KUSAM-MECO®

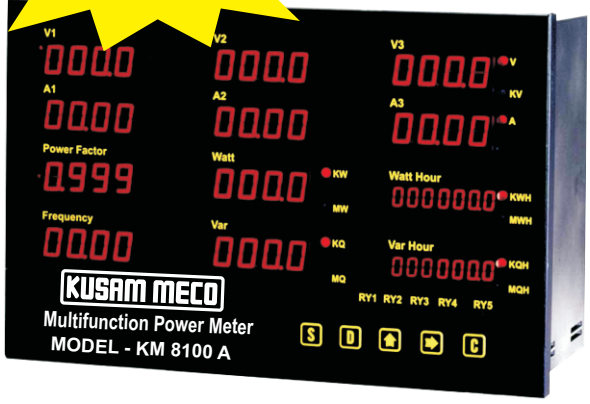
An ISO 9001:2008 Company

DIGITAL MICROPROCESSOR MULTIFUNCTION TRMS POWER METER

Series 8100

ONLY INST. IN INDIA WITH 12 DISPLAY

Model - KM 8100 A



UNIQUE FEATURES :

- Displays 12 parameters simultaneously : 3 V, 3 A, W, Var, WH, VarH, PF, Hz
- 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 set data
- With RS - 485 Modbus Output
- Software for Load Analysis (optional).
- User friendly programming.

GENERAL SPECIFICATIONS :

INPUT :

- Input Voltage Range : Voltage : 55 ~ 300 V AC, or 300 ~ 600 V AC, 45 ~ 65 Hz
  P.T. Ratio programmable upto 9999 / KV
- Input Voltage Over Range : Voltage : 200% Continuous, 300% of rating for 10sec.
- Input Current Range : Current : 110 % for rating. 0 - 1A or 0 - 5A,
  C. T. Ratio Programmable upto 9999 / 5 A.
- Input Current Over Range : Current : 400% Continuous, 2000% of rating for 10sec.
- Input Frequency : 45 Hz ~ 70 Hz.
- Input Burden : Voltage 0.25 VA / Unit, Current 0.25VA / Unit, at 50 / 60 Hz

OUTPUT :

- DC Current : 0 ~ 20mA DC
- Load resistance drive : output drive 10 VDC maximum. OR
- DC Voltage: 0 -10 V DC
- Load resistance drive : Output drive 5mA maximum
- Output Protection : No Damage even if output is open or Short Circuit.
- Output Response Time : <1 Sec.
- Digital Output Load : RS485 Output, Isolate Type with
- MODBUS RTU mode. 4800, 9600, 19200 Baud Rate, User Selectable

PERFORMANCE :

- Accuracy : V, A, W, = ± 0.2 % Fs + 2 Counts at 23° C ± 3°C.
  Var, WH, VarH, PF = ± 0.4 % rdg + 2 Count,
  Hz =± 0.02 % Fs + 1 C at 23° C ± 3° C.
- Display Range : V, A, W, Var, P F, Hz, 0.56" Super RED LED
  4 Digits = 0 ~ 9999 Counts, PT, CT User Selectable.
  W H; VarH, 0.36" Super Red LED,
  7 Digits = 0 ~ 9999999 Counts.
- Response Time : < 1 Sec.
- Memory Capacity : 10 Years Power Off Memory for set Data
- Dielectric Strength : AC 2.8KV / Min, Input / Power / Case, DIN IEC 688.
- Impulse : 6 KV 1.2 x 50 µS, ANSI C37.90a / 1983. DIN IEC 1000 4-5, 4-4.
- 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 ~ 265 V & DC 100 ~ 300 V ; 24 VDC (optional)
- Mounting : Panel Flush Mounting

Model KM 8100 A — [ ] — [ ] — [ ] — [ ] — [ ]

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
				O	4 Units Analog			F	AC 85 ~265V
				M	4 Units Analog+RS485				DC 100~300V
C	300 ~ 600V	B	5A						
				N	NONE	N	NONE		
Y	SPECIAL	Y	SPECIAL	Y	SPECIAL	Y	SPECIAL	Y	SPECIAL

