



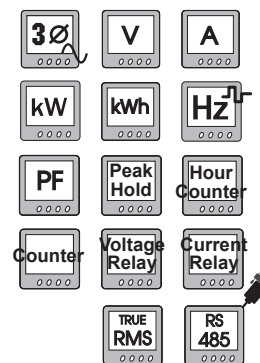
KM-23-P7



KM-23-P9



KM-23-DI



Specification

		KM-23-P7	KM-23-P9	KM-23-DI
Power Supply		110-240VAC 50-60Hz		
Power Consumption		3.5VA		
Display		7-Segment, Size 0.39 Inch, 3 Digit 3 Row, 4 Digit, 3 Row, 7 Digit, 1 Row	7-Segment, Size 0.39 Inch, 3 Digit 3 Row, 4 Digit, 3 Row, 8 Digit, 1 Row	
Input	Voltage	3 Phase		
	Voltage Range	20-500VAC		
	Accuracy Voltage	±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		
	Reset Input	Dry Contact		
Output		SPDT 5A 250VAC /5A 30VDC	SPDT 5A 250VAC /5A 30VDC	SPDT 5A 250VAC /5A 30VDC
Communi- cation	Protocol	Modbus RTU		
	Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps		
	Parity	None, Even, Odd		
	Stop Bits	1, 2 Bits		
	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		DIN RAIL
Material		ABS-V0		
Size (mm.)		72 x 72 x 80	96 x 96 x 80	90 x 150 x 61.5
Weight (ka.)		275	300	280

Operation

- Three Phase Volt - Amp - kW - kWh - PF Meter with Protection Relay : KM-23 Series. The KM-23 Series is a meter for measuring voltage (V), current (A), and electrical energy (kWh), equipped with protection relays for three-phase electrical systems.
- Under and over voltage protection, phase sequence protection, phase loss protection, and phase asymmetry protection relay.
- Under and over current protection relay.
- Voltage measurement range: 20–500 VAC.
- Current measurement range: 0.01–5 A, with maximum display up to 9999 A via CT ratio range 1–2000 (10,000/5 A).
- Measurement and display of kW, kWh, PF (COS), hour counter, and counter with relay output.
- Fault display with memory, indicating the cause of relay OFF.
- RS-485 communication with Modbus RTU protocol.
- Peak hold for maximum values of voltage (V), current (A), and power (kW).
- LED indicators showing measured values for each phase, output status, and peak status.
- Manual / Auto display of current and voltage values for each phase.

Operation

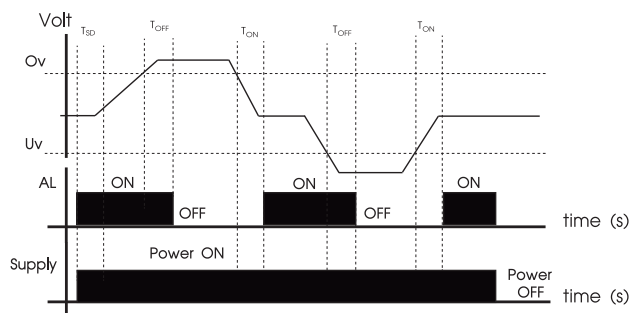
KM-23 Series is a meter for measuring voltage (V), current (A), and electrical energy (kWh), equipped with voltage protection relays for under-voltage and over-voltage, as well as current protection relays for three-phase electrical systems. It also displays kW, kWh, power factor (P.F.), hour counter, and counter values. In addition, it can record the maximum peak values of voltage (V), current (A), and power (kW) that occur, for analysis of system performance.

The voltage protection relay can be set for under-voltage and over-voltage protection within the range of 20–500 VAC for any single phase or all three phases. The ON delay time before operation can be set from 1 to 3600 seconds. However, if the phase sequence is incorrect, the relay will not operate and no delay time will be applied. Once operation begins, the relay monitors the voltage condition. If the voltage is lower or higher than the set value, if phase imbalance exceeds the preset percentage, or if a phase loss occurs, the relay will trip OFF within 0–3600 seconds.

Operation

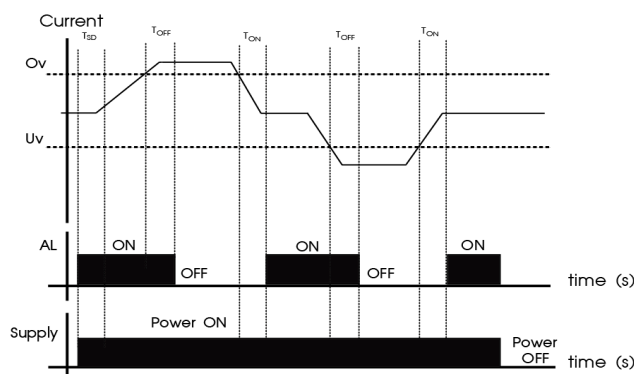
It can be set to trip quickly or slowly as required, and the cause will be shown on the display. When the voltage returns to within the preset range, the relay will turn ON again within the set time (ON Delay Time). After the circuit has been disconnected or the relay has turned OFF, the cause of the relay OFF condition can be reviewed on the display. The operating characteristics of the voltage protection relay are shown in Graph 1.

