

# Voltmeter

Specification Sheet



## 產品簡介 (Product Introduction)

Voltmeter 是一款三通道交流電壓感測器，專為精確量測電力系統中的交流電壓而設計。本產品支援獨立三通道 600V 交流電壓量測，具備真均方根值 (True-RMS) 量測能力，提供完整的電壓資訊以滿足各種應用需求。其高速波形取樣運算確保了高於 99% 的精確度，並可與 Power Sensor 電力感測器完美搭配，是節能感測器的理想選擇。本產品採用串聯式配線，施工方便，並支援 Modbus RTU 通訊協定。

## 產品特色 (Key Features)

- **高精度量測**：功率精確度高達 >99%，電流線性度優異 (積和非線性 < 8ppm)，確保數據可靠性。
- **多參數監測**：可量測電流 (A)、功率因數 (PF)、波峰因數 (CF)、視在功率 (VA)、有效功率 (W)、頻率 (Hz) 等多種電氣參數。
- **緊湊輕巧設計**：體積小巧、重量輕，方便攜帶與安裝，特別適用於空間受限的環境。
- **便捷安裝**：支援標準工業導軌安裝，大幅簡化施工流程，節省設置成本。
- **高密度監測能力**：相較於傳統電表，能以更少的設備監測更多迴路。
- **抗干擾能力**：具備抗諧波干擾，確保數據穩定性。
- **多重保護**：提供類比輸入 ESD 保護、極性錯誤保護及突波保護，確保設備安全。
- **即時通訊**：採用 Web Socket 通訊協議，反應時間小於 1 秒，實現即時數據傳輸。
- **獨立三通道 600V 交流電壓量測**：支援單相 3 組獨立 3KV 隔離，確保量測安全與精確。
- **真均方根值 (True-RMS) 量測**：提供精確的電壓讀數，適用於非正弦波形環境。
- **高精確度**：高速波形取樣運算，精確度高於 99%。
- **完美搭配 Power Sensor**：可與 Power Sensor 電力感測器無縫整合，提供更全面的電力監測方案。
- **極低自身能耗**：節能設計，降低營運成本。
- **串聯式配線**：簡化施工流程，提升安裝效率。
- **Modbus RTU 通訊協定**：標準工業通訊協議，易於整合到現有系統。
- **多樣化量測項目**：可量測真均方根電壓 (Vrms)、平均電壓 (Vavg)、峰對峰電壓 (Vpp)、交流頻率 (Hz)、波形因數 (FF)、峰值因數 (CF)。
- **多重保護設計**：具備極性保護、突波保護及事件警示功能，確保設備穩定。

# 技術規格 (Technical Specifications)

通用規格 (GENERAL)	
模型名稱 (Model Name)	ek VoltMeter
尺寸 (Dimensions)	85×65×28 mm
操作溫度 (Op. Temp.)	-10°C ~ +65°C
操作濕度(Operating Humidity)	-20°C 至 +65°C , R.H. < 90% (非凝結)
狀態燈 (Status Indicator)	雙色 LED 指示燈號
連接端子(Connection Terminals)	DC 9-24V / 250 mA , 漣波 < 150 mV
固定方式 (Mounting Method)	量測:螺釘接線型端子 x3 組
	通訊: 4 線 RJ-11 快速接頭 x2 孔
電源需求(Power Requirement)	DC 6-30 V / <0.2W

通訊規格 (COMMUNICATION)	
通訊介面 (Interface)	RS485
通訊協定(Communication Protocol)	Modbus RTU
鮑率 (Baud Rate)	9.6, 14.4, 19.2, 38.4, 57.6, 115.2 kBaud
資料格式 (Data Format)	None/Even/Odd
更新頻率 (Update Frequency)	<1 秒

## 技術規格 (Technical Specifications)

### 量測能力 (MEASUREMENT CAPABILITIES)

量測通道 (Measurement Channels)	單相 3 組獨立 3KV 隔離
適用電壓(Applicable Voltage)	AC 20 ~ 600 V
電壓解析度(Voltage Resolution)	0.1 V
頻率範圍(Frequency Range)	45 ~ 65 Hz
頻率解析度(Frequency Resolution)	0.1 Hz
量測項目 (Measured Items)	真均方根電壓(Vrms)、平均電壓(Vavg)、峰對峰電壓(Vpp)、交流頻率 (Hz)、波形因數 (FF)、峰值因數 (CF)
準確率 (Accuracy)	>99%

