



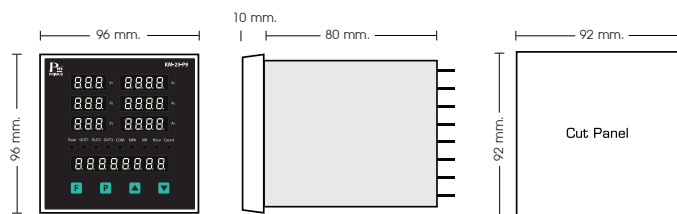
KM-23-P9



TECHNICAL SPECIFICATION

Power Supply		110-240 VAC 50-60 Hz
Power Consumption		3.5VA
Display		7-Segment, Size 0.39 Inch,
Input	Volt	3 Phase
	Volt Range	20-500 VAC
	Accuracy Volt	±0.5% FS.
	Current	Connection 1 CT, Direct
	Current Transformer Ratio	1-2000
	Primary	9999 AMP
	Secondary	0.01-5A
	Accuracy Current	±0.5% FS.
	kWh	Class 1
Output	Relay Output	SPDT 5A 250VAC / 5A 30VDC
	Protocol	MODBUS RTU
Communication	Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
	Parity	None, Even, Odd
	Stop Bits	1, 2
	Data Bits	8 Bits
	Support Device Node	255
Ambient Operation	Temperature	-10 °C to 60 °C
	Humidity	85 % RH Non-Condensing
Ambient Storage	Temperature	-20 °C to 80 °C
	Humidity	85 % RH Non-Condensing
Protection Degree		IP30
Installation		Panel Mounting
Material		ABS-V0
Size		96 x 96 x 80 mm.
Weight		?? g.

DIMENSION



DESCRIPTION

- Voltage measure range in 3 phase system maximum 500 VAC.
- Current measure range 0.01-5A, display maximum 9999 A by CT Ratio range 1-2000 (10000/5A).
- kw, kWh, Hour Counter, Counter Display with Relay Output.
- Under and Over Voltage , Phase Sequence, Phase Lose, Asymmetry Protection Relay.
- Under and Over Current Protection Relay.
- Peak Hold for Maximum of voltage, current and kW.
- Fault Display with Memory.
- RS-485 Modbus RTU.
- LED display measured value from each phase, output and peak.
- Manual / Auto Display of current and voltage in each phase.

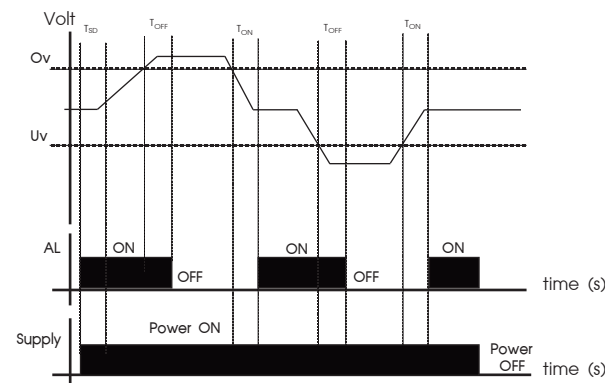
OPERATION

KM-23-P9 is a measuring device that displays voltage and current values in a 3-phase system. It also shows kW, kWh, Hour, and Counter values. The Hour function measures the operating hours of the electrical system or machinery to determine maintenance intervals. The Counter function counts the number of produced items, allowing comparison with the consumed electrical energy (kWh) to evaluate power usage efficiency. Additionally, the device can record Peak values of Voltage (V), Current (A), and Power (kW) for analysis of electrical system performance.

Voltage Protection Relay can be set to detect under or over voltage within the range of 50 to 500 VAC. The start delay time can be adjusted from 1 to 3600 seconds (ON Delay Time). If the phase sequence is incorrect, the relay will not operate and the delay time will not start. Once operating, it monitors the voltage level. If the voltage drops below or rises above the preset value, or if the phase sequence is abnormal or the voltage unbalance exceeds the preset percentage, the relay will turn OFF within 0-3600 seconds (depending on the set trip delay). This delay can be set for faster or slower tripping as required, and the display will show the cause of the fault. When the voltage returns to within the preset range, the relay will turn ON again after the internal ON Delay Time.

After the KM-23-P9 has tripped or the Relay is in the OFF state, the cause of the relay OFF condition can be checked from the Display. The operating status of the Voltage Protection is shown as illustrated in Figure 1.

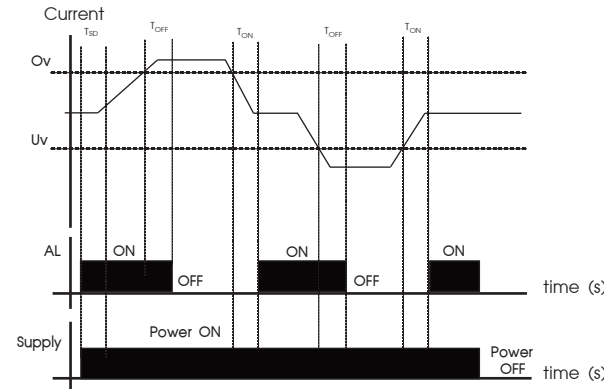
Graph 1 shows the operation Voltage Protection Relay.



The Current Protection Relay can be set to detect undercurrent or overcurrent within a range of 0.1 to 9999A. The ON delay time (the delay before operation) can be adjusted from 1 to 3600 seconds. Once activated, the relay continuously monitors the current level. If the current exceeds the preset value, the relay will switch OFF within 0 to 3600 seconds, depending on the selected trip delay time (which can be set for fast or slow response as desired). The cause of the trip will be displayed on the screen. When the current level returns below the preset threshold, the relay will automatically switch ON again within 1 to 3600 seconds.

After the KM-23-P9 disconnects the circuit or the relay turns OFF, the cause of the Relay OFF condition can be viewed on the display. It can also operate in the reverse function mode if desired. The operation graph of the Current Protection Relay is shown in Graph 2.

Graph 2 shows the operation Current Protection Relay.



Relay Output for kW, Hour and Counter

The alarm relay for kW, hour, and counter can be configured to activate or deactivate one of the loads.

kW function can be set from 0-100% of range, with a delay time before activation adjustable from 1-3600 seconds (ON Delay Time). Once activated, it monitors the operating kW. If the kW exceeds the set value, the relay will turn OFF within 0-3600 seconds, which can be adjusted for fast or slow response. The reason for relay operation will be displayed on the screen. When the kW drops below the set value, the relay will turn ON again within 1-3600 seconds, or it can be configured to operate in inverse mode, where the relay turns ON when the kW exceeds the set value.

Hour counter function allows setting the desired operating time. When the set time is reached, the relay turns ON. The relay can be reset to OFF either by pressing a button or using the Reset terminal pin.

Counter function allows setting a desired count. When the set count is reached, the relay turns ON. The relay can be reset to OFF either by pressing a button or using the Reset terminal pin.

Display in Manual and Auto

Volt, Amp, kW, kWh, Hour, and Counter can be displayed either manually or automatically. In manual mode, the values can be viewed by pressing the keypad on the device. In auto mode, the values for each phase are displayed in rotation, with the display interval adjustable from 10 to 60 seconds per phase. To disable the automatic display, the display time can be set to 0 seconds.

