

Ziegler

Redefine Innovative Metering

Technical Datasheet

ZMIT 13

MULTIMETER CUM INSULATION TESTER

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Ziegler ZMIT 13 is a two in one device combining the function of multimeter and Insulation Tester. This features makes it suitable for both applications where multimeter is used and insulation testing is required.

Product Features

- ZMIT 13 is a unique combination, offering functions of Digital Multimeter with 3 3/4 digits, 3100 counts & Insulation Tester
- It measures VAC, VDC, VAC+DC, Frequency, mA DC, mA AC+DC, Resistance, Continuity, Diode, Capacitance, AC current
- Trms measurement
- Test Voltages selectable from 50V, 100V, 250V, 500V and 1000V
- Insulation Resistance measurement upto 3 GΩ
- CAT II 1000V, CAT III 600V protection
- NULL ZERO Correction for Resistance & Capacitance
- Auto power off facility
- Min/Max function
- AC Current measurement up to 300A with clip-on sensor having ratio 1mv/10mA



Fact Sheet

Applicable Standards	
For Use as a Insulation Measuring instrument	IEC 61557: Devices for testing, measuring and monitoring protective safety measures in system with voltages of up to 1000 V AC and 1500 V DC IEC 61557- 1: For general requirements IEC 61557- 2: For Insulation resistance measuring instruments
EMC	IEC 61326: Class B
Immunity	IEC 61000-4-2 : 8 KV atmosphere discharge, 4 KV contact discharge IEC 61000-4-3 : 3 V/m
Safety	IEC 61010-1-2001
IP for water & dust	IEC 60529
Installation category:	III
High Voltage Test	3.5 kV (IEC 61010-1-2001)
Pollution degree	2

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Technical Specifications

Measuring function	Measuring range	Resolution	Input impedance	Intrinsic error of digital display ± (...% of rdg + ...digit) at reference condition	Over load capacity ¹⁾					
					Over load value	Overload duration				
V dc	30.00 mV	10 µV	>10 GΩ // <40pF	0.5 + 3 ²⁾	1000 V DC AC eff / rms Sine wave	Continuously				
	300.0 mV	100 µV	>10 GΩ // <40pF	0.5 + 3						
	3.000 V	1 mV	11 MΩ // <40pF	0.25 + 1						
	30.00 V	10 mV	10 MΩ // <40pF	0.25 + 1						
	300.0 V	100 mV	10 MΩ // <40pF	0.25 + 1						
	1000 V	1 V	10 MΩ // <40pF	0.35 + 1						
V ~	3.000 V	1 mV	11 MΩ // <40pF	1.0 + 3 (>10 Digits)			1000 V DC AC eff / rms Sine wave	Continuously		
	30.00 V	10 mV	10 MΩ // <40pF							
	300.0 V	100 mV	10 MΩ // <40pF							
	1000 V	1V	10 MΩ // <40pF							
V AC+DC	3.000 V	1 mV	11 MΩ // <40pF	1.0 + 3 (>10 Digits)	1000 V DC AC eff / rms Sine wave	Continuously				
	30.00 V	10 mV	10 MΩ // <40pF							
	300.0 V	100 mV	10 MΩ // <40pF							
	1000 V	1V	10 MΩ // <40pF							
A AC with clamp ⁶⁾	30/300 A	10/100mA	–	0.5 +5					–	--
A DC	Voltage Drop								0.36 A	Continuously
	300.0 µA	100 nA	15 mV	0.5+5 (>10 Digit)						
	3.000 mA	1 µA	150 mV	0.5+2						
	30.00 mA	10 µA	650 mV	0.5+5 (>10 Digit)						
	300.0 mA	100 µA	1V	0.5+5						
A AC+DC	3.000 mA	1 µA	150 mV	1.5+4 (>10 Digit)	0.36 A	Continuously				
	300.0 mA	100 µA	1 V	1.5+4 (>10 Digit)						
Ω	No load voltage				1000 V DC AC eff / rms Sine wave	10 sec				
	30.00 Ω	10 mΩ	Max. 3.2 V	0.5 + 3 ²⁾						
	300.0 Ω	100 mΩ	Max. 3.2 V	0.5 + 3						
	3.000 KΩ	1Ω	Max. 1.25 V	0.4 + 1						
	30.00 KΩ	10 Ω	Max. 1.25 V	0.4 + 1						
	300.0 KΩ	100 Ω	Max. 1.25 V	0.4 + 1						
	3.000 MΩ	1 KΩ	Max. 1.25 V	0.6 + 1						
	30.00 MΩ	10 KΩ	Max. 1.25 V	2.0 + 1						
→	2.000 V	1 mV	Max. 3.2 V	0.25 + 1						

