

**INTRODUCTION**

This meter is an industrial, battery-powered instrument for field maintenance, an integration of a digital multi-meter and process signal sources.

It conforms to safety standards of 600V CAT.IV and 1000V CAT.III defined in IEC 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

It is designed with a dual-color plastic enclosure of IP65, for application in harsh environment.

It has the following functions:

**• Measurement Functions:**

Measurement of AC Voltage, DC Voltage, Ohm, Capacitance, DC Current, AC Current, On-Off, Diodes, Frequency, Thermocouples, Thermal Resistance;  
Data display and Retention;  
Measurement of relative values

**• Output Functions:**

Output of DC voltage, Resistance, Frequency, Thermocouples, Thermal Resistance, and DC Current (constant output, manual stepping and SIMULATE);

**• Loop Inspection:** Supply power to 24V circuits and meanwhile measure current; with built - in 250Ω HART loop resistance.



**TECHNICAL SPECIFICATION**

**SAFETY AND COMPLIANCES**

<b>Overload protection</b>	V ~ COM terminal: AC1000V/10 seconds
	mAV terminal: 500mA/250V quick-acting fuse
<b>Regulatory compliance</b>	IEC61010-1 (CAT. 600V, CAT.1000V, pollution level)
<b>Electromagnetic compatibility</b>	Consistent with Group 1 and Class B of IEC61326-1
<b>Surge protection</b>	8kV(As per IEC61010.1-2001)
<b>Authentication mark</b>	CE
<b>Quality standard</b>	It is developed, designed and produced according to ISO 9001.

**GENERAL CHARACTERISTICS**

<b>Display</b>	Digit: 4-digit display (for current measurement and output: 5-digit display)
<b>Display refreshing</b>	Fast (F): 20 times/second; slow (S): 5 times/second
<b>Temperature and humidity range for work</b>	0 ~ 40 °C, relative humidity ≤85% (without moisture condensation)
<b>Temperature and humidity range for storage</b>	-20 °C ~ 60 °C, relative humidity below 90% (without moisture condensation)
<b>Temperature and humidity range for guaranteed precision</b>	23 ± 5°C, relative humidity below 75% (without moisture condensation)
<b>Temperature factor</b>	0.1× basic precision / °C (temperature range: <18°C or >28°C)
<b>Application environment</b>	Indoors, outdoors (non-watertight), altitude of 0 ~ 2000m
<b>Indication of outrange</b>	OL
<b>On-Off / open-circuit test</b>	Buzzer beeps indicate the resistance reading is lower than the threshold, or an open circuit
<b>Battery type</b>	Four 1.5V (LR6) alkaline batteries
<b>Service life of batteries</b>	When alkaline batteries are used, For measurement of all parameters: about 100 hours For DC current output (SIMULATE): about 50 hours For DC current output (SOURCE) 20mA (load of 1000Ω): about 2.5 hours
<b>Low battery indication</b>	It is indicated with a battery mark.
<b>Automatic shutdown</b>	The meter is automatically shut down after about 5 minutes of no operation. The time can be adjusted.
<b>Warm-up time</b>	10 minutes
<b>Close meter calibration</b>	No need for internal adjustment
<b>Battery cover</b>	For battery replacement, without influencing meter calibration
<b>Size</b>	206 (L)×97 (W)×60 (D)mm
<b>Weight</b>	About 500g
<b>Calibrating period</b>	1year

**Detailed precision indexes**

Precision is affirmed within one year after calibration, with working temperature of 23 ± 5°C and relative humidity of 75%.