Calculation of % Unbalance Voltage

This function monitors the voltage of each phase and compares it to the average voltage of all three phases. If the difference exceeds the set % Unbalance, the output relay will operate with an OFF delay. The % Unbalance (%UBL) is calculated according to Equation 1. When the measured value exceeds the set Ub, the output relay will turn OFF, and the display will show the symbol - Ub - .

$$\%UBL = 100 \times \frac{V_{MD}}{V_{avg}} \quad (1) \quad V_{avg} = \left(\frac{V_a + V_b + V_c}{3} \right) \quad (2)$$

V_{MD} is the maximum absolute value of the difference between the voltage of each phase and the average voltage of all three phases.

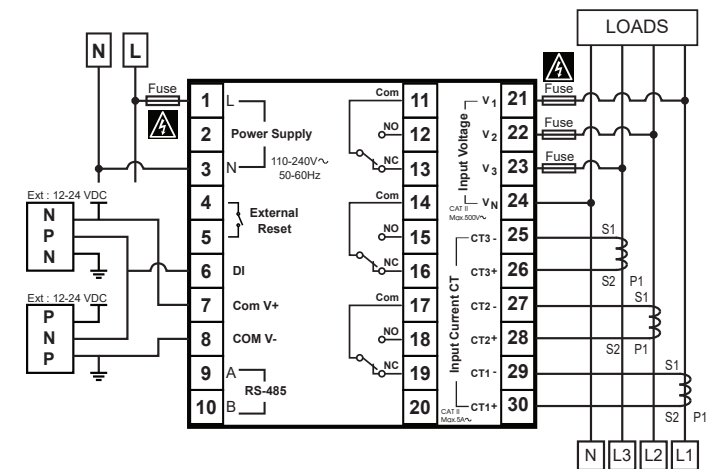
$$V_{MD} = \text{Max} (|V_a - V_{avg}|, |V_b - V_{avg}|, |V_c - V_{avg}|) \quad (3)$$

Example if set Ub = 20 % and $V_{avg} = 183$ V, $V_a = 110$ V, $V_b = 220$, $V_c = 220$

$$|V_a - V_{avg}| = 73 \text{ V} \quad |V_b - V_{avg}| = 37 \text{ V} \quad |V_c - V_{avg}| = 39.8 \text{ V}$$

$$\%UBL = 100 \times \frac{73}{183} = 37\%$$

WIRING DIAGRAM



ORDERING CODE

KM-23-P9 - A

OPTION	
	None
B	Alarm Relay 2
C	Alarm Relay 3
M	RS-485

First page



Display volt value of each phase , current of each phase, kWh.

Display Volt of each phase Phase , Current of each Phase



Display volt value of each phase , current of each phase, kWh.



Display Volt(L-L), kWh.



Display Volt(L-L), Avg, Current Avg, kWh.



Display Hz of each Phase, kWh.



Display PF of each phase.



Display Total PF

Display of kWh, Total kW, Hour Counter, Digital Counter



Display volt of each phase, current of each phase, kWh.



Display volt of each phase, current of each phase, Total kWh.



Display volt of each phase, current of each phase, Hour Counter.



Display volt of each phase, current of each phase, Digital Counter.

Display value Previous Fault of Protection Relay, Angle of between Volt and Current, Total PF



Display volt of each phase, current of each phase, kWh.



Display Previous Fault Output 1



Display Previous Fault Output 2



Display Previous Fault Output 3



Display angle value between Volt and Current Phase 1.



Display angle value between Volt and Current Phase 2.



Display angle value between Volt and Current Phase 3.



Display kWATT Phase 1



Display kWATT Phase 2



Display kWATT Phase 3

Display Peak Volt of each Phase, Peak Current of Phase, Demand kW



Display Volt of each Phase, Current of each Phase, kWh.



Display Peak Volt, Current, Demand kWATT.

Alarm Fault of Volt and Current Protection Relay



Every 3 sec.



Manual Reset Protection Relay Method

Press and hold the  button for 5 seconds to reset the Start Time. The Start Time is used to delay the detection of Voltage, Current, and kW Protection functions. During this period, the LED indicators Out1, Out2, and Out3 on the KM-23-P9 Three-Phase kWh Meter with Voltage Protection Relay will blink until the Start Time expires while monitoring Voltage, Current, and kW. If any output function is set to Disable, that output will not operate during the Start Time, and its corresponding LED will not blink.

■ CONFIGURATION

KM-23-P9

Measurement Display	0000	Show Measurement Value
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Press  for 2 Sec.

1. CT Ratio (For KM-21)	CT	1	CTratio range 1 to 2000
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Press  1 time

2. Start Delay Time	St	003	1 to 3600 Sec
---------------------	----	-----	---------------

Press  1 time

3. Function Setting for Output1	OPF1	11	Select Type and Function of Alarm Relay
Type		Alarm Function	
0 : Non Inverse		0 : Disable	
1 : Inverse		1 : kWatt	
		2 : Hour	
		3 : Counter	

Press  1 time

4. Over limit setting for Output 1	SPH1	250	Volt Protection : 50 to 500V Current Protection : 0.1 to 9999 A
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Press  1 time

5. Under limit setting for Output 1	SPL1	190	Volt Protection : 50 to 500V Current Protection : 0.1 to 9999 A
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Press  1 time

6. ON Delay Time setting for Output 1	OnD1	3	1 to 3600 Sec
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Press  1 time

7. OFF Delay Time setting for Output 1	OFd1	3	0 to 3600 Sec
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Press  1 time

8. Function Setting for Output 2	OPF2	11	Select Type and Function of Alarm Relay
Type		Alarm Function	
0 : Non Inverse		0 : Disable	
1 : Inverse		1 : Over and Under limit : 1	
		2 : Over limit : 2	
		3 : Under limit : 3	

Press  1 time

9. Over limit setting for Output 2	SPH2	50	Volt Protection : 50 to 500V Current Protection : 0.1 to 9999 A
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Press  1 time

10. Under limit setting for Output 2	SPL2	0.1	Volt Protection : 50 to 500V Current Protection : 0.1 to 9999 A
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Press  1 time

11. ON Delay Time setting for Output 2	OnD2	3	1 to 3600 Sec
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Press  1 time

12. OFF Delay Time setting for Output 2	OFd2	3	0 to 3600 Sec
---	------	---	---------------

Press  1 time

13. Function Setting for Output 3	OPF3	11	Select Type and Function of Alarm Relay
Type		Alarm Function	
0 : Non Inverse		0 : Disable	
1 : Inverse		1 : kWatt	
		2 : Hour	
		3 : Counter	

Press  1 time

14. kWatt setting for Output 3	SPK1	50	kWatt Protection : 1 to 3,000 kWatt
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Press  1 time

15. Hour setting for Alarm 3	SPHr	1	Hour Set point : 1 to 100,000
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Press  1 time

16. Counter setting for Alarm 3	SPC1	1	Counter Set point : 1 to 99999999
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Press  1 time

17. ON Delay Time setting for Output 3	OnD3	3	1 to 3600 Sec
--	------	---	---------------

Press  1 time

18. OFF Delay Time setting for Output 3	OFd3	3	0 to 3600 Sec
---	------	---	---------------

Press  1 time

19. Counter Input Filter	CIF	1	0 : Disable 1 : Frequency less than ≤ 10 Hz 2 : Frequency maximum 1kHz
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Press  1 time

