

DranTech PRO

TRMS Digital Multimeter



- Digital Hand-Held Multimeter with RMS Measurement
VAC TRMS, VAC+DC TRMS, VDC, Hz (V), Hz (A), Ω , V, °C/°F (TC)
- 4 $\frac{3}{4}$ -digit display (60.000 counts), with backlit display
- Direct Current measurement with increased accuracy and
Current measurement, via clip-on current transformer and sensors
- Data Storage of Min-Max Values
- Automatic or Manual Measuring Range Selection
- Analog Scale for Quick Trend Indication – Bar Graph or Pointer
- Rugged with Protective Rubber Holster



Applications

This multimeter is suitable for universal use in electrical engineering, electrical installation, laboratory applications, telecommunication, technical training, as well as for troubleshooting in the field.

Features

Three Connector Terminals with patented Automatic Blocking Sockets *

All current ranges are implemented via a single connector socket which prevents any possibility of operator error. Beyond this, the automatic blocking sockets prevent incorrect connection of the measurement cables, as well as selection of the wrong measured quantity. Danger to the user, the instrument and the device under test resulting from operator error is therefore eliminated.

* Patented (patent no. DE 40 27 801 C2 and US 5,166,599)

Overload Protection

The instrument is safeguarded for up to 1000 V in all measuring functions by overload protection. Voltages of greater than 1000 V and current of greater than 10 or 16 A are indicated acoustically.

RMS Value with Distorted Waveforms

The measuring method applied allows for waveform independent RMS measurement (TRMS AC and AC+DC) for voltage and current up to 10 kHz).

Selectable Filter for V AC Measurement

A 1 kHz low-pass filter can be activated if required, for example when measuring motor voltage at electronic frequency converters.

Battery Capacity Indication – Power Saving Circuit

The battery load capacity is indicated on the display. If user selected, the device is switched off automatically if the measured value remains unchanged for a period of between 10 and 59 minutes (adjustable), and if none of the controls are activated during this time.

DKD Calibration Certificate

Multimeters are furnished with an internationally accepted DKD calibration certificate (recognized by EA and ILAC). After the specified calibration interval has elapsed (recommended interval: 1 to 3 years), the multimeters can be inexpensively recalibrated by any calibration laboratory.

Scope of Delivery

- Multimeter with 1 pair of safety test leads (1.5 m) with 4 mm diameter, 1000 V CAT III, 600 V CAT IV (KS17-2)
- 2 alkaline batteries, 1.5 V, type AA
- CD with operating instructions,
- DKD calibration certificate
- Pack of 10 superfast Fuses 10A/1kV
- HC20 Hardcase

Applicable Regulations and Standards

IEC/EN 61010, part 1:2001/VDE 0411-1:2002	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN EN 61326 VDE 0843, part 20	Electrical equipment for control technology and laboratory use – EMC requirements
DIN EN 60529 DIN VDE 0470, part 1	Test instruments and test procedures – degrees of protection provided by enclosures (IP code)

Warranty

24 months for materials and workmanship

1 to 3 years for calibration (depending upon application)

Internal Clock

Time format DD.MM.YYYY hh:mm:ss

Resolution 0.1 s

Accuracy ± 1 min. per month

Temperature Influence 50 ppm/K

Power Supply

Battery 2 ea. 1.5 V, size AA, alkaline manganese per IEC LR6
(2 ea. 1.2 V NiMH rechargeable battery possible)

Service life with alkaline manganese: approx. 200 hours

Battery test: Battery capacity display with battery symbol in 4 segments: .

Display of momentary battery voltage via menu function.

Power OFF function: Multimeter is switched off automatically:

– If battery voltage drops to below approx. 1.8 V

– If none of the keys or the rotary switch are activated for an adjustable duration of 10 to 59 minutes, and the multimeter is not in continuous operating mode

Fuse


Fuse FF (UR) 10 A/1000 V AC/DC; 10 mm x 38 mm, Switching capacity: 30 kA at 1000 V AC/ DC, protects the current measurement input in the 100 μ A through 10 A ranges

Display

LCD panel (65 mm x 36 mm) with analog and digital display including unit of measure, type of current and various special functions

Background illumination is switched off approximately 1 minute after it has been activated (backlit display)

Analog

Display	LCD scale with bar graph or pointer, depending on the selected parameter setting
Scaling	With 4 division lines each, 1 bar/pointer corresponds to 500 digits at the digital display
Polarity display	In auto-ranging mode
Overflow display	With the symbol 
Update rate	40 measurements per second and display refresh

Digital

Display/char height	7-segment characters / 15 mm
Resolution	4 $\frac{3}{4}$ digits, 60,000 counts
Overflow display	“OL” is displayed for $\geq 60,000$
Polarity display	“–” (minus sign) is displayed if pos. lead is connected to “ \perp ”
Measuring rate	10 and 40 measurements per second with the Min-Max function except for the capacitance, frequency and keying ratio measuring functions
Refresh rate	2 times per sec., every 500 ms

Acoustic Signals

For voltage: Intermittent signal at above 1000 V

For current: Intermittent signal at above 10 A
Continuous signal at above 16 A

Electrical Safety

Per IEC 61010-1:2001/VDE 0411-1:2002

Cat. III 1000 V - Cat. IV 600 V

Test voltage 6.7 kV~

Electromagnetic Compatibility EMC

Interference emission	EN 61326: May 2004, class B
Interference immunity	EN 61326: May 2004, appendix E
	IEC 61000-4-2: Dec. 2001
	Feature B
	8 kV atmospheric discharge
	4 kV contact discharge
	IEC 61000-4-3: Dec. 2001
	Feature A 3 V/m