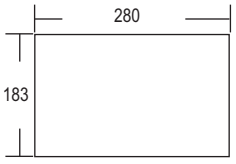
In 3 4 system Voltage (INPUT (V) : is Line - Neutral Voltage

When ordering specify Model code number and variable (e.g. 8100A-A-A-F-A-F)

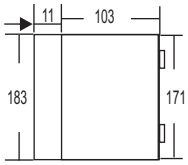
Code number : Model - Input Voltage - Input Current - Output - Setting - Auxillary power.

DIMENSION :

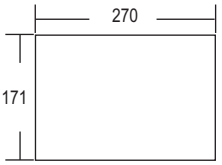
FRONT VIEW (mm)



SIDE VIEW



CUT OUT



All Specifications are subject to change without prior notice

KUSAM-MECO®

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KUSAM-MECO®

MULTIFUNCTION POWER METER

MODEL

KM 8100A / KM 8100B
KM 8100C

OPERATION MANUAL

Microprocessor Multifunction Power Meter

MODEL 8100

Features :

- Applicable Standard : Answer for DIN-IEC 688
- Display at one time : 3V、3A、W、Var、WH、VarH、PF、Hz、Harmonics、Demand
- Measurable 1φ2W、1φ3W、3φ3W、3φ4W
- Harmonics Analyze Voltage, Current for 31 times, Display for 15 times.
- Demand Management & Demand Control
- 10 Years Power-Off Memory for 5000 data
- With RS-485 Modbus Output

MODEL : 8100 A / 8100 B / 8100 C — □ — □ — □ — □ — □ — Demand — 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
				O	4 Units Analog			F	AC 85~265V
				M	4 Units Analog+RS-485				DC 100~300V
C	300 ~ 600V	B	5A	P	Print Function+RS-485				
				Q	Full Function				
				N	NONE	N	NONE		
Y	SPECIAL	Y	SPECIAL	Y	SPECIAL	Y	SPECIAL	Y	SPECIAL

3ø 4ω Voltage Line-Neutral

Specifications :

INPUT :

Input Frequency : 45Hz ~ 70Hz.
Input Burden : Voltage 0.25VA/Unit, Current 0.25VA/Unit, as 50/60Hz.
Input Range : Voltage : 55~300V AC, 45~65Hz or 300~600V AC, 45~65Hz
Current : 110% for rating.
Input Over : Voltage : 200% Continuous, 300% of rating for 10 sec.
Current : 400% Continuous, 2000% of rating for 10 Sec., 8000% of rating for 0.5 Sec.

OUTPUT :

DC Current : 0 - 20 mA DC
Load resistance drive : output drive 10 VDC maximum

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

DC Voltage : 0 - 10 V DC
Load resistance drive : output drive 5 mA maximum

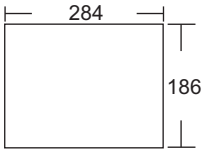
Output	Load Resistance
0 - 5 V :	1 KΩ
1 - 5 V :	1 KΩ
0 - 10 V :	2 KΩ

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.

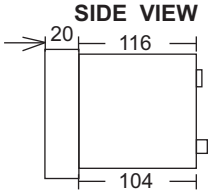
INSTALLATION & PERFORMANCE :

Accuracy : V、A、W、 = ±0.2% Fs+2C at 23°C ±3°C. Var、WH、VarH、PF = ±0.4%RD+2C,
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, 0.36" Super Red LED, 7 Digits = 0 ~ 9999999 Counts.
Response Time : ≤ 1 Sec.
Memory Capacity : 10 Years Power Off Memory for 5000 Data.
Dielectric Strength : AC 2.8KV / Min, Input/Power/Case, DIN IEC 688.
Impulse : 6 KV 1.2x50 uS, ANSI C37.90a / 1983. DIN IEC 1000.4 - 5, 4 -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 can be withstood.
Mounting : Panel Flush Mounting.