20. Unbalance Voltage Setting	Ub	1	Setting value of % Unbalance for checking voltage of electrical system. Unbalance : 0.0 to 50.0
-------------------------------	----	---	--

Press  1 time

21. Clear Peak Volt, Current and kWatt	CL-P	-CLR	---- : Disable -CLR : Enable
--	------	------	---------------------------------

Press  1 time

22. Clear Previous Fault	CL-F	-CLR	---- : Disable -CLR : Enable
--------------------------	------	------	---------------------------------

Press  1 time

23. Clear kWh, Hour Counter, Counter Input	CL--	-CLR	---- : Disable -CLR : Clear kWh -CL-H : Clear Hour Counter -CL-C : Clear Counter Input -CL-A : Clear kWh, Hour Counter, Counter Input
--	------	------	---

Press  1 time

24. RS-485 Address	Addr	1	Setting Device Address 1 to 255
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Press  1 time

25. RS-485 Baud Rate	Baud	9600	Baud rate 2400 bps 19200 bps 115200 bps 4800 bps 38400 bps 9600 bps 57600 bps
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Press  1 time

26. Communication Stop bit/Parity bit	Com	n15	n15 : none parity, 1 stop bit E15 : even parity, 1 stop bit o15 : odd parity, 1 stop bit n25 : none parity, 2 stop bit E25 : even parity, 2 stop bit o25 : odd parity, 2 stop bit
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Press  1 time

27. Auto Display	Auto	0	Set time from 10 to 60 sec. to change display of volt and amp from measure as sort. If set 0 : Disable.
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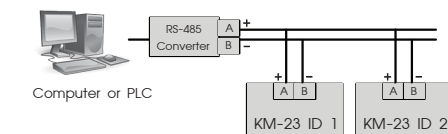
Press  1 time

28. Edit kWh	H1h	10	Set kWh as request follow as Table 2.
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■ SERIAL COMMUNICATION

The KM-23 are Equipped With a RS-485 Series Communication Interface to Allow Connection to Computer or PLCs. MODBUS PROTOCOL is Provided as Standard Communication. The User Can Connect KM-23 as Network Up to 128 Meters.

Wiring Diagram



MODBUS PROTOCOL

This MODBUS PROTOCOL Has Been Implement In Accordance With MODBUS.ORG MODBUS Application PROTOCOL Specification V1.1 With The Following Conditions Applying. The Following Conditions Apply Baudrate Can Selected Refer 22. Speed Setting The Format Is MODBUS RTU Refer 22. Speed Setting The Format Is MODBUS RTU UART Data Can Selected Refer 23. Communication Setting Data Is Considered To Be Half Duplex Using 2 Wire.

Modbus Function code

Function code	Operation	Broadcast
0x03	Read Holding Registers	No
0x04	Read Multiple Registers	No
0x06	Preset Single Registers	Yes
0x10	Preset Multiple Registers	Yes

Modbus Exception code

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the data field is not an allowable value for server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Example of a client request and server exception response

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	84
Starting Address HI	00	Exception Code	02
Starting Address Lo	00	CRC HI	C2
Quantity of Input Reg. HI	00	CRC Lo	C1
Quantity of Input Reg. Lo	1E		
CRC HI	70		
CRC Lo	02		

MODBUS Table of KM-23 will be as below :

Modbus Table 1

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
0	0x0	Volt (L-L) Avg	Unsignde int	1	Read Only	
1	0x1	Volt L1-L2	Unsignde int	1	Read Only	
2	0x2	Volt L2-L3	Unsignde int	1	Read Only	
3	0x3	Volt L3-L1	Unsignde int	1	Read Only	
4	0x4	Volt Phase 1	Unsignde int	1	Read Only	
5	0x5	Volt Phase 2	Unsignde int	1	Read Only	
6	0x6	Volt Phase 3	Unsignde int	1	Read Only	
7	0x7	Current Avg	Unsignde int	1	Read Only	
8	0x8	Current Phase 1	Unsignde int	1	Read Only	
9	0x9	Current Phase 2	Unsignde int	1	Read Only	
10	0xA	Current Phase 3	Unsignde int	1	Read Only	
11	0xB	Current Exponential	Unsignde int	1	Read Only	
12	0xC	PF Total	Int	1	Read Only	
13	0xD	PF Phase 1	Int	1	Read Only	
14	0xE	PF Phase 2	Int	1	Read Only	
15	0xF	PF Phase 3	Int	1	Read Only	
16	0x10	Hz Phase 1	Unsignde int	1	Read Only	
17	0x11	Hz Phase 2	Unsignde int	1	Read Only	
18	0x12	Hz Phase 3	Unsignde int	1	Read Only	
19	0x13	Peak Volt Phase 1	Unsignde int	1	Read Only	
20	0x14	Peak Volt Phase 2	Unsignde int	1	Read Only	
21	0x15	Peak Volt Phase 3	Unsignde int	1	Read Only	
22	0x16	Peak Current Phase 1	Unsignde int	1	Read Only	
23	0x17	Peak Current Phase 2	Unsignde int	1	Read Only	
24	0x18	Peak Current Phase 3	Unsignde int	1	Read Only	
25	0x19	Peak Current Exponential	Unsignde int	1	Read Only	
26	0x1A	Previous Fault Alarm 1	Unsignde int	1	Read Only	See Table 1
27	0x1B	Previous Fault Alarm 2	Unsignde int	1	Read Only	See Table 1
28	0x1C	Previous Fault Alarm 3	Unsignde int	1	Read Only	See Table 1
29	0x1D	Status Digital Counter	Unsignde int	1	Read Only	

Modbus Table 2

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
256	0x100	Watt MSB	Long	2	Read Only	
257	0x101	Watt LSB				
258	0x102	VA MSB	Long	2	Read Only	
259	0x103	VA LSB				
260	0x104	kWh MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-99999999
261	0x105	kWh LSB				
262	0x106	kWh Exponential MSB	Unsigned Long	2	Read Only	0 : kWh Reg/1 1 : kWh Reg/10
263	0x107	kWh Exponential LSB				
264	0x108	Peak Watt MSB	Unsigned Long	2	Read Only	
265	0x109	Peak Watt LSB				
266	0x10A	Hour MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-100,000
267	0x10B	Hour LSB				
268	0x10C	Counter MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-99999999
269	0x10D	Counter LSB				

Modbus Table 3

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
512	0x200	CT Ratio	Unsignde int	1	R/W	ตั้งค่า 1-2000
513	0x201	Start Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
514	0x202	On Delay 1 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
515	0x203	Off Delay 1 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
516	0x204	Function Alarm 1	Unsignde int	1	R/W	
517	0x205	On Delay 2 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
518	0x206	Off Delay 2 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
519	0x207	Function Alarm 2	Unsignde int	1	R/W	
520	0x208	On Delay 3 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
521	0x209	Off Delay 3 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
522	0x20A	Function Alarm 3	Unsignde int	1	R/W	
523	0x20B	Unbalance	Unsignde int	1	R/W	ตั้งค่า 0-500
524	0x20C	Counter Filter	Unsignde int	1	R/W	ตั้งค่า 0-2
525	0x20D	Over Limit Alarm 1 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
526	0x20E	Over Limit Alarm 1 LSB				
527	0x20F	Under Limit Alarm 1 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
528	0x210	Under Limit Alarm 1 LSB				

