# KM-09-W

# 1 PHASE WATT-MD METER TRUE RMS



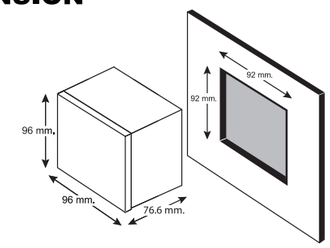
KM-09-W

1ø | W | MD | TRUE RMS | RS 485

## TECHNICAL SPECIFICATION

| | | |
|---|---|---|
| Power Supply | | 230 VAC ±15% 50-60 Hz |
| | | 115 VAC ±15% 50-60 Hz |
| Power Consumption | | 2.5 VA |
| Display | | 7-Segment, Size 0.56 Inch 4 Digit, 1 Row |
| Input | Voltage | Single Phase |
| | Phase Voltage (Vfull) | 8-500 VAC |
| | Potential Transformer Ratio | 0.1-400.0 |
| | Primary Voltage | 40000 V |
| | Secondary Voltage | 5-300 V |
| | Current | Connection 1 CT, Direct |
| | Current (Direct) | 0.02-10 A |
| | Ib(Base Current) | 5 A |
| | Current Transformer Ratio | 1-2000 |
| | Primary Current | 9999 A |
| | Secondary Current | 0.2-5 A |
| | Watt Accuracy | ±1.0% FS |
| Output | | 1 Alarm 5A/250 VAC |
| Communication | Protocol | MODBUS RTU |
| | Baud Rate | 2400, 4800, 9600,19200, 38400 bps |
| | Parity | None, Even, Odd |
| | Stop Bits | 1, 2 |
| | Data Bits | 8 Bits |
| | Support Device Node | 128 |
| Ambient Operation | Temperature | -10 ℃ to 60 ℃ |
| | Humidity | 85 % RH Non-Condensing |
| Ambient Storage | Temperature | -20 ℃ to 80 ℃ |
| | Humidity | 85 % RH Non-Condensing |
| Protection Degree | Front Protection Rating | IP52 |
| | Case Protection Rating | IP30 |
| Installation | | Panel Mounting |
| Material | | ABS-V0 |
| Size | | 96 x 96 x 76.6 mm. |
| Weigth | | 465 g. |

## DIMENSION




## DESCRIPTION

- KM - 09 - W is a meter that measures Watt, MD for one phase.
- Display as 7 - Segment, 0.56 inch, 4 digits, 1 row
- Can be combined with Current Transformer ( CT ) up to 10,000 / 5A and Potential Transformer Ratio ( PT ) 0.1 - 400.0.
- High accuracy TRUE RMS measurement.
- LED status indicator and power unit.
- Peak Hold to see the maximum Watt value in the system.
- Can communicate with computer via RS - 485 port. MODBUS RTU PROTOCOL

## OPERATION

The display will have 2 pages, indicating the current measured Watt and the Peak demand Watt value value. The Peak Demand Watt calculates the average of 15 minutes by pressing the up arrow. show current Watt value When you press the down arrow, the Peak Demand Watt is displayed. Peak Demand Watt discplay. LED will blink while displaying

KM - 09 - W with optional RS - 485 and Alarm Fault. The alarm can be set to 4 conditions, depending on the conditions of the order

Display kW ( Key ^ )


Display current kW value

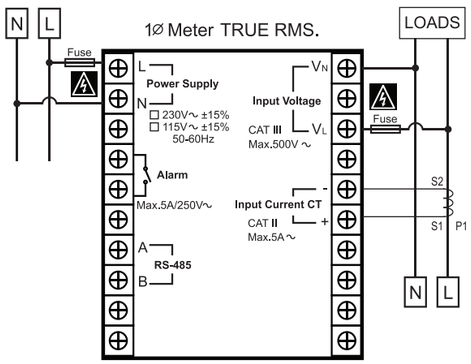
Display Peak kW ( Key v )


Display Peak kW

## How to Reset Pk-Demand Watt

1. Set PH-d to -CLr-
2. Scroll down the Meter display on the Pk - Demand Watt page, then press Hold v for 5 seconds until Pk-Demand Watt equals 0

## WIRING DIAGRAM




KM-09-W

**WARNING**

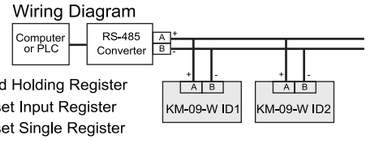
- Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire.
- Never modify the unit to prevent damage or incident such as malfunction and fire etc.

## SERIAL COMMUNICATION

KM - 09 - W can read parameter values measured in real time with the system BUS RS - 485 by PROTOCOL. Communication is MODBUS RTU Mode.

A set of commands that can be used with the Meter

Wiring Diagram




0x03 : Read Holding Register
0x04 : Preset Input Register
0x06 : Preset Single Register
0x10 : Preset Multi Register