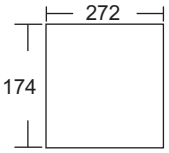
FRONT VIEW (mm)



SIDE VIEW

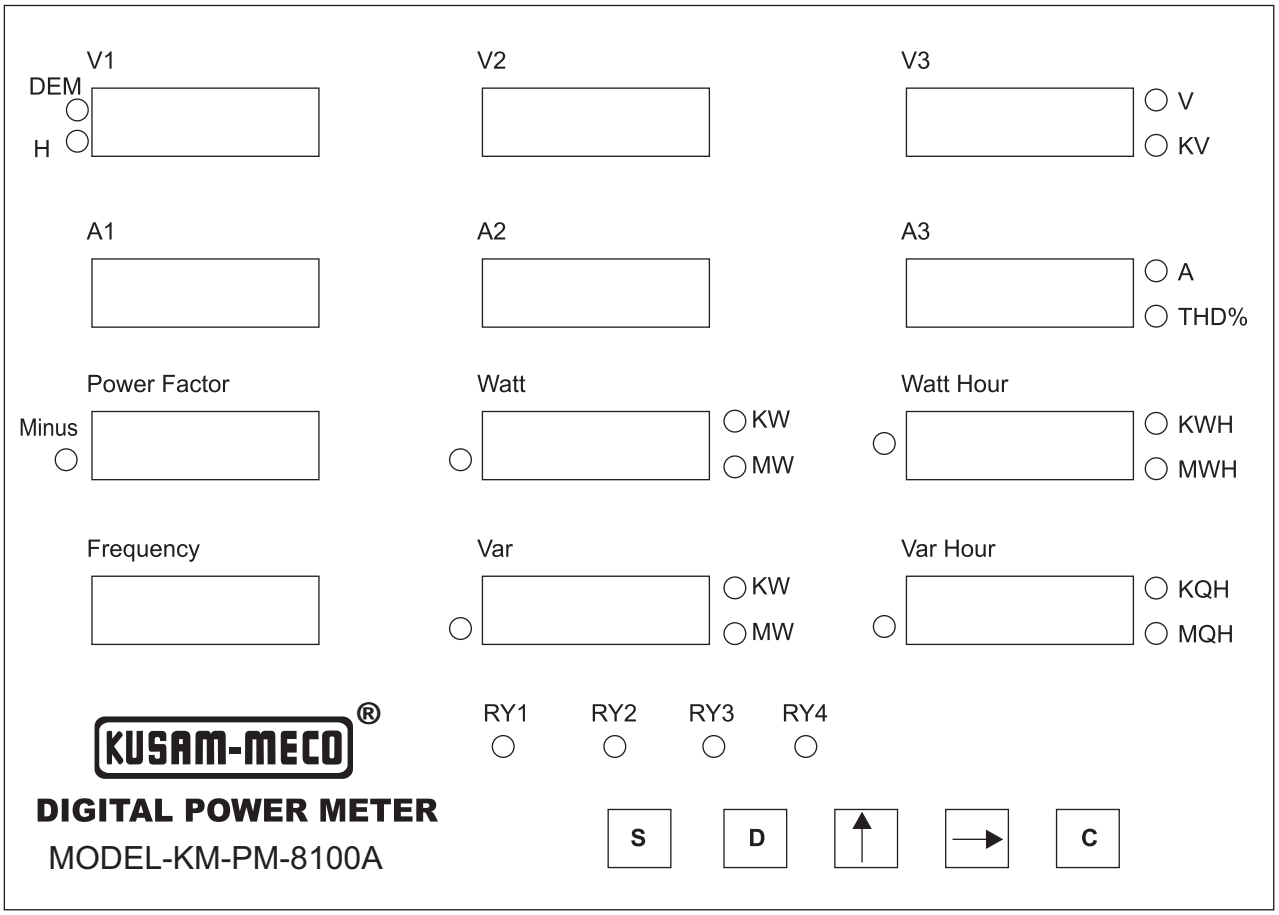


CUT OUT



Microprocessor Multifunction Power Meter Model-KM-PM-8100 A

1. Panel Operation :



Function :

S : SELECT BIT
D : DATA
C : Special Function Clear WH QH

↑ : 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 changer setting value.
4. On mode 01 "Wait" ' operate **S** to elect each statue 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.