529	0x211	Over Limit Alarm 2 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
530	0x212	Over Limit Alarm 2 LSB				
531	0x213	Under Limit Alarm 2 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
532	0x214	Under Limit Alarm 2 LSB				
533	0x215	kWatt Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-3000000
534	0x216	kWatt Set point LSB				
535	0x217	Hour Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-100000
536	0x218	Hour Set point LSB				
537	0x219	Counter Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-99999999
538	0x21A	Counter Set point LSB				

Table 1

Symbol	Display	Comment
0	----	None
1	-PH-	Phase Sequence
2	L055 L 1--	Phase 1 Loss
3	L055 L-2-	Phase 2 Loss
4	L055 L--3	Phase 3 Loss
5	L055 L 12-	Phase 1, 2 Loss
6	L055 L-23	Phase 2, 3 Loss
7	L055 L 1-3	Phase 3,1 Loss
8	L055 L 123	Phase 1,2,3 Loss
9	-Ub-	Unbalance
10	0uu L 1--	Over Volt Phase 1
11	0uu L-2-	Over Volt Phase 2
12	0uu L--3	Over Volt Phase 3
13	0uu L 12-	Over Volt Phase 1, 2
14	0uu L-23	Over Volt Phase 2, 3
15	0uu L 1-3	Over Volt Phase 1, 3
16	0uu L 123	Over Volt Phase 1, 2, 3
17	Unu L 1--	Under Volt Phase 1
18	Unu L-2-	Under Volt Phase 2
19	Unu L--3	Under Volt Phase 3
20	Unu L 12-	Under Volt Phase 1, 2
21	Unu L-23	Under Volt Phase 2, 3
22	Unu L 1-3	Under Volt Phase 1, 3
23	Unu L 123	Under Volt Phase 1, 2, 3

24	0uL L 1--	Over Current Phase 1
25	0uL L-2-	Over Current Phase 2
26	0uL L--3	Over Current Phase 3
27	0uL L 12-	Over Current Phase 1, 2
28	0uL L-23	Over Current Phase 2, 3
29	0uL L 1-3	Over Current Phase 1, 3
30	0uc L 123	Over Current Phase 1, 2, 3
31	UnL L 1--	Under Current Phase 1
32	UnL L-2-	Under Current Phase 2
33	UnL L--3	Under Current Phase 3
34	UnL L 12-	Under Current Phase 1, 2
35	UnL L-23	Under Current Phase 2, 3
36	UnL L 1-3	Under Current Phase 1, 3
37	UnL L 123	Under Current Phase 1, 2, 3
38	-H'L-	Over kWATT
39	-Hr-	Hour Counter
40	-d r-	Digital Counter

How to set Peak volt, Current, Total kWatt value

1. Set parameter $CL-P$ to be CLr .
2. Stay in one of Peak result page then press $\blacksquare + \blacksquare$ and hold for 5 seconds.
3. When Reset then Parameter $CL-P$ will be ----.

How to set Fault Alarm value

1. Set parameter $CL-F$ to be CLr .
2. Stay in one of Fault Alarm page then press $\blacksquare + \blacksquare$ and hold for 5 seconds.
3. When Reset then Parameter $CL-P$ will be ----.

How to reset kWh, Hour Counter, Counter Input, Reset kWh.

1. Set Parameter $CL--$ to be CLr .
2. Stay in kWh display page then press $\blacksquare + \blacksquare$ for 5 seconds.
3. When Reset then Parameter $CL--$ will be ----.

Reset Hour Counter

1. Set Parameter $CL--$ to be $CL-H$.
2. Stay in Hour Counter display page then press $\blacksquare + \blacksquare$ for 5 seconds.
3. When Reset them parameter $CL--$ will be ----.

Reset Counter Input

1. Set Parameter $CL--$ to be $CL-C$.
2. Stay in Counter Input display page then press $\blacksquare + \blacksquare$ for 5 seconds.
3. When Reset them parameter $CL--$ will be ----.

Reset kWh, Hour Counter, Counter Input

1. Set Parameter $CL--$ to be $CL-R$.
2. Stay in one of kWh, Hour Counter, Counter Input display page then press $\blacksquare + \blacksquare$ for 5 seconds.
3. When Reset them parameter $CL--$ will be $CL-R$.

How to reset kWh, Hour Counter, Counter Input by External Input reset kWh.

1. Set parameter $CL--$ to be CLr .
2. Stay in any result page then connect Input as Fig 5. hold for 3 seconds.
3. When Reset then Parameter $CL--$ will be ----.

Reset Hour Counter

1. Set parameter $CL--$ to be $CL-H$.
2. Stay in any result page then connect Input as Fig 5. hold for 3 seconds.
3. When Reset then Parameter $CL--$ will be ----.

Reset Counter Input

1. Set parameter $CL--$ to be $CL-C$.
2. Stay in any result page then connect Input as Fig 5. hold for 3 seconds.
3. When Reset then Parameter $CL--$ will be ----.

Reset kWh ,Hour Counter ,Counter Input

1. Set parameter $CL--$ to be $CL-R$.
2. Stay in any result page then connect Input as Fig 5. hold for 3 seconds.
3. When Reset then Parameter $CL--$ will be $CL-R$.

Fig 5. External Input Reset Connection

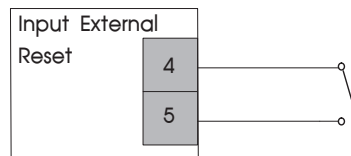


Table 2.

How to edit kWh

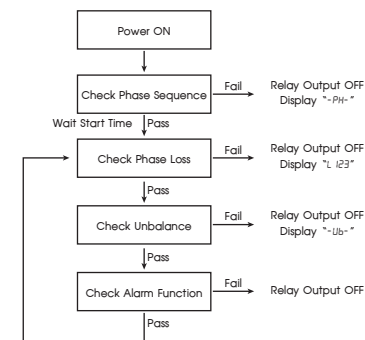
1. Stay in page of Menu Parameter $H'L'h$.
2. Press $\blacksquare + \blacksquare$ hold for 5 seconds then show $PAR55$ and fill password 5041 by pressing P to move the digit positions Press F to accept, press $\blacksquare$ or $\blacksquare$ to move value that requested value.
3. After fill password press $\blacksquare$ until this page show up  after that press $\blacksquare$ or $\blacksquare$ to slide the required value. When finish press keypad $\blacksquare$.