กราฟที่ 1 แสดงการทำงานของ Voltage Protection Relay



The Current Protection Relay can be set for undercurrent or overcurrent in the range of 0.1–9999 A for any one phase or for all three phases. The ON delay time before operation can be set from 1 to 3600 seconds. Once activated, it monitors the current condition; if the current exceeds the preset value, the relay will turn OFF within 0–3600 seconds, which can be set for fast or slow tripping as required, and the cause will be shown on the display. When the current level returns to below the preset value, the relay will turn ON again within 1–3600 seconds, or it can operate in the opposite manner (Inverse Function), in which the relay turns ON when the current exceeds the preset value. After the circuit has been disconnected or the relay has turned OFF, the cause can be reviewed on the display. The operating characteristics of the current protection relay are shown in Graph 2.

กราฟที่ 2 แสดงการทำงานของ Current Protection Relay



Relay Output สำหรับ kW, Hour และ Counter

Alarm Relay สำหรับ kW, Hour, Counter นี้สามารถเลือกให้ทำหน้าที่ในการตัดต่อ Load ได้ โดยตัวใดตัวหนึ่งคือ

kW Function can be set from 0–100% of the measurement range, and the ON delay time before operation can be set from 1 to 3600 seconds. Once activated, it monitors the kW in use; if the kW value exceeds the preset level, the relay will turn OFF within 0–3600 seconds, which can be set for fast or slow tripping as required, and the cause will be displayed. When the kW value returns to below the preset level, the relay will turn ON again within 1–3600 seconds, or it can operate in the opposite manner (Inverse Function), in which the relay turns ON when the kW value exceeds the preset level.

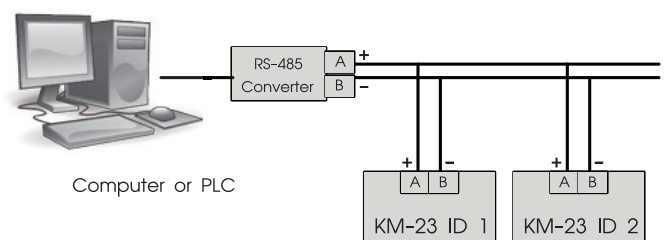
The Hour Counter Function measures the operating hours of machinery and allows the desired operating time to be set. When the preset time is reached, the relay turns ON and can be reset to OFF either by pressing the button or by using the terminal reset.

The Counter Function measures the quantity of products produced and compares it with energy consumption (kWh) in order to evaluate the electrical cost per unit. The desired quantity can be set, and when the preset quantity is reached, the relay turns ON and can be reset to OFF either by pressing the button or by using the terminal reset.

SERIAL COMMUNICATIONS

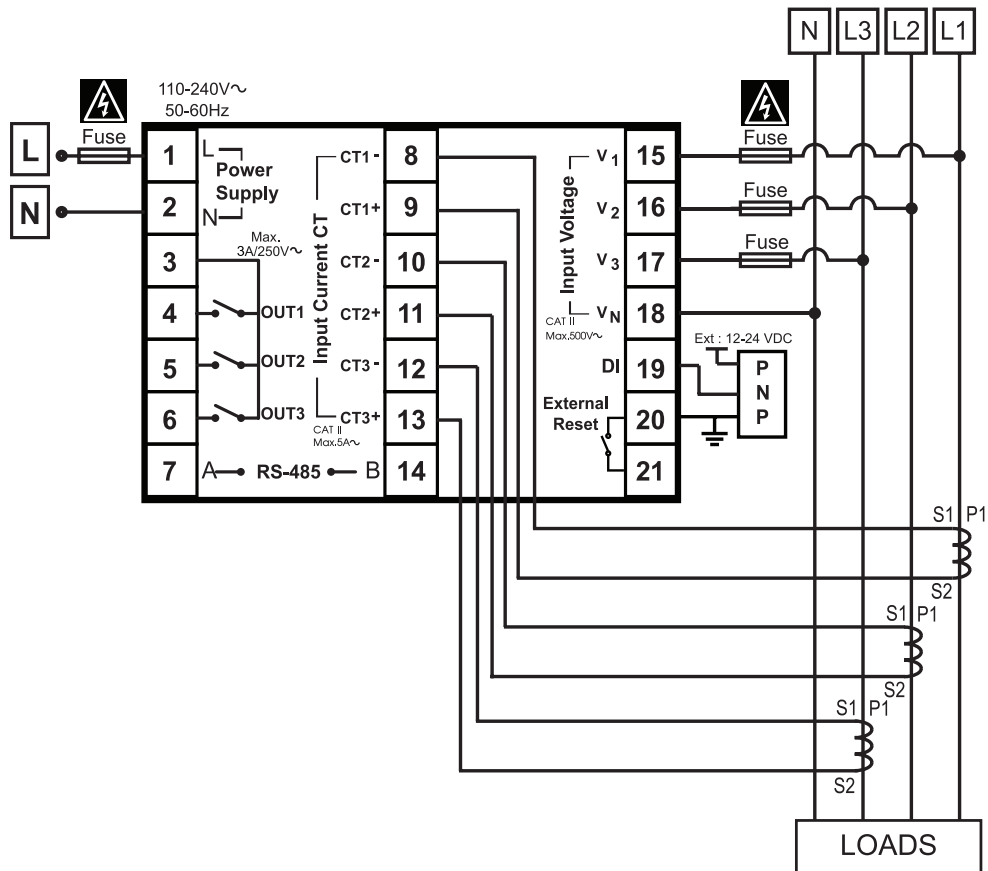
The KM-23 are Equipped With a RS-485 Series Communication Interface to Allow Connection to Computer or PLCs. Modbus Protocol is Provided as Standard Communication. The User Can Connect KM-23 as Network Up to 128 Meters.