A precision range can be marked as: ± ([reading%] + count) (Note: "count" means increased or decreased number at the lowest significance digit)

**Detailed precision indexes for measurement**

Function	Range	Measuring scope	Resolution	Precision
<b>DC voltage DCV</b>	50mV	-55.00mV ~ 55.00mV	0.01mV	0.1%+4
	500mV	-550.0mV ~ 550.0mV	0.1mV	0.1%+4
	5V	-5.500V ~ 5.500V	0.001V	0.1%+4
	50V	-55.00V ~ 55.00V	0.01V	0.1%+4
	500V	-550.0V ~ 550.0V	0.1V	0.1%+4
	1000V	-1000V ~ 1000V	1V	0.1%+4
<b>AC voltage ACV</b>	5V	0 ~ 5.500V	0.001V	0.5%+4(<400Hz) 5%+4(>400Hz)
	50V	0 ~ 55.00V	0.01V	0.5%+4
	500V	0 ~ 550.0V	0.1V	0.5%+4
	1000V	0V ~ 750V	1V	0.5%+4
<b>OHM ( Ω )</b>	500Ω	0 ~ 550.0Ω	0.1Ω	0.1%+4
	5KΩ	0 ~ 5.500KΩ	0.001KΩ	0.1%+4
	50KΩ	0 ~ 55.00KΩ	0.01KΩ	0.1%+4
	500KΩ	0 ~ 550.0KΩ	0.1KΩ	0.5%+4
	5MΩ	0 ~ 5.500 MΩ	0.001MΩ	1%+4
	50MΩ	0 ~ 55.00 MΩ	0.01MΩ	1%+4
<b>DC current DCI</b>	50mA	-55.000mA ~ 55.000mA	0.001mA	0.1%+5
	500mA	-500.00mA ~ 500.00mA	0.01mA	0.1%+5
<b>AC current ACI</b>	50mA	0000mA ~ 55.000mA	0.001mA	0.5%+10
	500mA	0.00mA ~ 500.00mA	0.01mA	0.5%+10
<b>Frequency FREQ</b>	10Hz	0 ~ 9.9999Hz	0.0001Hz	0.02%+4
	100Hz	0 ~ 99.999Hz	0.001Hz	0.02%+4
	1000Hz	0 ~ 999.99Hz	0.01Hz	0.02%+4
	10kHz	0 ~ 9.9999kHz	0.0001kHz	0.02%+4
	100kHz	0 ~ 99.999kHz	0.001kHz	0.02%+4
	DUTY	10% ~ 90%	0.1%	1%
<b>Diode</b>	2V		0.001V	1%+10
<b>On-off test</b>	500Ω		0.1Ω	≤50ΩBB

**Detailed precision indexes for measurement (Contd.)**

<b>Thermocouple TC</b>	R	-40°C ~ 1760°C	1°C	0.5%+3°C (≤100) °C 0.5%+2°C(>100) °C
	S	-200°C ~ 1760°C		
	B	400°C ~ 1800°C		
	K	-200°C ~ 1350°C		
	E	-200°C ~ 700°C		0.5%+2°C (≤-100) °C 0.5%+1°C (>-100) °C
	J	-200°C ~ 950°C		
	T	-200°C ~ 400°C		
	N	-200°C ~ 1300°C		
<b>Thermal resistance RTD</b>	Cu50	-50°C ~ 150°C	1°C	0.5%+3°C
	Pt100	-200°C ~ 850°C		
<b>Capacitance CAP</b>	10nF	0 ~ 11.00nF	0.01nF	5%+50
	100nF	0 ~ 110.0nF	0.1nF	5%+5
	1000nF	0 ~ 1100nF	1nF	5%+5
	10μF	0 ~ 11.00μF	0.01μF	5%+5
	100μF	0 ~ 110.0μF	0.1μF	5%+5
	1000μF	0 ~ 1100μF	1μF	5%+5
	10mF	0 ~ 11.00mF	0.01mF	5%+50
	100mF	0 ~ 110.0mF	0.1mF	5%+50

1. AC measurement: True RMS, 20Hz ~ 1kHz, range of 10% ~ 110%;
2. The thermocouple measurement adopts the thermometric scale of ITS-90. The precision doesn't include errors in cold-end compensation, or influences of thermo-electrical potential.
3. The thermal resistance measurement adopts the thermometric scale of Pt100-385. The precision doesn't include errors due to lead resistance.
4. During frequency measurement, for signals with frequency lower than 3Hz, relevant readings will be zero.

