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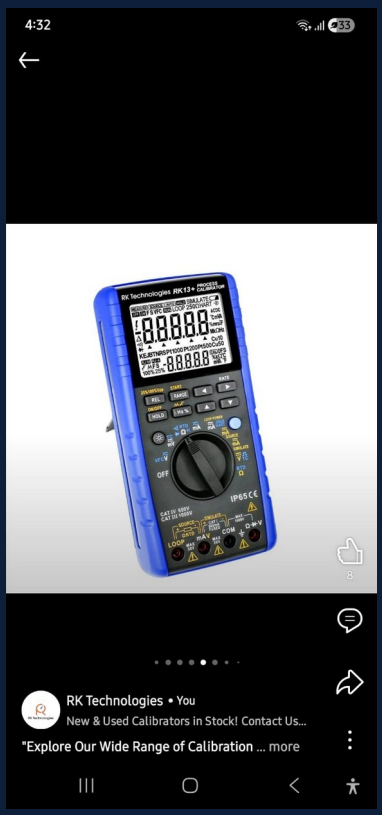
RK13+

Process Calibrator

✦ **DMM + SOURCE + LOOP | 0.05% ACCURACY | IP65 | CAT IV 600V**

55000 Count Display | 24V Loop Power | TC & RTD Simulate | HART Ready



PRODUCT OVERVIEW

The RK13+ is a professional industrial process calibrator that combines a 55000-count True RMS digital multimeter with a precision process signal source — all in a single IP65-rated handheld instrument. Designed for field and bench use, it measures and sources DC/AC voltage & current, resistance, frequency, capacitance, thermocouple (8 types), and RTD (5 types).

The built-in 24 V loop power supply with optional 250 Ω HART resistor eliminates the need for separate power supplies or load resistors. The SIMULATE function allows the RK13+ to act as a 4–20 mA transmitter for testing control loops. Safety rated to CAT IV 600 V / CAT III 1000 V.

KEY FEATURES

Measurement (DMM)	Source / Output	Loop & Special
✦ 55000-count True RMS DMM	✦ DC voltage output: 100 mV – 10 V	✦ 24 V internal loop power supply
✦ DC / AC voltage up to 1000 V	✦ DC current output: 0 – 33 mA	✦ Built-in 250 Ω HART resistor
✦ DC / AC current up to 500 mA	✦ RTD simulation: Pt100, Pt1000, Cu50	✦ Simultaneous loop power + mA read
✦ Resistance: 500 Ω – 50 MΩ	✦ TC simulation: 8 thermocouple types	✦ VFC mode for VFD voltage meas.
✦ Frequency: 10 Hz – 10 kHz	✦ Resistance output: 400 Ω, 4 kΩ	✦ Auto cold-end TC compensation
✦ Capacitance: 10 nF – 1000 µF	✦ Frequency output: 1 Hz – 11 kHz	✦ REL / % relative measurement
✦ 8 TC types: K, J, E, T, N, R, S, B	✦ 25% / 100% step & auto-ramp mA	✦ Fast 20 /sec or slow 5 /sec rate
✦ RTD: Pt100, Pt1000, Cu50	✦ SIMULATE: analog transmitter	✦ IP65 — dust & water spray proof

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	mode	

INPUT MEASUREMENT SPECIFICATIONS

Used within 1 year after calibration | 23°C ± 5°C | 20–70% RH | Accuracy = ± (% rdg + count)