"C" Button : perform ↑ and → , key in password, press "D" again.
When display first page, clear +/-WH (WH) ' +/-QH(QH)

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

2. Display Discrption :

First Page ***Basic Display***

RV (R Phase Voltage)	SV (S Phase Voltage)	TV (T Phase Voltage)
A1 (R Phase Current)	A2 (S Phase Current)	A3 (T Phase Current)
PF (Power Factor)	W (Watt)	+WH/-WH (Watthour)
HZ (Frequency)	Q (Var)	+QH/-QH (Varhour)

S D ↑ → C

1. +WH/-WH(WH) : When W(W) positive, display +WH. When W(W) negative, display -WH.
2. +QH/-QH(QH) : When Q(Q) positive, display +QH. When Q(Var) negative, display -QH.

Second Page ***Demand Display (Optional)***

DEM ○	Demand Remaining time	Useable Remaining Demand	Target Demand
		Demand Forecast	Maximum Demand
		Present Demand	Historical Demand
	Year / Month	Day / Hour	Min / Sec

S D ↑ → C

Third Page ***Harmonics Voltage (Optional)***

H ○	Voltage 1 time Harmonics	Voltage 9 times Harmonics	Voltage Total harmonics	○ V/KV
	Voltage 3 times Harmonics	Voltage 11 times Harmonics	Total harmonics percentage	○ THD%
	Voltage 5 times Harmonics	Voltage 13 times Harmonics		
	Voltage 7 times Harmonics	Voltage 15 times Harmonics		

S D ↑ → C

Fourth Page ***Harmonics Current (Optional)***

H ○	Current 1 time Harmonics	Current 9 times Harmonics	Current Total harmonics	
	Current 3 times Harmonics	Current 11 times Harmonics	Total harmonics percentage	○ A
	Current 5 times Harmonics	Current 13 times Harmonics		○ THD%
	Current 7 times Harmonics	Current 15 times Harmonics		

S D ↑ → C

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 :

Function		Button	Range & Instruction of Functions
01 PW		→	Among 3P4W~1P2W~1P3W~3P3W cyclic switch (34W mark change)
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.
	15 History data saving interval time	→↑	History data set 1-999 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
	20 Set W, V analogy output	→↑	0 ~ 9999
	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 switch	→↑ D	Press "D" to assure, "S" to cancel setting, " → or ↑ " to change 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

PS: 09-16 and 09-28 functions need to be set personally.

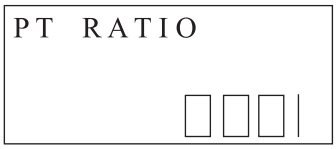
Note : inner setting password is 88 (password alterable)

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 shows as follows :

1.

Operate →, 1ϕ2 W、
1ϕ3 W、3ϕ3 W、 3ϕ4 W
are selectable.

2.



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

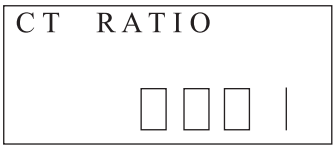
3.

Operate →, to select V or K V

4.

Operate →, to select the
position of radix point.

5.



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

6.

Operate →, select the position
of radix point.

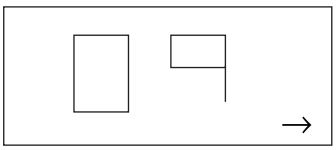
7.

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

8.

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

9.



Press D to enter special function.