How to calculate value

$$\text{Volt} = \frac{\text{Volt Reg}}{10} \quad \text{Current} = \frac{\text{Current reg}}{\text{Current Exponential}}$$

$$\text{Hz} = \frac{\text{Hz Reg}}{10} \quad \text{Power Factor} = \frac{\text{Power Factor Reg}}{1000}$$

Output Volt workflow





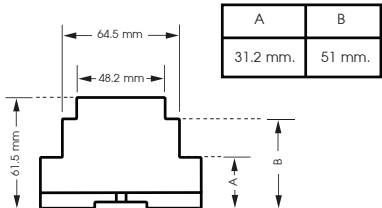
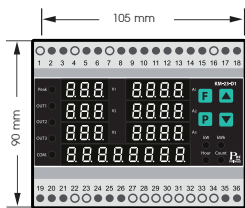
KM-23-DI



TECHNICAL SPECIFICATION

Power Supply		110-240 VAC 50-60 Hz
Power Consumption		3.5VA
Display		7-Segment, Size 0.39 Inch, 3 Digit 3 Row, 4 Digit 3 Row 8 Digit 1 Row
Input	Volt	3 Phase
	Volt Range	20-500 VAC
	Accuracy Volt	±0.5% FS.
	Current	Connection 3 CT, Direct
	Current Transformer Ratio	1-2000
	Primary	9999 AMP
	Secondary	0.01-5A
	Accuracy Current	±0.5% FS.
	kWh	Class 1
	Counter Input	Dry Contact Max 1k Hz
Output	Relay Output	SPDT 5A 250VAC / 5A 30VDC
	Protocol	MODBUS RTU
Communication	Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
	Parity	None, Even, Odd
	Stop Bits	1, 2
	Data Bits	8 Bits
	Support Device Node	255
Ambient Operation	Temperature	-10 °C to 60 °C
	Humidity	85 % RH Non-Condensing
Ambient Storage	Temperature	-20 °C to 80 °C
	Humidity	85 % RH Non-Condensing
Protection Degree		IP30
Installation		DIN-RAIL
Material		ABS-V0
Size		90 x 150 x 61.5 mm.
Weigth		280 g.

DIMENSION



DESCRIPTION

- The voltage range in 3 phase system maximum 500 VAC
- The current range 0.01-5 A, show maximum 9999 A by C.T. Ratio Range 1-2000 (10000/5A)
- kw, kWh, Hour Counter, Counter Display with Relay Output
- Under and Over Voltage, Phase Sequence, Phase Lose, Asymmetry, Protection Relay
- Under and Over Current Protection Relay
- Peak Hold for Maximum of voltage, current and kW
- Fault Display with Memory
- RS-485 Modbus RTU
- LED show the measured value in each Phase, Output and Peak
- Manual / Auto Display the current and voltage value in each phase.

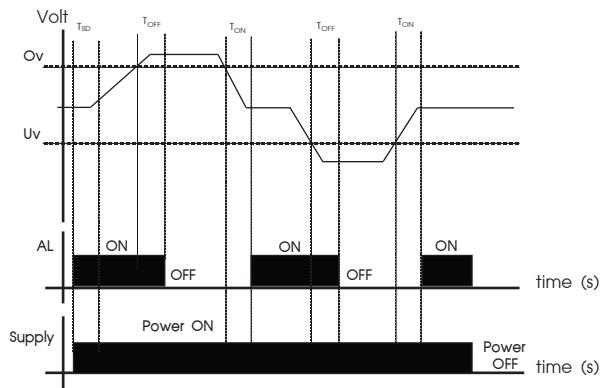
OPERATION

KM-23-DI is the device and display voltage and current in 3 phase and show and show kW, kWh, Hour, and Counter. Hour value is measuring the operation of electrical system or machine time to schedule the maintenance. Counter is counting the product from production to compare with the power (kWh) from usage that is measure energy efficiency and it can memory the peak value of voltage(v), current(A), and power(kW) that may happen to analyze the possible of electrical system.

Voltage Protection Relay can set the over - under voltage value between 50 to 500 VAC by set the delay time before start the operation since 1-3600 seconds (ON Delay Time) but the phase sequence are not correct. Relay will not operate and delay. When it start operation it will detect the voltage. If the voltage lower or over the setting value or unbalance phase over than percentage from setting or Phase loss. Relay will OFF in 0-3600 seconds which can set to cut fast or slow as require and show the cause of incident on display. When the voltage back to the setting voltage range. Relay will back to ON again in setting time.

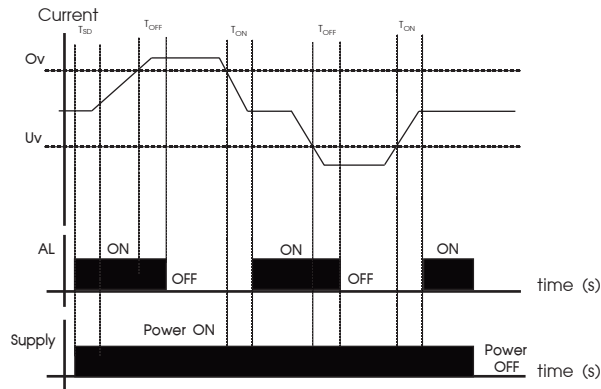
After KM-23-DI cut the circuit or Relay OFF. The user can browse the cause of Relay OFF from Display graph shows the operation of Voltage Protection shows in graph 1.

Graph 1 the Voltage Protection Relay operation



Current Protection Relay can set the under or over current between 0.1 to 9999 A set the delay time before start working since 1-3600 second (ON Delay Time) when start operation it will detect the current. If the current over than setting value. Relay will OFF in 0-3600 seconds which is able to set as require and show the cause on Display when the current level back to lower level from setting. Relay will back to ON again in 1-3600 seconds.

graph 2 shows the Current Protection Relay operation



Relay Output for kW, Hour and Counter

Alarm Relay for kW, Hour, Counter that choose to response in cut or connect Load in the one of them.

kW Function can set kW 0-100% of Range and the setting when start operate and detect the possible of kW. If kW value more than from setting. Relay will OFF in 0-3600 seconds which can cut fast or slow as require. And shows the cause on display. When kW level back to lower level than the setting. Relay will back to ON again in 1-3600 second or operate in Inverse Function is Relay will ON when kW value more than the setting.

Hour Counter Function can set the operation hour as require when it complete the time. Relay send ON and can Reset to order OFF by press the buttons or use Terminal Reset PIN.

Counter Function can set the required quantity when complete the quantity from setting. Relay will ON and can Reset to OFF by press the buttons or use Terminal Reset PIN.

Display in Manual and Auto

Display Volt, Amp, kW, kWh, Hour and Counter from measured. It can do both

way of Manual is pressing to see Volt, Amp, kW, kWh, Hour and Counter by pressing key pad on the device or Auto will show circulating by can set to show value since 10-60 second per phase. If the user don't it show on Auto mode. If the user don not want to show it can set to 0

% Unbalance Voltage Calculation

This Function will check that the voltage value of each phase compare with the average voltage value all 3 phase. There are the difference over % Unbalance from setting or not. If the value is over than setting. It will delay OFF Delay then Output Relay will stop operate and calculate % Unbalance follow formula 1. When measured value more than Ub value that setting it will made Output Relay will OFF and the screen will show the sign - Ub-

$$\%UBL = 100 \times \frac{V_{MD}}{V_{avg}} \quad (1) \quad V_{avg} = \left(\frac{V_A + V_B + V_C}{3} \right) \quad (2)$$