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Measuring function	Measuring range	Resolution	Discharge resistance	U0 max.	Intrinsic error of digital display \pm (...% of rdg + ...digit) at reference condition	Over load capacity ¹⁾	
						Over load value	Overload duration
Farad +	30.00 nF	10 pF	250 K Ω	2.5 V	1.0 + 3 ²⁾	1000 V DC AC eff / rms Sine	10 sec
	300.0 nF	100 pF	250 K Ω	2.5 V	1.0 + 3		
	3.000 μ F	1 nF	25 K Ω	2.5 V	1.0 + 3		
	30.00 μ F	10 nF	25 K Ω	2.5 V	3.0 + 3		

Measuring function	Measuring range	Resolution	Discharge resistance	U0 max.	Intrinsic error of digital display \pm (...% of rdg + ...digit) at reference condition	Over load capacity ¹⁾		
						Over load value	Overload duration	
Hz			f min V dc	f min V ~	0.5 + 1 ³⁾	\leq 3 kHz 1000 v \leq 30 kHz; 300 V	Continuously	
	300.0 Hz	0.1 Hz	1 Hz	45 Hz				
	3.000 KHz	1 Hz	1 Hz	45 Hz				
	30.00 KHz	10 Hz	10 Hz	45 Hz				
	100.0 KHz	100 Hz	100 Hz	100 Hz				
%	2.0....98.0%	0.1 %	2 Hz	--	2 Hz... 1kHz \pm 5 Digit ⁴⁾ 1 kHz ... 10 kHz; \pm 5 Digit / kHz ⁴⁾	\leq 100 kHz 30 V		
°C	Pt 100	-200.0... +200.0 °C	0.1 °C	-	--	2 Kelvin + 5 Digit ⁵⁾ 1.0 + 5 ⁵⁾	1000 V DC AC eff / rms Sine	10 sec
		+200.0... +850.0 °C	0.1 °C					
	Pt 1000	-100.0... +200.0 °C	0.1 °C	-	--	2 Kelvin + 2 Digit ⁵⁾ 1.0 + 2 ⁵⁾		
		+200.0... +850.0 °C	0.1 °C					

Interface	
Type	RS232C, serial, as per DIN 19241
Data transmission	Optically with infrared light through the case
Baud rate	8192 bits/s
Reference conditions for accuracy	
Reference Temperature	23°C ± 2K
Relative Humidity	45%...55% RH
Waveform of measured quantity	Sinusoidal
Input frequency	50 or 60 Hz ±2%
Battery Voltage	8 V ± 0.1 V
Environmental conditions	
Operating temperature	-20 to +50°C
Storage temperature	- 25 to +70°C
Relative humidity	<75% non-condensing
Terminal Protection	IP20 for terminals
Altitude	Up to 2000 m
Battery	
Battery Voltage	6 X 1.5 V Cells
Battery type	Alkaline manganese Dioxide cells as per IEC LR 03 , ANSI 24A (Size AAA)
Battery Life	<p>Minimum 600 hours on Vdc, Adc ,240 hours on Vac, Aac,</p> <p>For MΩISO @1000 V, 800 Measurements possible with nominal current</p> <p>MΩISO @500,250V, 100V, 50 V, 2400 Measurements possible with nominal current</p>

Influence Quantities and Variations

Influence Quantity	Measuring Range	Resolution	Intrinsic error of digital display ± (...% of rdg + ...digit) at reference condition
V1MΩ ⁷⁾	0...1000 V AC+DC	1V	1+10 D
MΩIT@1000V ⁸⁾	0...1000 V AC+DC	1V	1+10 D
MΩIT Un=50 V	0.100...1.600 MΩ	1KΩ	--
	01.40...16.00 MΩ	10 KΩ	5 + 15 D
	014.0...155.0 MΩ	100 KΩ	--
MΩIT Un=100 V	0.100...3.100 MΩ	1KΩ	--
	02.80...31.00 MΩ	10 KΩ	5 + 15 D
	028.0...310.0 MΩ	100 KΩ	--
MΩIT Un=250 V	0.100...0.800 MΩ	1KΩ	--
	00.70...08.00 MΩ	10 KΩ	3 + 10 D
	007.0...080.0 MΩ	100 KΩ	--
	0070...0775 MΩ	1MΩ	--
MΩIT Un=500 V	0.100...1.600 MΩ	1KΩ	--
	01.40...16.00 MΩ	10 KΩ	3 + 10 D
	014.0...160.0 MΩ	100 KΩ	--
	0140...1600 MΩ	1MΩ	--
MΩIT Un=1000 V	0.100...3.100 MΩ	1kΩ	--
	02.80...31.00 MΩ	10 KΩ	3 + 10 D
	028.0...310.0 MΩ	100 KΩ	--
	0280...3100 MΩ	1MΩ	--