3.3 Example Other 09 Functions Discription : 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 ~ 255 and save.

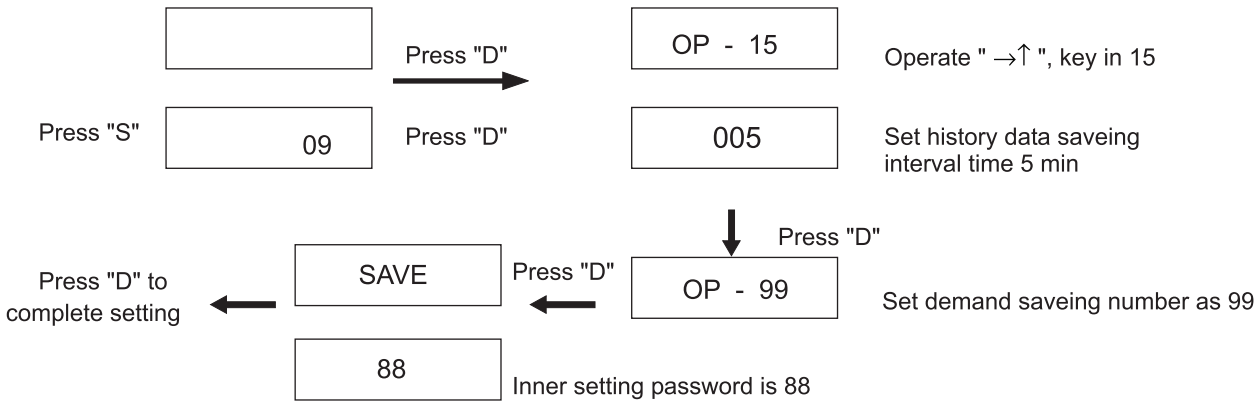
Operate "→↑ ", adjust display to 15, operate "D" again, show change of history data saving interval time display, key in history data saving interval tim and press "D".

Operate "→↑ ", adjust display to 16, operate "D" again, show change of present time display, key in present time and press "D".

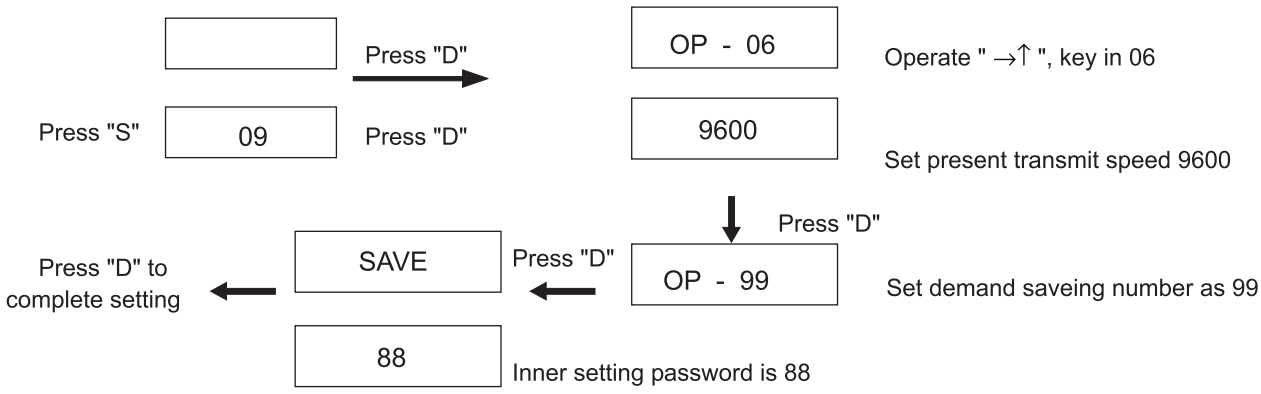
Operate "→↑ ", adjust display to 87, operate "D" again, show change display, key in old password and the same new password twice.

Operate "→↑ ", adjust display to 99, operate "D" again. To save display, key in password (99), then press "D" to save 01 ~ 08 and 15、16、87 setting fumction of 09 Functions.