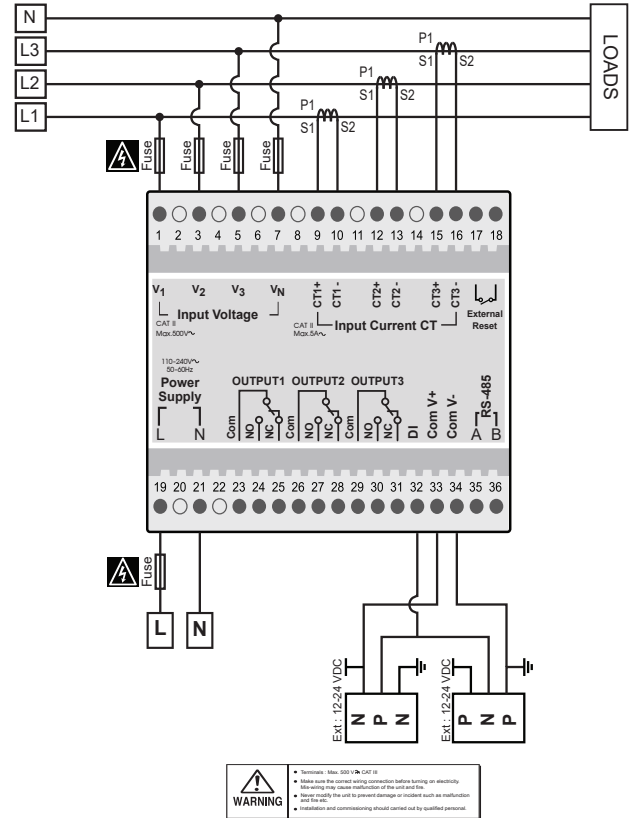
V_{MD} is Absolute maximum of the difference of voltage in each phase with the average voltage

$$V_{MD} = \text{Max} (|V_A - V_{avg}|, |V_B - V_{avg}|, |V_C - V_{avg}|) \quad (3)$$

Example if set Ub = 20 % and V_{avg} = 183 V, V_A =110 V, V_B = 220, V_C = 220

$$|V_A - V_{avg}| = 73 \text{ V} \quad |V_B - V_{avg}| = 37 \text{ V} \quad |V_C - V_{avg}| = 39.8 \text{ V}$$
$$\%UBL = 100 \times \frac{73}{183} = 37\%$$

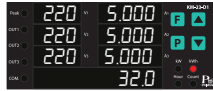
WIRING DIAGRAM



ORDERING CODE

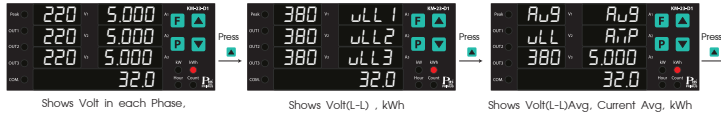
KM-23-DI - A		OPTION
		OPTION 1
NONE	Alarm Relay 1 : Voltage and Current Protection	
B	Alarm Relay 2 : Voltage and Current Protection Relay Function	
C	Alarm Relay 3: kW, Hour Counter and Counter Function	
M	RS-485	

First Page

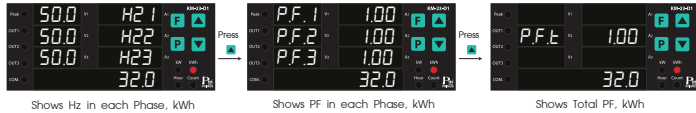


shows Volt in each Phase, Current in each Phase, kWh

Display Volt in each Phase, Volt(L-L), Current in each Phase, Hz, PF, Total PF

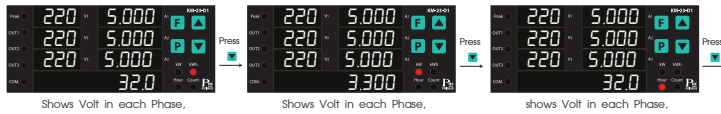


Shows Volt in each Phase, Current in each Phase, kWh

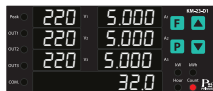


Shows Hz in each Phase, kWh

Display kWh, Total kW, Hour Counter, Digital Counter

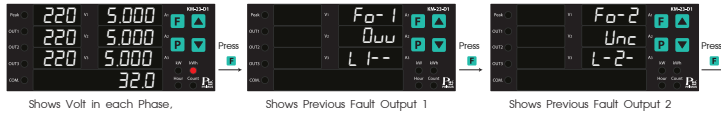


Shows Volt in each Phase, Current in each Phase, kWh



Shows Volt in each Phase, Current in each Phase, Digital Counter

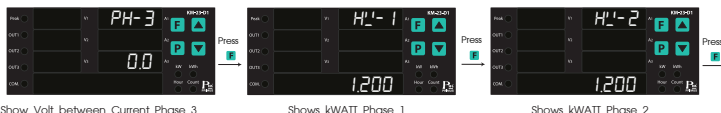
Display Previous Fault of Protection Relay, Volt angle between Current



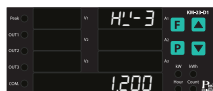
Shows Volt in each Phase, Current in each Phase, kWh



Shows Previous Fault Output 3

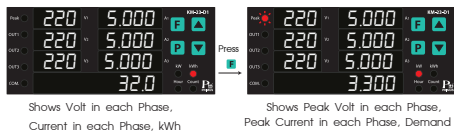


Shows kWATT Phase 1



Shows kWATT Phase 3

Display Peak Volt in each Phase, Peak Current in each Phase, Demand kW



Shows Volt in each Phase, Current in each Phase, kWh

Fault Alarm of Volt and Current Protection Relay



Manual Reset Protection Relay process

Press and hold for 5 seconds. Start time will back to start in Start Time

use for delay the detection of Volt, Current and kWATT Protection in this time LED

Out1, Out2, Out3 will flash until finish Start Time period and check Volt, Current,

KWATT in case Output Function in one of them equal to Disable Output that will

not operate in Start Time. It make LED Out1, Out2, Out3 will not flash.

