31 ' 0x00~0x23	R/W
45	Min / Sec	0x00~0x59 ' 0x00~0x59 Present System Time	R/W
46	VH1	One time voltage harmonics	R
47	VH_ALL	Total voltage harmonic	R
48	VH_PER	Total voltage harmonics percentage	R
49	VH3	Three times voltage harmonics	R
50	VH5	Five times voltage harmonics	R
51	VH7	Seven times voltage harmonics	R
52	VH9	Nine times voltage harmonics	R
53	VH11	Eleven times voltage harmonics	R
54	VH13	Thirteen times voltage harmonics	R
55	VH15	Fifteen times voltage harmonics	R
56	IH1	One times current harmonics	R
57	IH_ALL	Total current harmonics	R
58	IH_PER	Total current harmonics percentage	R
59	IH3	Three times current harmonics	R
60	IH5	Five times current harmonics	R
61	IH7	Seven times current harmonics	R
62	IH9	Nine times current harmonics	R
63	IH11	Eleven times current harmonics	R
64	IH13	Thirteen times current harmonics	R
65	IH15	Fifteen times current harmonics	R
66	S_V1	Total Voltage	R
67	S_A1	Total Current	R
68	VH17	Seventeen times voltage harmonics	R
69	VH19	Nineteen times voltage harmonics	R
70	VH21	Twenty-one times voltage harmonics	R
71	VH23	Twenty-three times voltage harmonics	R
72	VH25	Twenty-five times voltage harmonics	R
73	VH27	Twenty-seven times voltage harmonics	R
74	VH29	Twenty-nine times voltage harmonics	R
75	VH31	Thirty-one times voltage harmonics	R
76	IH17	Seventeen times current harmonics	R
77	IH19	Nineteen times current harmonics	R
78	IH21	Twenty-one times current harmonics	R
79	IH23	Twenty-three times current harmonics	R
80	IH25	Twenty-five times current harmonics	R
81	IH27	Twenty-seven times current harmonics	R
82	IH29	Twenty-nine times current harmonics	R
83	IH31	Thirty-one times current harmonics	R

Example :

DS\_V1=inbuff [adr\_v1]\*256+inbuff [adr\_v1+1];

WHP=inbuff [adr\_whp]\*256+inbuff [adr\_whp +1]+(inbuff [adr\_whp+2]\*256+inbuff [adr\_whp+3])\*65536;



# RS-485 Modbus

Address 12 S-PF 65038 ~~~~~ 64539 | 999 ~~~~ 500  
 Power Factor Value -500 (C) ~~~ -999 | 999 ~~~~~ +500 (L)  
 Power Factor (L) displays directly.  
 When Power Factor (C), 65538 - Address 12 S-PF = Power Factor value.  
 Example : Present PF = -0.800 , 65538 - 800 = 64738 (Address 12 S-PF)  
 Meaning :  
 When Address 12 S-PF value > 60000, Power Factor is negative (C)  
 Power Factor value = 65538 - obtained value (Address 12 S-PF)  
 When Address 12 S-PF value < 2000  
 Power Factor value = obtained value (Address 12 S-PF)  
 Var obtained value is indicative value, Power Factor judges (C) or (L).

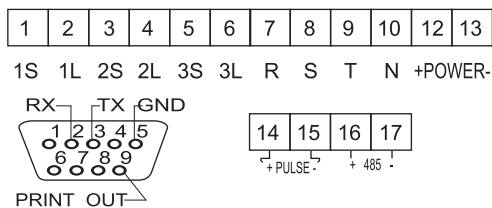
## 9. Example :

Key in 3⌘3W 3.3KV/110V, 40/5A (PT=30 multiple, CT=8 multiple)  
 Indicate 3.300KV 0~40.00A 0~240.0KW (KVar) :  
 Press "S", enter 01 select file, press "D" again, operate " → ", adjust display to 3 3W condition.  
 Press "S" or "D", enter 02 PT multiple file, press "D", again, operate " → ↑ ", adjust PT multiple to 30 multiple condition.  
 Press "S" or "D", enter 03 voltage unit file, press "D", operate " → ", adjust voltage unit to KV condition.  
 Press "S" or "D", enter 04 voltage decimal file, press "D", operate " → ", adjust voltage decimal to 0.000KV condition.  
 Press "S" or "D", enter 05 CT multiple file, press "D", operate " → ↑ ", adjust CT multiple to 8 multiple condition.  
 Press "S" or "D", enter 06 current decimal, press "D" again, operate " → ", adjust current decimal to 00.00A condition.  
 Press "S" or "D", enter 07 watt unit selection, press "D" again, operate " → ", adjust display unit to KW, Kvar, KWH, KvarH condition.  
 Press "S" or "D", enter 08 watt decimal file, press "D" again, operate " → ", adjust decimal to 000.0KW, Kvar, KWH, KvarH condition.  
 Press "S" or "D", enter 09 Save, operate " → ↑ " adjust display to 88, then operate "D", display save, key in password, Press "D" to save.

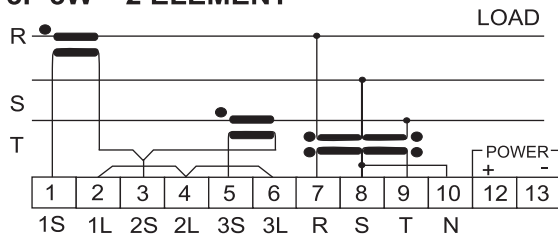
## Connection Diagram :

### WARNING

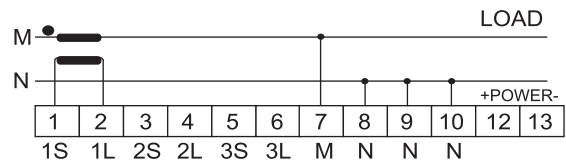
TO AVOID ELECTRIC SHOCK PLEASE.  
 NO OPERATOR SERVICEABLE  
 COMPONENTS INSIDE. DO NOT REMOVE COVERS.  
 REFER SERVICING TO QUALIFIED PERSONNEL.



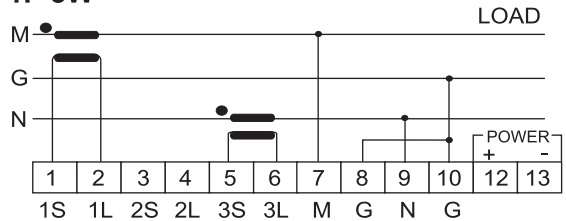
### 3P 3W 2 ELEMENT



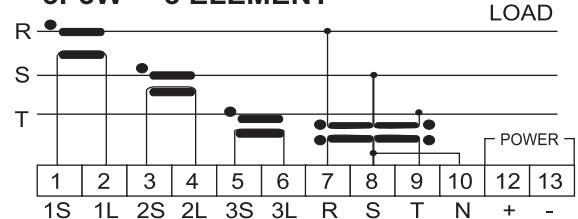
### 1P 2W



### 1P 3W



### 3P3W 3 ELEMENT



### 3P4W 3 ELEMENT