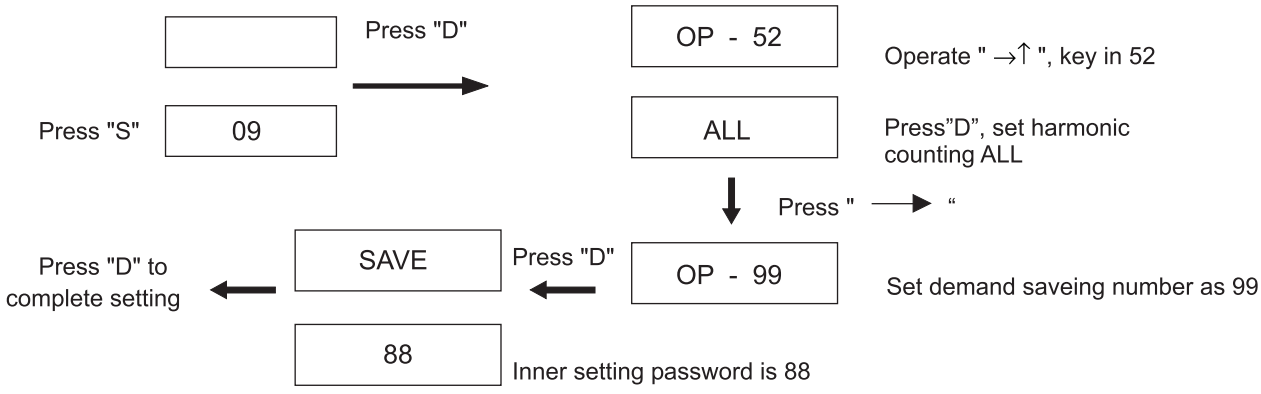
3.3.1 Press ⟶, enter basic display



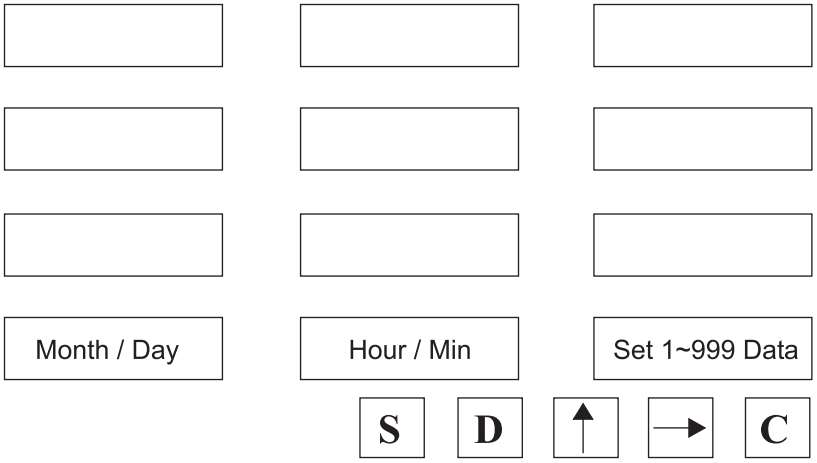
3.3.2 Press ⟶, enter basic display



3.3.3 Harmonic ODD/ALL select Press ⟶, enter basic display



4. Printing Function (Optional)



4.1 Press "D", adjust setting value, operate " →↑ ", key in printing time and no. of printouts and press "D" again.

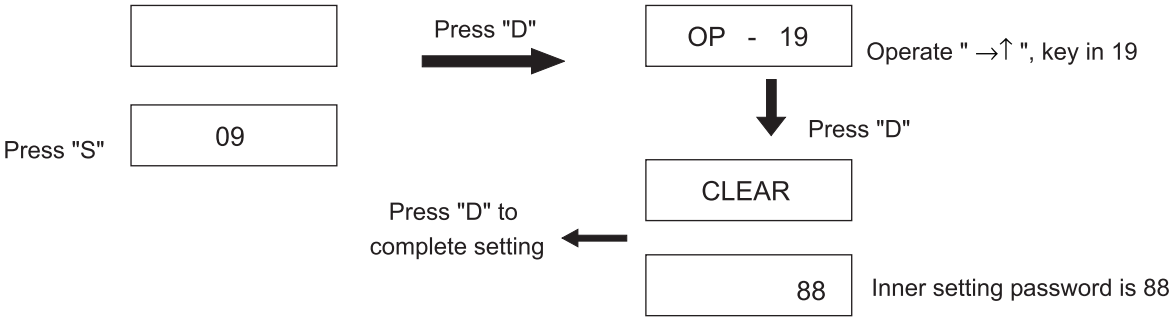
4.2 Press print button to show above display, press "S" to move out and won't print, press "D" start printing from setting hour 1 ~ 999. (If press "S" won't print, press "D" to start new printing)