■ CONFIGURATION

KM-23-DI

Measurement Display

0000

Show Measurement Value

Press hold for 2 seconds

1. CT Ratio (For KM-21)

CT

1

CTRatio range 1 to 2000

Press 1 Time

2. Start Delay Time

St

003

1 to 3600 Sec

Press 1 Time

3. Function Setting for Output1

OPF1

11

Select Type and Function of Alarm Relay

Type

0 : Non Inverse

1 : Inverse

Alarm Function

0 : Disable

1 : kWatt

2 : Hour

3 : Counter

Press 1 Time

4. Over limit setting for Output 1

SPH1

250

Volt Protection : 50 to 500V

Current Protection : 0.1 to 9999 A

Press 1 Time

5. Under limit setting for Output 1

SPL1

190

Volt Protection : 50 to 500V

Current Protection : 0.1 to 9999 A

Press 1 Time

6. ON Delay Time setting for Output 1

OnD1

3

1 to 3600 Sec

Press 1 Time

7. OFF Delay Time setting for Output 1

OFd1

3

0 to 3600 Sec

Press 1 Time

8. Function Setting for Output 2

OPF2

11

Select Type and Function of Alarm Relay

Type

0 : Non Inverse

1 : Inverse

Alarm Function

0 : Disable

1 : kWatt

2 : Hour

3 : Counter

Press 1 Time

9. Over limit setting for Output 2

SPH2

50

Volt Protection : 50 to 500V

Current Protection : 0.1 to 9999 A

Press 1 Time

10. Under limit setting for Output 2

SPL2

0.1

Volt Protection : 50 to 500V

Current Protection : 0.1 to 9999 A

Press 1 Time

11. ON Delay Time setting for Output 2

OnD2

3

1 to 3600 Sec

Press 1 Time

12. OFF Delay Time setting for Output 2

OFd2

3

0 to 3600 Sec

Press 1 Time

13. Function Setting for Output 3

OPF3

11

Select Type and Function of Alarm Relay

Type

0 : Non Inverse

1 : Inverse

Alarm Function

0 : Disable

1 : kWatt

2 : Hour

3 : Counter

Press 1 Time

14. kWatt setting for Output 3

SPK1

50

kWatt Protection : 1 to 3,000 kWatt

Press 1 Time

15. Hour setting for Alarm 3

SPHr

1

Hour Set point : 1 to 100,000

Press 1 Time

16. Counter setting for Alarm 3

SPC1

1

Counter Set point : 1 to 99999999

Press 1 Time

17. ON Delay Time setting for Output 3

OnD3

3

1 to 3600 Sec

Press 1 Time

18. OFF Delay Time setting for Output 3

OFd3

3

0 to 3600 Sec

Press 1 Time

19. Counter Input Filter

CIF

1

0 : Disable

1 : Frequency lower < 10 Hz

2 : Maximum Frequency 1kHz

Press 1 Time

20. Unbalance Voltage Setting

Ub

1

Setting value of % Unbalance for check

Unbalance : 0.0 to 50.0

Press 1 Time

21. Clear Peak Volt, Current and kWatt

CL-P

-CLR

--- : Disable

-CLR : Enable

Press 1 Time

22. Clear Previous Fault

CL-F

-CLR

--- : Disable

-CLR : Enable

Press 1 Time

23. Clear kWh, Hour Counter, Counter Input

CL--

-CLR

--- : Disable

-CLR : Clear kWh

-CL-H : Clear Hour Counter

-CL-C : Clear Counter Input

-CL-A : Clear kWh, Hour Counter, Counter Input

Press 1 Time

24. RS-485 Address

Addr

1

Setting Device Address 1 to 255

Press 1 time

25. RS-485 Baud Rate

bAud

9600

Baud rate

2400 bps

4800 bps

9600 bps

19200 bps

38400 bps

115200 bps

57600 bps

Press 1 time

26. Communication Stop bit/Parity bit

Com

n15

n15 : none parity, 1 stop bit

E15 : even parity, 1 stop bit

O15 : odd parity, 1 stop bit

n25 : none parity, 2 stop bit

E25 : even parity, 2 stop bit

O25 : odd parity, 2 stop bit

Press 1 time

27. Auto Display

Auto

0

Set time 10 to 60 seconds to change show Volt and Amp for measure by sequence. If set to 0 : Disable

Press 1 time

28. Edit kWh

H'h

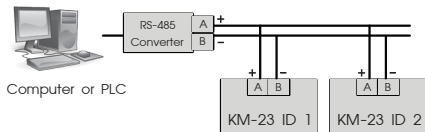
10

Set kWh as require follow Table 2.

■ SERIAL COMMUNICATION

The KM-23 are Equipped With a RS-485 Series Communication Interface to Allow Connection to Computer or PLCs. MODBUS PROTOCOL is Provided as Standard Communication. The User Can Connect KM-23 as Network Up to 128 Meters.

Wiring Diagram



Computer or PLC

KM-23 ID 1

KM-23 ID 2

MODBUS PROTOCOL

This MODBUS PROTOCOL Has Been Implement In Accordance With MODBUS.ORG MODBUS Application PROTOCOL Specification V1.1 With The Following Conditions Applying. The Following Conditions Apply Baudrate Can Selected Refer 22. Speed Setting The Format Is MODBUS RTU Refer 22. Speed Setting The Format Is MODBUS RTU UART Data Can Selected Refer 23. Communication Setting Data Is Considered To Be Half Duplex Using 2 Wire.

Modbus Function code

Function code	Operation	Broadcast
0x03	Read Holding Registers	No
0x04	Read Multiple Registers	No
0x06	Preset Single Registers	Yes
0x10	Preset Multiple Registers	Yes

Modbus Exception code

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the data field is not an allowable value for server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Example of a client request and server exception response

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	84
Starting Address Hi	00	Exception Code	02
Starting Address Lo	00	CRC Hi	C2
Quantity of Input Reg. Hi	00	CRC Lo	C1
Quantity of Input Reg. Lo	1E		
CRC Hi	70		
CRC Lo	02		

MODBUS table of KM-23 as follow

Modbus Table 1

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
0	0x0	Volt (L-L) Avg	Unsignde int	1	Read Only	
1	0x1	Volt L1-L2	Unsignde int	1	Read Only	
2	0x2	Volt L2-L3	Unsignde int	1	Read Only	
3	0x3	Volt L3-L1	Unsignde int	1	Read Only	
4	0x4	Volt Phase 1	Unsignde int	1	Read Only	
5	0x5	Volt Phase 2	Unsignde int	1	Read Only	
6	0x6	Volt Phase 3	Unsignde int	1	Read Only	
7	0x7	Current Avg	Unsignde int	1	Read Only	
8	0x8	Current Phase 1	Unsignde int	1	Read Only	
9	0x9	Current Phase 2	Unsignde int	1	Read Only	
10	0xA	Current Phase 3	Unsignde int	1	Read Only	
11	0xB	Current Exponential	Unsignde int	1	Read Only	
12	0xC	PF Total	Int	1	Read Only	
13	0xD	PF Phase 1	Int	1	Read Only	
14	0xE	PF Phase 2	Int	1	Read Only	
15	0xF	PF Phase 3	Int	1	Read Only	
16	0x10	Hz Phase 1	Unsignde int	1	Read Only	
17	0x11	Hz Phase 2	Unsignde int	1	Read Only	
18	0x12	Hz Phase 3	Unsignde int	1	Read Only	
19	0x13	Peak Volt Phase 1	Unsignde int	1	Read Only	
20	0x14	Peak Volt Phase 2	Unsignde int	1	Read Only	
21	0x15	Peak Volt Phase 3	Unsignde int	1	Read Only	
22	0x16	Peak Current Phase 1	Unsignde int	1	Read Only	
23	0x17	Peak Current Phase 2	Unsignde int	1	Read Only	
24	0x18	Peak Current Phase 3	Unsignde int	1	Read Only	
25	0x19	Peak Current Exponential	Unsignde int	1	Read Only	
26	0x1A	Previous Fault Alarm 1	Unsignde int	1	Read Only	See Table 1
27	0x1B	Previous Fault Alarm 2	Unsignde int	1	Read Only	See Table 1
28	0x1C	Previous Fault Alarm 3	Unsignde int	1	Read Only	See Table 1
29	0x1D	Status Digital Counter	Unsignde int	1	Read Only	

Modbus Table 2

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
256	0x100	Watt MSB	Long	2	Read Only	
257	0x101	Watt LSB				
258	0x102	VA MSB	Long	2	Read Only	
259	0x103	VA LSB				
260	0x104	kWh MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-99999999
261	0x105	kWh LSB				
262	0x106	kWh Exponential MSB	Unsigned Long	2	Read Only	0 : kWh Reg/1 1 : kWh Reg/10
263	0x107	kWh Exponential LSB				
264	0x108	Peak Watt MSB	Unsigned Long	2	Read Only	
265	0x109	Peak Watt LSB				
266	0x10A	Hour MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-100,000
267	0x10B	Hour LSB				
268	0x10C	Counter MSB	Unsigned Long	2	R/W	เขียนค่าได้ตั้งแต่ 0-99999999
269	0x10D	Counter LSB				