Function	Range	Measuring Range	Resolution	Accuracy
DC Voltage				
DC Voltage	50 mV	-55.000 to 55.000 mV	0.001 mV	0.1% + 10
DC Voltage	500 mV	-550.00 to 550.00 mV	0.01 mV	0.05% + 5
DC Voltage	5 V	-5.5000 to 5.5000 V	0.0001 V	0.05% + 5
DC Voltage	50 V	-55.000 to 55.000 V	0.001 V	0.05% + 5
DC Voltage	500 V	-550.00 to 550.00 V	0.01 V	0.1% + 5
DC Voltage	1000 V	-1000.0 to 1000.0 V	0.1 V	0.1% + 5
AC Voltage				
AC Voltage	5 V	0 to 5.5000 V	0.0001 V	0.5% + 4 (<400 Hz) | 5% + 4 (>400 Hz)
AC Voltage	50 V	0 to 55.000 V	0.001 V	0.5% + 4
AC Voltage	500 V	0 to 550.00 V	0.01 V	0.5% + 4
AC Voltage	1000 V	0 to 760.0 V	0.1 V	0.5% + 4
DC / AC Current				
Current	DC 50 mA	-55.000 to 55.000 mA	0.001 mA	0.1% + 5
Current	DC 500 mA	-500.00 to 500.00 mA	0.01 mA	0.1% + 5
Current	AC 50 mA	0 to 55.000 mA	0.001 mA	0.15% + 20
Current	AC 500 mA	0 to 500.00 mA	0.01 mA	0.15% + 10
Resistance				
Ohm	500 Ω	0 to 550.00 Ω	0.01 Ω	0.05% + 10
Ohm	5 kΩ	0 to 5.5000 kΩ	0.0001 kΩ	0.05% + 5
Ohm	50 kΩ	0 to 55.000 kΩ	0.001 kΩ	0.05% + 5
Ohm	500 kΩ	0 to 550.00 kΩ	0.01 kΩ	0.05% + 5
Ohm	5 MΩ	0 to 5.5000 MΩ	0.0001 MΩ	0.2% + 5
Ohm	50 MΩ	0 to 55.000 MΩ	0.001 MΩ	1% + 10
Thermocouple (Measure) — ITS-90 scale | Accuracy excludes cold-end compensation error				
TC K	K	-200°C to 1350°C	0.1°C	0.1% + 2°C (>-100°C) | 0.1% + 2°C (≤-100°C)
TC J	J	-200°C to 950°C	0.1°C	0.1% + 2°C
TC E	E	-200°C to 700°C	0.1°C	0.1% + 2°C
TC T	T	-200°C to 400°C	0.1°C	0.1% + 2°C
TC N	N	-200°C to 1300°C	0.1°C	0.1% + 2°C

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TC R	R	0°C to 1760°C	1°C	0.1% + 3°C (≤100°C) | 0.1% + 2°C (>100°C)
TC S	S	0°C to 1760°C	1°C	0.1% + 3°C (≤100°C) | 0.1% + 2°C (>100°C)
TC B	B	600°C to 1800°C	1°C	0.1% + 3°C (≤800°C) | 0.1% + 2°C (>800°C)
RTD / Thermal Resistance (Measure) — Pt-385 scale | 0.8 mA excitation				
RTD	Pt100	-200°C to 850°C	0.1°C	0.1% + 1°C
RTD	Pt1000	-200.0°C to 630.0°C	0.1°C	0.1% + 1°C
RTD	Cu50	-50°C to 150°C	0.1°C	0.1% + 1°C
Frequency & Capacitance				
Freq	10 Hz	0 to 9.9999 Hz	0.0001 Hz	0.02% + 4
Freq	1 kHz	0 to 999.99 Hz	0.01 Hz	0.02% + 4
Freq	10 kHz	0 to 5.0000 kHz	0.0001 kHz	0.02% + 4
Cap	10 nF	0 to 11.00 nF	0.01 nF	5% + 50
Cap	100 µF	0 to 110.0 µF	0.1 µF	5% + 5
Cap	1000 µF	0 to 1100 µF	1 µF	5% + 50

ANALOG OUTPUT / SOURCE SPECIFICATIONS

Used within 1 year after calibration | 23°C ± 5°C | 20–70% RH | Accuracy = ± (% set + count)

Function	Range	Output Range	Resolution	Accuracy / Remarks
DC Voltage	100 mV	-10.00 to 110.00 mV	10 µV	0.05% + 3 | Max output 0.5 mA
DC Voltage	1 V	-0.1000 to 1.1000 V	100 µV	0.05% + 3 | Max output 2 mA
DC Voltage	10 V	-1.000 to 11.000 V	1 mV	0.05% + 2 | Max output 5 mA
DC Current	30 mA	0.000 to 33.000 mA	1 µA	0.05% + 4 | Load ≤ 1 kΩ (20 mA) / 600 Ω (30 mA)
SIMULATE	-30 mA	0.000 to -33.000 mA	1 µA	24V loop power ±10% | Max 35 mA
Resistance	400 Ω	0 to 400.0 Ω	0.1 Ω	0.05% + 2 | Excitation ±0.1–5 mA
Resistance	4 kΩ	0 to 4.000 kΩ	1 Ω	0.05% + 2
Frequency	100 Hz	1.0 to 110.0 Hz	0.1 Hz	0.05% + 2 | 50% duty, 1–11 Vp-p
Frequency	1 kHz	0.100 to 1.100 kHz	1 Hz	0.05% + 2
Frequency	10 kHz	6.0 to 11.0 kHz	100 Hz	0.05% + 2
TC Source (Simulate) — ITS-90 | Accuracy excludes cold-end compensation				
TC K	-200.0 to 1372.0°C	0–33.000 mA	0.1°C	±0.5°C (typical range)
TC J	-200.0 to 1200.0°C	0–33.000 mA	0.1°C	±0.5°C
TC E	-200.0 to 1000.0°C	0–33.000 mA	0.1°C	±0.5°C