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.

4.5.1 Press ⟶, enter basic display.



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.

006	F	00
Time	OFF Delay Time	Function Code
H		**223.0**
State		Setting Data

6. 223.0 is moving point.

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

FUN 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 :

024	N	05
Time	ON Delay Time	Function Code
H		**4.500**
State		Setting Data

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 :

		Day of weeks	5
		Year / Month / Date	0 4. 0 3. 0 5
		Hour / Min / Sec	1 2. 5 0. 3 5

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.

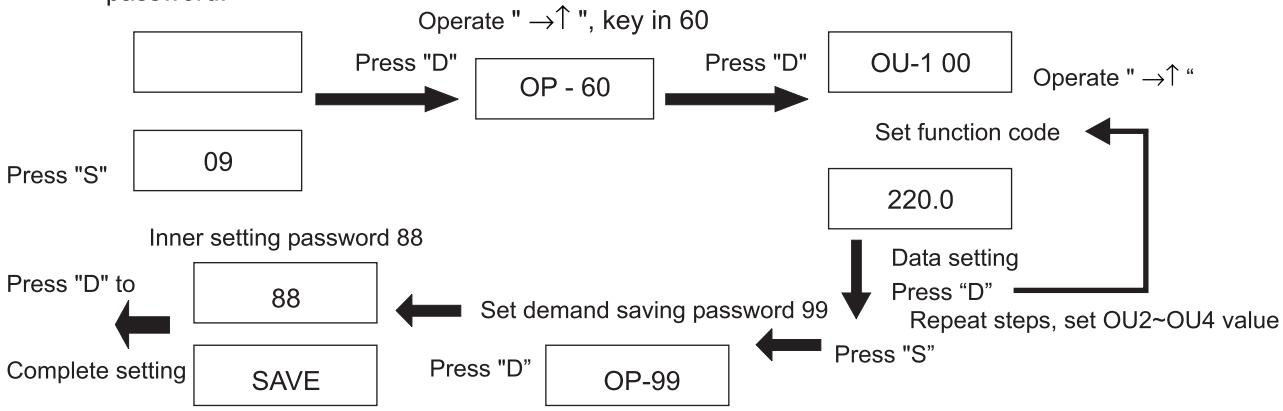
7. Analogy Output (Optional) :

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 0 9 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 20 mA)

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



FUN 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
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
12	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.

OU-2	03
Analogy output Set 2	Function Code

2.500
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)

OU-3	08
Analogy output Set 3	Function Code

PF
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.

OU-4	09
Analogy output Set 4	Function Code

60-5
Data setting

Example 5. Watt : 0~2.000KW 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 6 condition. (Watt)
3. Setting value file, operate " ↑ → ", adjust display to 2000 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.

OU-2	06
Analogy output Set 2	Function Code

2.000
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 pin, D type terminal)
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 reading (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 : DMMPX address is 31 ' PC reads address of 31 DMMP, from 100 (64H) start reading to 200 (C8H) data.

PC dispatches 1 FH+63H+00H+64H+00H+C8H+CRCL+CRCH
DMMPX 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	Totalvoltage 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	Ninteen 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 ϕ 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 ϕ 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 SHOCKPLEASE.
NO OPERATOR SERVICEABLE
COMPONENTS INSIDE. DO NOT REMOVE COVERS.
REFER SERVICING TO QUALIFIED PERSONNEL.