1) At 0° + 40 °C

2) With zero adjustment, without zero adjustment + 50 digits

3) Range

3 V ac/dc: Ue = 1.5 V eff/rms ... 100 V eff/rms

30 V ac/dc: Ue = 15 V eff/rms ... 300 V eff/rms

300 V ac/dc: Ue = 150 V eff/rms... 1000 V eff/rms

4) On the range 3 V dc, square – wave signal positive on one side 5 ... 15 V, f = const., not 163.84 Hz or integral multiple

5) Without sensor

6) Measurement with clip-on current sensor with ratio 1mv/10mA


7) Discharge the DUT through 1MΩ resistance, before insulation resistance measurement. LCD displays value of voltage present on DUT

8) In this switch position live circuit detection (V AD+DC) is done before insulation measurement. If voltage present is greater than 50V (AC+DC), insulation resistance measurement function is disabled and LCD displays value of voltage present on DUT

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Influence Quantities

Influence Quantity	Range of Influence	Measured Quantity / measuring Range	Variation ¹⁾ ± (... % of rdg. +digits)
Temperature	0 °C +21 °C and +25 °C...+40°C MΩIT 0.25 + 2	30/300 mV dc	1.0 + 3
		3...300 V dc	0.15 + 1
		1000 V dc	0.2 + 1
		V ~	0.4 + 1
		300µA ... 300mA DC	0.5+1
		A AC+DC	0.75+3
		30 Ω ²⁾	0.15 + 2
		300 Ω	0.25 + 2
		3 KΩ – 3 MΩ	0.15 + 1
		30 MΩ	1.0 + 1
		30 nF ²⁾ – 3 µF	0.5 + 2
		30 µF	2.0 + 2
		Hz	0.5 + 1
		%	± 5
		-200...+200 °C	0.5 K + 2
+200...+850°C	0.5 + 2		
Frequency of the measured quantity	15 Hz... < 30 Hz	3...1000 V ~	1.0 + 3
	30 Hz... < 45 Hz		0.5 + 3
	> 65 Hz... 400 Hz		2.0 + 3
	>400 Hz...1 KHz		3.0 + 3
Wave form of the measured quantity ³⁾	20Hz ... < 45 Hz	A~	3.0 + 7
	>66 Hz... 1 kHz		2.0 + 3
	Crest factor CF <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1...3</td></tr><tr><td>3...5</td></tr></table>		1...3
1...3			
3...5			
Battery Voltage	 ⁵⁾ ... < 7.9 V > 8.1 V ...10.0 V	V ~ 4), A~ 4)	± 1 % of rdg
		V DC	± 3 % of rdg
		V~, ADC	2 Digit
		A AC+DC	4 Digit
			6 Digit
		30Ω / 300 Ω/°C	4 Digit
		3 kΩ – 30MΩ, MΩIT	3 Digit
nF, µF, Hz	1 Digit 1 Digit		
%	1 Digit		
Relative humidity	75%	V~, V DC A AC+DC, A DC	3 Days
	3 Days	Ω	1 x intrinsic error
	Meter off	Hz °C	
DATA	-	%	± 1 digits
MIN/MAX	-	V ac/dc , A ac/dc, clamp	± 2 digits

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- 1) With temperature: Error data apply per 10 K change in temperature.
With frequency: Error data apply to a display from 300 digits onwards
- 2) With zero adjustment.
- 3) With unknown waveform (crest factor CF > 2), measure with manual range selection
- 4) With the exception of sinusoidal waveform
- 5) After “ —|— ” symbol is displayed

Influence Quantity	Range of Influence	Measuring Range	Attenuation
Common Mode interference voltage	Noise quantity max. 1000 V	V dc	> 120 dB
		3V~, 30V~	> 70 dB
		300 V~	> 60 dB
Normal Mode Interference Voltage	Noise quantity max. 1000 V~ Value of the measuring range at a time Max. 1000V~, 50Hz, 60Hz sinusoidal	V dc	50dB
		Noise quantity max. 1000 V- V~	>110dB

Response time (after manual range selection):

Measured Quantity/ Measured Response time	Response Time		Transient response for step function of the measured quantity
	Of Analog indication	Of Digital indication	
VDC, VAC, A AC+DC, A AC	0.7 s	1.5 s	From 0 to 80 % of upper range limit.
30Ω...3 MΩ	1.5 s	2 s	From ∞ to 50 % of upper range limit.
30 MΩ	4 s	5 s	
	0.7s	1.5s	
nF, μF, °C,		Max. 1... 3 s	From 0 to 80 % of upper range limit.
300 Hz, 3KHz		Max 2 s	
30 KHz, 300 KHz		Max 0.7 s	
% (1 Hz)		Max 9 s	
% (≥10 Hz)		Max 2.5 s	

Standard Scope of Supply

- 1 Meter
- 1 Cable set
- 1 Copy Operating Instructions
- 1 Protective Case (Holster)
- 2 Crocodile Clips
- 1 Battery Set

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