Modbus table of km - 09 - W is shownin following table

| Address Decimal | Address Hex | Contents | Format | Word | Access |
|---|---|---|---|---|---|
| 0-1 | 00-01 | Current Register | Unsignde long | 2 | Read Only |
| 2-3 | 02-03 | Volt Register | Unsignde long | 2 | Read Only |
| 4 | 04 | Power Factor Register | Unsignde int | 1 | Read Only |
| 5 | 05 | Hz | Unsignde int | 1 | Read Only |
| 6 | 06 | Watt Unit Register | Unsignde int | 1 | Read Only |
| 7 | 07 | Watt Exponential | Unsignde int | 1 | Read Only |
| 8-9 | 08-09 | Watt Register | Unsignde int | 2 | Read Only |
| 10 | 0A | Pk-Demand Watt Unit Register | Unsignde long | 1 | R/W |
| 11 | 0B | Pk-Demand Watt Exponential | Unsignde int | 1 | R/W |
| 12-13 | 0C-0D | Pk-Demand Watt Register | Unsignde long | 2 | R/W |

| Address Decimal | Address Hex | Contents | Format | Word | Access |
|---|---|---|---|---|---|
| 256 | 0x100 | CT Ratio Redigter | Unsignde int | 1 | R/W |
| 257 | 0x101 | PT Ratio Register | Unsignde int | 1 | R/W |
| 258 | 0x102 | Meter ID | Unsignde int | 1 | Read Only |
| 259 | 0x103 | Baud Rate | Unsignde int | 1 | Read Only |
| 260 | 0x104 | Comm (Parity, Stop Bit) | Unsignde int | 1 | Read Only |
| 261 | 0x105 | ALF | Unsignde int | 1 | R/W |
| 262 | 0x106 | ALH | Unsignde int | 1 | R/W |
| 263 | 0x107 | ALL | Unsignde int | 1 | R/W |
| 264 | 0x108 | ALC | Unsignde int | 1 | R/W |
| 265 | 0x109 | Clear Pk Demand | Unsignde int | 1 | R/W |

Example of sending Command reads register Volt value by meter ID is 1

| Slave ID | Fun | Hi Order Address | Low Order Address | Hi Order Word | Low Order Word | CRC Hi Order | CRC Low Order |
|---|---|---|---|---|---|---|---|
| 01 | 03 | 00 | 00 | 00 | 02 | C4 | 0B |

### Note Using MODBUS RTU with PLC / HMI

PROTOCOL of KM - 09 - W is designed according to MODBUS standard. RTU if used with PLC / HMI. Read values for the register table for the Holding Register ( 03 ) must start at Address 40001 and for Input Register (04) must start at Address 30001

Sample Meter KM - 09 - W

To read the VOLT register value must set the address used to read at 30001 ( For Fun 4 ), and if you want to read the value at kWh Register must be set to Read Address is 30017 ( for Fun 04 )

Readable Register Values calculation

Watt = Watt reg / 10

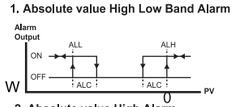
When Watt/Pk-Demand Unit reg.= 0 - - > Unit is Watt
Watt/Pk-Demand Unit reg.= 1 - - > Unit is kWatt

$$\text{Volt} = \frac{\text{Volt}_{Reg}}{10} \qquad \text{Current} = \frac{\text{Current}_{Reg}}{1000}$$

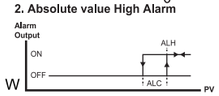
$$\text{Hz} = \frac{\text{Hz}_{Reg}}{10} \qquad \text{Power Factor} = \frac{\text{Power Factor}_{Reg}}{1000}$$

## ALARM FUNCTION

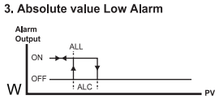
1. Absolute value High Low Band Alarm



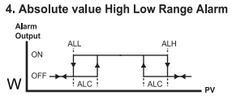

2. Absolute value High Alarm




3. Absolute value Low Alarm




4. Absolute value High Low Range Alarm




The measurement used in the alarm condition is Direct, without CT Ratio and PT Ratio. For example, the KM - 09 - W CT Ratio is 10 and the PT Ratio is 1.0. The Input Measurement is 220 W. The Primary 2200 W The value used in Alarm conditions is 220 W.

## CONFIGURATION

KM-09-W

**Measurement Display**
0000 — Show Measurement Value

Press F hold 2 secse conds

**1. Current Transformer Ratio (CT)**
CT → 1 — CT 1 to 2000

Push F
Press F 1 time

**2. Potential Transformer Ratio (PT)**
Pt → 1 — PT 0.1 to 400.0

Push F
Press F 1 time

**3. Device Address for MODBUS RTU**
Addr → 1 — Setting Address 1 to 128

Press F 1 time

**4. RS-485 Baud Rate**
baud → 96

Baud Rate
2.4 kbps 19.2 kbps
4.8 kbps 38.4 kbps
9.6 kbps

Press F 1 time

**5. Communication Stop bit/Parity Bit**
Comm → n1S

N1S : none parity, 1 stop bit
e1S : even parity, 1 stop bit
o1S : odd parity, 1 stop bit
n2S : none parity, 2 stop bit
e2S : even parity, 2 stop bit
o2S : odd parity, 2 stop bit

Press F 1 time

**6. Function setting for Alarm**
ALF → 1

0 : Disable
1 : Absolute Value High and Low Band Alarm
2 : Absolute Value High Lmit
3 : Absolute Value Low Limit
4 : Absolute Value High and Low Range Alarm

Press F 1 time

**7. High Limit Setting for Alarm**
ALH → 1 — 0.0 to 2500 Watt

Press F 1 time

**8. Low Limit Setting for Alarm**
ALL → 1 — 0.0 to 2499 Watt

Press F 1 time

**9. Control Sensitivity Setting for Alarm**
ALC → _1 — Set Sensitivity When Required 0 to 500 Watt

Press F 1 time

**10. Reset PkMD**
Ph-d → ----

---- No Operate
-CLr- Reset PkMD to '0000'

## ORDERING CODE

KM-09-W – [OPTION 1] – [OPTION 2] – [POWER SUPPLY]

| OPTION 1 | |
|---|---|
| R | Alarm Relay |

| OPTION 2 | |
|---|---|
| M | RS-485 |
| NONE | None RS-485 |

| CODE | POWER SUPPLY |
|---|---|
| NONE | 230 VAC |
| 115 | 115 VAC |

Example: KM - 09 - W - R - M means Watt meter, MD with alarm fault and RS - 485.

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