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TC T	-250.0 to 400.0°C	0–33.000 mA	0.1°C	±0.6°C
TC N	-200.0 to 1300.0°C	0–33.000 mA	0.1°C	±0.7–1.0°C
TC R	0 to 1767°C	0–33.000 mA	0.1°C	1.5°C (0–100°C) | 1.2°C (>100°C)
TC S	0 to 1767°C	0–33.000 mA	0.1°C	1.5°C (0–100°C) | 1.2°C (>100°C)
TC B	600 to 1820°C	0–33.000 mA	0.1°C	1.5°C (600–800°C) | 1.1°C (>800°C)
RTD Source (Simulate) — Pt-385 | Excitation ±0.1–5 mA				
Pt100	-200.0 to 850.0°C	0–400 Ω / 4 kΩ	0.1°C	0.3°C (-200–0°C) | 0.5°C (0–400°C) | 0.8°C (>400°C)
Pt1000	-200.0 to 630.0°C	0–4000 Ω	0.1°C	0.2°C (-200–100°C) | 0.5°C (100–300°C) | 0.7°C (>300°C)
Cu50	-50.0 to 150.0°C	0–400 Ω	0.1°C	0.6°C

GENERAL SPECIFICATIONS

Parameter	Specification
Display & Measurement	
Display	55000-count segment LCD | 48 × 65 mm | Dual display with white LED backlight
Basic Accuracy	0.05% (measure & source)
Measurement Rate	Fast: 20 readings/second | Slow: 5 readings/second
True RMS	AC RMS measurement | Bandwidth: 20 Hz – 1000 Hz | Crest factor: 3.0
Safety & Protection	
Safety Rating	CAT IV 600 V / CAT III 1000 V (EN 61010-1)
IP Rating	IP65 — dust-tight and protected against water jets
Input Protection	500 mA / 250 V fast fuse | Max voltage: 1000 V AC
Withstand Voltage	AC 6880 V / 50–60 Hz / 5 sec (terminal to housing)
Insulation	DC 1000 V / ≥ 100 MΩ (terminal to housing)
Loop & Special Functions	
Loop Power	Internal 24 V DC loop supply (simultaneous current measurement)
HART Resistor	Built-in 250 Ω HART loop resistor (selectable)
SIMULATE Mode	4–20 mA analog transmitter simulation | Auto-ramp, 25%/100% step, auto-step
VFC Mode	Low-pass filter for accurate VFD/inverter voltage measurement
TC Compensation	Auto cold-end compensation (−10 to 50°C, error ≤ ±2°C) | Manual set also available
Power Supply & Physical	
Power Supply	3 × AA (LR6) alkaline batteries | DC 5 V adaptor (optional)
Calibration Period	1 year | Warm-up time: ≥ 10 minutes before use
Dimensions	206 (L) × 97 (W) × 60 (D) mm

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Weight	~500 g (with batteries)
Housing	Dual-colour rubber-over-moulded ABS | Rubber keypad
Environmental	
Operating Temp / Humidity	0°C to 50°C | ≤ 80% RH (0–40°C) | ≤ 70% RH (40–50°C)
Storage Temp / Humidity	-25°C to 60°C | ≤ 90% RH
Operating Altitude	0 – 2000 m
Standards & Certifications	
Electrical Safety	EN 61010-1, EN 61010-031
EMC	EN 61326-1:2006 (Performance Criterion 2)
Shock & Vibration	IEC 60068-2-64:2008 | IEC 60068-2-32:2008 | 2g, 5–500 Hz | 1 m drop
Quality	ISO 9001 (CQC certified) | CE marked

STANDARD PACKING LIST

Item	Qty	Remarks
RK13+ Process Calibrator (main unit)	1 pc	
Test Pen / Probe Set (CF-733720-EU)	1 set	
Crocodile Clip Set (CF-732170)	1 pair	
Fuse — 500 mA / 250 V fast-acting	1 pc	Spare
AA Alkaline Batteries (LR6)	3 pcs	Installed
Soft Carrying Bag	1 pc	
User Manual	1 pc	English

Optional: Linear DC 5 V Power Adapter (1 item) — for continuous bench use without battery drain.

TYPICAL APPLICATIONS

Loop Calibration	Sensor Simulation	Field Maintenance	Panel / Bench
✦ 4–20 mA loop testing ✦ HART device commissioning ✦ Transmitter calibration ✦ Control valve positioner check	✦ TC & RTD simulation ✦ Temperature controller test ✦ PLC / DCS input verification ✦ Alarm setpoint checking	✦ VFD output voltage check (VFC) ✦ Pressure transmitter cal. ✦ Flow / level transmitter check ✦ On-site panel verification	✦ Bench calibration of indicators ✦ Datalogger input check ✦ Continuity / diode testing ✦ Resistance / capacitance meas.

Contact RK Technologies for Pricing, Demo & Calibration Services

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