### 保護設計 (PROTECTION DESIGN)

電源 (Power Supply)	單相 3 組獨立 3KV 隔離
其它(Others)	事件警示

# Product Introduction

VolMeter is a three-channel AC voltage sensor designed for precise measurement in power systems. The product supports independent three-channel AC voltage measurement up to 600 V and features True-RMS capability, providing comprehensive voltage information to meet diverse application requirements. Its high-speed waveform sampling and computation ensure measurement accuracy greater than 99%. The device is fully compatible with the Power Sensor, making it an ideal choice for energy-saving sensing applications. Designed with series wiring for easy installation, it also supports the Modbus RTU communication protocol.

## Key Features

- **High-precision Measurement:** Power measurement accuracy greater than 99%, with excellent current linearity (integral nonlinearity < 8 ppm), ensuring data reliability.
- **Multi-parameter Monitoring :** Capable of measuring current (A), power factor (PF), crest factor (CF), apparent power (VA), active power (W), and frequency (Hz).
- **Compact and Lightweight Design :** Small size and lightweight construction for portability and easy installation, ideal for space-constrained environments.
- **Easy Installation :** Supports standard industrial DIN-rail mounting, simplifying installation and reducing setup costs.
- **High-density Monitoring Capability :** Compared with traditional meters, monitors more circuits with fewer devices.
- **Anti-interference Performance :** Equipped with harmonic suppression, ensuring stable and accurate data.
- **Comprehensive Protection :** Provides analog input ESD protection, reverse polarity protection, and surge protection for device safety.
- **Real-time Communication :** WebSocket protocol with response time less than 1 second, enabling real-time data transmission.
- **Independent Three-channel AC Voltage Measurement :** Supports three sets of independent single-phase 600 V AC inputs with 3 kV isolation, ensuring safety and accuracy.
- **True-RMS Measurement :** Provides accurate voltage readings, suitable for non-sinusoidal waveform environments.
- **High Accuracy :** High-speed waveform sampling and computation, with accuracy exceeding 99%.
- **Seamless Integration with Power Sensor :** Designed for perfect compatibility with the Power Sensor, delivering a more comprehensive power monitoring solution.
- **Ultra-low Power Consumption :** Energy-efficient design simplifies installation process and improves efficiency.
- **Modbus RTU Protocol :** Standard industrial communication protocol, easy to integrate into existing systems.
- **Diverse Measurement Items :** Supports  $V_{rms}$  (true RMS voltage),  $V_{avg}$  (average voltage),  $V_{pp}$  (peak-to-peak voltage), frequency (Hz), form factor (FF), and crest factor (CF).
- **Multi-layer Protection Design :** Equipped with polarity protection, surge protection, and event alert functions to ensure device stability.

# Technical Specifications

GENERAL	
Model Name	ek VoltMeter
Dimensions	85×65×28 mm
Op. Temp.	-10°C ~ +65°C
Operating Humidity	-20°C to +65°C , R.H. < 90% (non-condensing)
Status Indicator	Dual-color LED Indicators
Connection Terminals)	DC 9-24V / 250 mA , Ripple < 150 mV
Mounting Method)	Measurement:Screw terminal block × 3 sets Communication:4-wire RJ-11 quick connector × 2 ports
Power Requirement)	DC 6-30 V / <0.2W

COMMUNICATION	
Interface	RS485
Communication Protocol	Modbus RTU
Baud Rate	9.6, 14.4, 19.2, 38.4, 57.6, 115.2 kBaud
Data Format	None/Even/Odd
Update Frequency	< 1 second

# Technical Specifications

MEASUREMENT CAPABILITIES	
Measurement Channels	Three independent single-phase inputs with 3 kV isolation
Applicable Voltage	AC 20 ~ 600 V
Voltage Resolution	0.1 V
Frequency Range	45 ~ 65 Hz
Frequency Resolution	0.1 Hz
Measured Items	True RMS Voltage (Vrms), Average Voltage (Vavg), Peak-to-Peak Voltage (Vpp), AC Frequency (Hz), Form Factor (FF), Crest Factor (CF)
Accuracy	>99%

PROTECTION DESIGN	
Power Supply	Three independent single-phase inputs with 3 kV isolation
Others	Event Alarm