Wiring Diagram

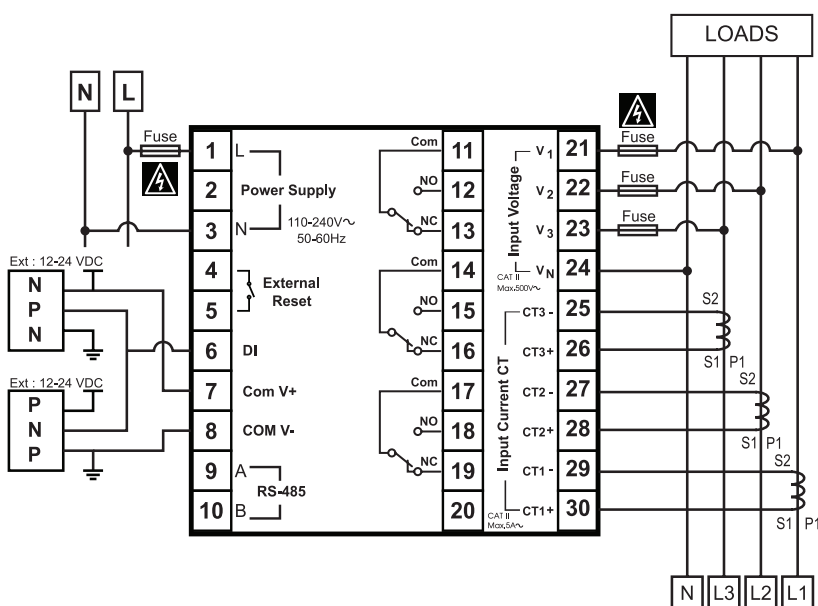


Wiring Diagram

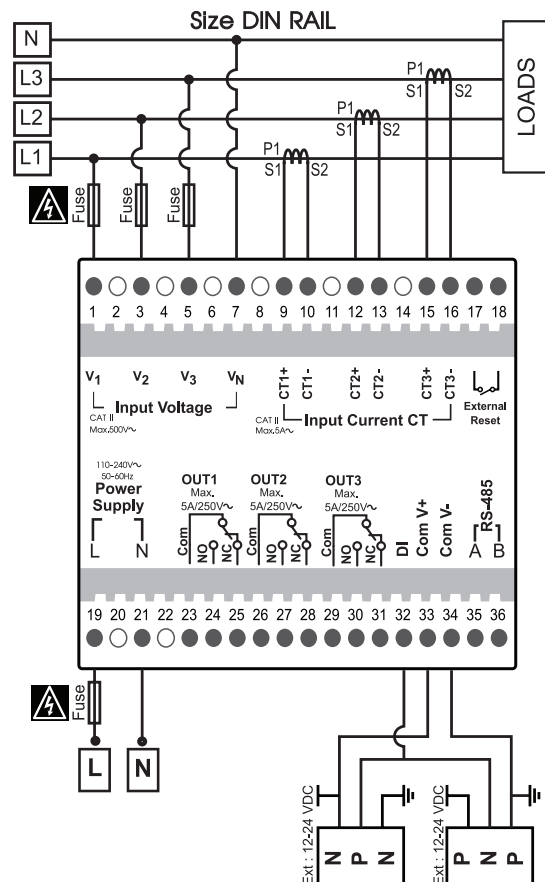
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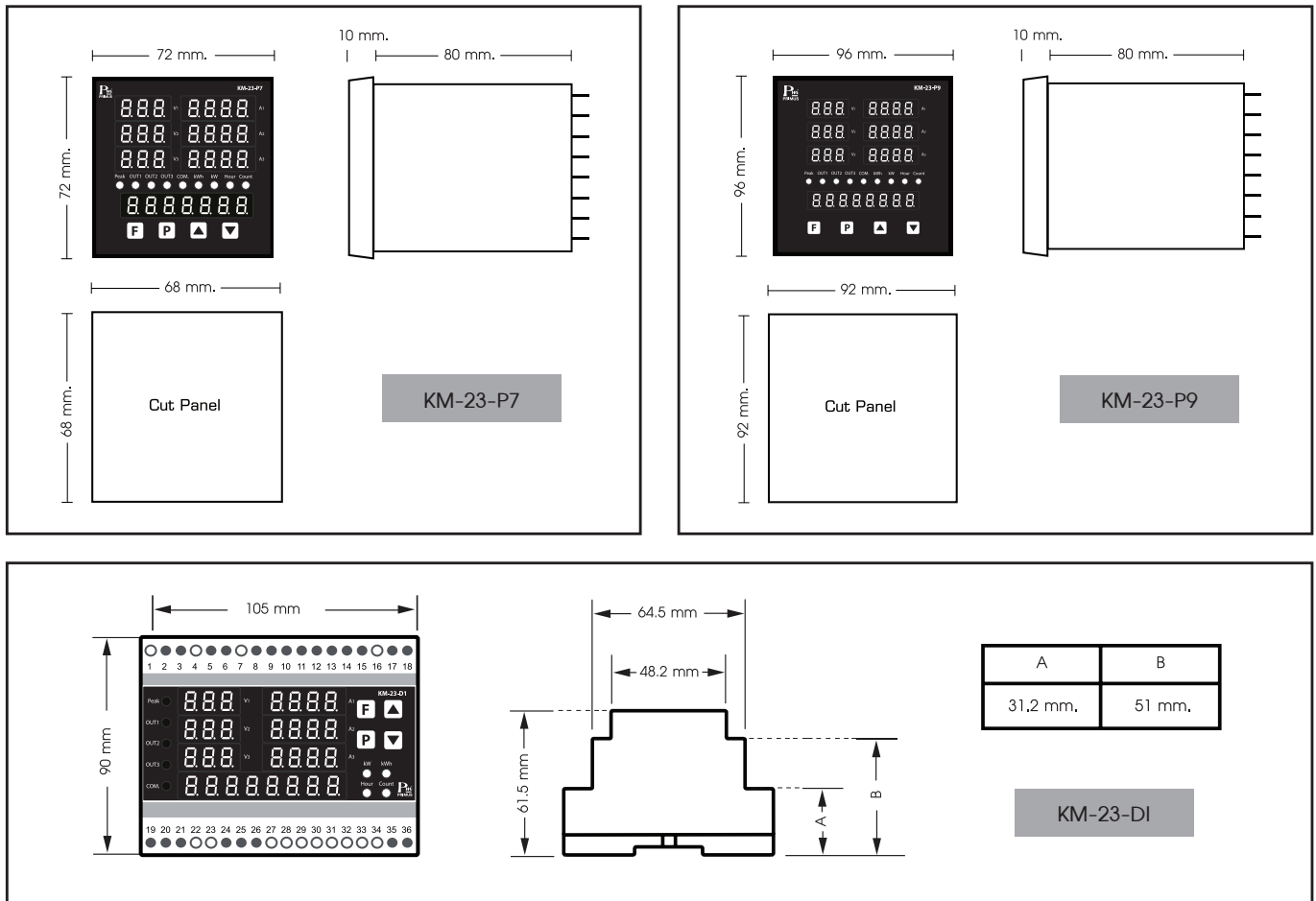
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MADE IN THAILAND



- Terminals : Max. 500 V~ CAT III
- 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.
- Installation and commissioning should be carried out by qualified personnel.

Dimension



Ordering Code

Installation		Option 1		
KM-23 -		- A		
Installation		Option 1		
DI	DIN RAIL	NONE	Alarm Relay 1 : Voltage and Current Protection	
P7	Panel 72x72	B	Alarm Relay 2 : Voltage and Current Protection Relay Function	
P9	Panel 96x96	C	Alarm Relay 3: kW, Hour Counter and Counter Function	
		M	RS-485	

Example: KM-23-P9-ABM means Alarm Relay 1, Alarm Relay 2, and RS-485, panel-mounted size 96 × 96, and power supply 230 VAC.