Modbus Table 3

Reg. Address		Contents	Format	Word	Access	Comment
Decimal	Hex					
512	0x200	CT Ratio	Unsignde int	1	R/W	ตั้งค่า 1-2000
513	0x201	Start Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
514	0x202	On Delay 1 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
515	0x203	Off Delay 1 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
516	0x204	Function Alarm 1	Unsignde int	1	R/W	
517	0x205	On Delay 2 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
518	0x206	Off Delay 2 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
519	0x207	Function Alarm 2	Unsignde int	1	R/W	
520	0x208	On Delay 3 Time	Unsignde int	1	R/W	ตั้งค่า 1-3600
521	0x209	Off Delay 3 Time	Unsignde int	1	R/W	ตั้งค่า 0-3600
522	0x20A	Function Alarm 3	Unsignde int	1	R/W	
523	0x20B	Unbalance	Unsignde int	1	R/W	ตั้งค่า 0-500
524	0x20C	Counter Filter	Unsignde int	1	R/W	ตั้งค่า 0-2
525	0x20D	Over Limit Alarm 1 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
526	0x20E	Over Limit Alarm 1 LSB				
527	0x20F	Under Limit Alarm 1 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
528	0x210	Under Limit Alarm 1 LSB				

529	0x211	Over Limit Alarm 2 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
530	0x212	Over Limit Alarm 2 LSB				
531	0x213	Under Limit Alarm 2 MSB	Unsigned Long	2	R/W	Volt : 50-500V Current : 1-999900A
532	0x214	Under Limit Alarm 2 LSB				
533	0x215	kWatt Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-3000000
534	0x216	kWatt Set point LSB				
535	0x217	Hour Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-100000
536	0x218	Hour Set point LSB				
537	0x219	Counter Set point MSB	Unsigned Long	2	R/W	ตั้งค่า 1-99999999
538	0x21A	Counter Set point LSB				

Table 1

Symbol	Display	Comment
0	----	None
1	-PH-	Phase Sequence
2	Lo55 L 1--	Phase 1 Loss
3	Lo55 L -2-	Phase 2 Loss
4	Lo55 L --3	Phase 3 Loss
5	Lo55 L 12-	Phase 1, 2 Loss
6	Lo55 L -23	Phase 2, 3 Loss
7	Lo55 L 1-3	Phase 3,1 Loss
8	Lo55 L 123	Phase 1,2,3 Loss
9	-Ub-	Unbalance
10	0uu L 1--	Over Volt Phase 1
11	0uu L -2-	Over Volt Phase 2
12	0uu L --3	Over Volt Phase 3
13	0uu L 12-	Over Volt Phase 1, 2
14	0uu L -23	Over Volt Phase 2, 3
15	0uu L 1-3	Over Volt Phase 1, 3
16	0uu L 123	Over Volt Phase 1, 2, 3
17	Unu L 1--	Under Volt Phase 1
18	Unu L -2-	Under Volt Phase 2
19	Unu L --3	Under Volt Phase 3
20	Unu L 12-	Under Volt Phase 1, 2
21	Unu L -23	Under Volt Phase 2, 3
22	Unu L 1-3	Under Volt Phase 1, 3
23	Unu L 123	Under Volt Phase 1, 2, 3

24	0uL L 1--	Over Current Phase 1
25	0uL L -2-	Over Current Phase 2
26	0uL L --3	Over Current Phase 3
27	0uL L 12-	Over Current Phase 1, 2
28	0uL L -23	Over Current Phase 2, 3
29	0uL L 1-3	Over Current Phase 1, 3
30	0uL L 123	Over Current Phase 1, 2, 3
31	UnL L 1--	Under Current Phase 1
32	UnL L -2-	Under Current Phase 2
33	UnL L --3	Under Current Phase 3
34	UnL L 12-	Under Current Phase 1, 2
35	UnL L -23	Under Current Phase 2, 3
36	UnL L 1-3	Under Current Phase 1, 3
37	UnL L 123	Under Current Phase 1, 2, 3
38	-H'-	Over kWATT
39	-Hr-	Hour Counter
40	-d r-	Digital Counter

How to Reset Peak volt, Current, Total kWatt value

- Set Parameter $[L-P]$ to be $-Lr$
- Must stay in Page shows Peak in the one page then press $\blacksquare + \blacksquare$ hold 5 seconds
- When Reset then Parameter $[L-P]$ will be ----

How to Reset Fault Alarm value

- Set Parameter $[L-F]$ to $-Lr$
- Must stay in Page shows Fault Alarm in the one page then press $\blacksquare + \blacksquare$ for 5 seconds
- When Reset then Parameter from $[L-P]$ to ----

How to Reset kWh, Hour Counter, Counter Input value

Reset kWh

- Set Parameter from $[L--]$ to $[L-']$
- Must stay in Page shows kWh then press $\blacksquare + \blacksquare$ for 5 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset Hour Counter

- Set Parameter from $[L--]$ to $[L-H]$
- Must stay in Page shows Hour Counter then press $\blacksquare + \blacksquare$ hold for 5 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset Counter Input

- Set Parameter from $[L--]$ to $[L-L]$
- Must stay in Page shows Counter Input press $\blacksquare + \blacksquare$ for 5 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset kWh, Hour Counter, Counter Input

- Set Parameter from $[L--]$ to $[L-R]$
- Must Stay Page shows kWh, Hour Counter, Counter Input in one of page then press $\blacksquare + \blacksquare$ for 5 seconds
- When Reset then Parameter $[L--]$ to $[L-R]$

How to Reset kWh, Hour Counter, Counter Input value by External Input

Reset kWh

- Set Parameter from $[L--]$ to $[L-']$
- Stay in Page shows anything wiring Input follow Fig 5. hold for 3 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset Hour Counter

- Set Parameter from $[L--]$ to $[L-H]$
- Stay in Page shows anything then wiring Input follow Fig 5. hold for 3 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset Counter Input

- Set Parameter from $[L--]$ to $[L-L]$
- Stay in Page shows anythings wiring Input follows Fig 5. hold for 3 seconds
- When Reset then Parameter from $[L--]$ to ----

Reset kWh ,Hour Counter ,Counter Input

- Set Parameter from $[L--]$ to $[L-R]$
- When stay Page shows anything wiring Input follow Fig 5. hold for 3 seconds
- When Reset then Parameter from $[L--]$ to $[L-R]$

Fig 5. External Input Reset Connection

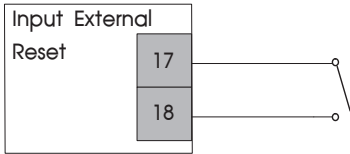
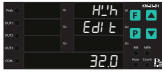


Table 2.

How to Edit kWh

- Stay in page Menu Parameter $H'h$
- Press $\blacksquare + \blacksquare$ hold for 5 seconds until show $PR55$ fill password 5041 press P to move digit Press F for accept press $\blacksquare$ or $\blacksquare$ to move the required value.
- When fill password finished press $\blacksquare$ until shows $H'h$ Edit then press $\blacksquare$ or $\blacksquare$ to move the required value. when finished press $\blacksquare$



Value Calculation

$$\text{Volt} = \frac{\text{Volt Reg}}{10} \quad \text{Current} = \frac{\text{Current Reg}}{10} \quad \text{Hz} = \frac{\text{Hz Reg}}{10} \quad \text{Power Factor} = \frac{\text{Power Factor Reg}}{1000}$$

Output Volt Process