**Detailed precision indexes for output**

Function	Range	Output setting scope	Resolution	Precision	Remark
DC voltage DCV	100mV	-10.00 ~ 110.00mV	10μV	0.2%+4	Maximum output current 0.5mA
	1000mV	-100.0 ~ 1100.0mV	100μV	0.2%+4	Maximum output current 2mA
	10V	-1.000 ~ 11.000V	1mV	0.2%+4	Maximum output current 5mA
DC current DCI	30mA	0.000 ~ 33.000mA	0.001mA	0.2%+4	20mA, maximum load 1KΩ 30mA, maximum load 600Ω
Simulated transmitter SIMULATE	-30mA	0.000 ~ -33.000mA	0.001mA		
Loop power LOOP	24V			±10%	Maximum output current 35mA
OHM	400Ω	0.0Ω ~ 400.0Ω	0.1Ω	0.2%+4	Excitation current: ±0.5 ~ 3mA When excitation current is ±0.1 ~ 0.5mA, an additional error of 0.1Ω should be taken into account. The precision doesn't include lead resistance.
Thermocouple TC	R	0°C ~ 1767°C	1°C	0.2%+3°C (≤100) 0.2%+2°C (>-100)	With the thermometric scale of ITS-90; The precision doesn't include errors in cold-end compensation
	S	0°C ~ 1767°C			
	B	600°C ~ 1820°C			
	K	-200.0°C ~ 1372.0°C	0.1°C	0.2%+2°C (≤-100) 0.2%+1°C (>-100)	
	E	-200.0°C ~ 1000.0°C			
	J	-200.0°C ~ 1200.0°C			
	T	-250.0°C ~ 400.0°C			
	N	-200.0°C ~ 1300.0°C			
Thermal resistance RTD	PT100	-0200.0 ~ 0850.0	0.1°C	0.2%+0.6°C	With the thermometric scale of Pt100-385; With excitation current of ±1mA The precision doesn't include lead resistance.
	Cu50	-050.0 ~ 150.0			
Frequency FREQ	100Hz	1.0Hz ~ 110.0Hz	0.1Hz	0.2%+2	Rectangular wave, duty cycle of 50% 1 ~ 11Vp-p
	1KHz	0.100KHz ~ 1.100KHz	1Hz	0.2%+2	
	10KHz	1.0KHz ~ 11.0KHz	0.1KHz	0.2%+2	

1.Load characteristics: inductive loads ≥0.01uF.

**Input characteristics**

Function position	Input impedance (nominal value)					
V	10MΩ, <100pF					
mV	>2.5GΩ					
mA	1Ω					
	Common-mode rejection ratio			Series-mode rejection ratio		
DCV, DCmV	80dB (dc to 50Hz / 60Hz/1KΩ)			40dB (50Hz / 60Hz)		
ACV, ACmV	60dB (dc to 50Hz / 60Hz/1KΩ)					
	Open-circuit voltage			Full-scale voltage		
Ohm	2.5V			2.2V		
Diode	< 3.5V			2.2V		
On-off	< 1V			500mV		
	Typical short-circuit current					
Ohm	500Ω	5KΩ	50KΩ	500KΩ	5MΩ	50MΩ
	0.8mA	0.2mA	20μA	2μA	0.2μA	< 0.1μA
Diode	0.2mA (typical value)					

**ACCESSORIES**
**Standard accessories:**

- One pair of testing wires (including analligator clip)
- One operating manual
- Four 1.5V alkaline cells (LR6)
- One 500mA/250V quick-acting fuse
- One soft portable bag

**Optional accessories:**

- One power adapter