Ambient Conditions (to meet all specs)

Accuracy range	0 °C ... +40 °C
Operating temp. range	-10° C ... +50° C
Storage temp. range	-25° C ... +70° C (without batteries)
Relative humidity	Max.75%, no condensation allowed
Elevation	To 2000 m
Deployment	Indoors, except within specified ambient conditions

Mechanical Design

Housing	Impact resistant plastic (ABS)
Dimensions	200 x 87 x 45 mm (without protective rubber holster)
Weight	Approx. 0.35 kg with batteries
Protection Housing:	IP 52

Specifications

Meas. Function	Measuring Range	Resolution at Upper Range Limit		Input Impedance		Intrinsic Error under Reference Conditions			Overload Capacity 2)			
		11,999	1199	∞	$\sim 10^6$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	Value	Time		
V	100 mV	10 μV		$\geq 9 \text{ M}\Omega$	$\geq 9 \text{ M}\Omega // < 50 \text{ pF}$	0.09 + 5 with ZERO	1 + 30 (> 300 d) ¹⁾	1 + 30 (> 300 d) ¹⁾	1000 V DC AC RMS sine ³⁾	Continuous		
	1 V	100 μV		$\geq 9 \text{ M}\Omega$	$\geq 9 \text{ M}\Omega // < 50 \text{ pF}$	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)				
	10 V	1 mV		$\geq 9 \text{ M}\Omega$	$\geq 9 \text{ M}\Omega // < 50 \text{ pF}$	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)				
	100 V	10 mV		$\geq 9 \text{ M}\Omega$	$\geq 9 \text{ M}\Omega // < 50 \text{ pF}$	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)				
	1000 V	100 mV		$\geq 9 \text{ M}\Omega$	$\geq 9 \text{ M}\Omega // < 50 \text{ pF}$	0.09 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)				
				Voltage drop, approx. at upper range limit		∞	$\sim 10^6$	$\sim 10^6$				
A	10 mA	1 μA		16 mV	16 mV	0.1 + 5	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)	0.2 A	dauermd		
	100 mA	10 μA		160 mV	160 mV	0.1 + 5	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)				
	1 A	100 μA		40 mV	40 mV	0.9 + 10	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)	10 A: 5 min 16 A: 30 s			
	10 A	1 mA		600 mV	600 mV	0.9 + 10	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)				
	Factor: 1:1/10/100/1000	Input		Input Impedance								
A >C	0.1/1/10/100 A	100 mA		Current measuring input (A socket)		Specification see current ranges A plus clip-on current sensor error			Measuring input 0.2 A continuous 10 A: 5 min			
	1/10/100/1000 A	1 A										
	10/100/1000/10000 A	10 A										
A >C	0.1/1/10/100 A	100 mV		Voltage measurement input (V socket) Ri = 1 M Ω /9 M Ω ...		$\pm(0.5\% \text{ rdg.} + 10 \text{ d})$ $\pm(1\% \text{ rdg.} + 30 \text{ d})$ $\pm(1\% \text{ rdg.} + 30 \text{ d})$ Plus clip-on current sensor error			Measurement input 1000 V RMS Max. 10 s			
	1/10/100/1000 A	1 V										
	10/100/1000/10000 A	10 V										
				Open-circuit voltage Meas. curr. @ range limit		$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$						
Ω	100 Ω	10 m Ω		< 1.4 V	Approx. 300 μA	0.2 + 5 with active ZERO function			1000 V DC AC RMS sine	Max. 10 s		
	1 k Ω	100 m Ω		< 1.4 V	Approx. 250 μA	0.2 + 5						
	10 k Ω	1 Ω		< 1.4 V	Approx. 100 μA	0.2 + 5						
	100 k Ω	10 Ω		< 1.4 V	Approx. 12 μA	0.2 + 5						
	1 M Ω	100 Ω		< 1.4 V	Approx. 1.2 μA	0.2 + 5						
	10 M Ω	1 k Ω		< 1.4 V	Approx. 125 nA	0.5 + 10						
	40 M Ω	10 k Ω		< 1.4 V	Approx. 20 nA	2.0 + 10						
d))	100 Ω	—	0.1 Ω	Approx. 8 V	Approx. 1 mA const.	1 + 5						
->	5,1 V ³⁾	—	1 mV	Approx. 8 V	Approx. 1 mA const.	0.5 + 3						

Specifications (cont'd)

				Discharge resist.	$U_{0\max}$	$\pm(\dots \% \text{rdg.} + \dots \text{d})$		
F	10 nF		10 pF	10 M Ω	0.7 V	$1 + 6^{(4)}$ with ZERO function active	1000 V DC AC RMS sine	Max. 10 s
	100 nF		100 pF	1 M Ω	0.7 V	$1 + 6^{(4)}$		
	1 μ F		1 nF	100 k Ω	0.7 V	$1 + 6^{(4)}$		
	10 μ F		10 nF	12 k Ω	0.7 V	$1 + 6^{(4)}$		
	100 μ F		100 nF	3 k Ω	0.7 V	$5 + 6^{(4)}$		
	1000 μ F		1 μ F	3 k Ω	0.7 V	$5 + 6^{(4)}$		
					$f_{\min}^{(5)}$	$\pm(\dots \% \text{rdg.} + \dots \text{d})$		
Hz (V)	100.00 Hz	0.01 Hz			1 Hz	$0.05 + 3^{(9)}$	Hz (V) ⁽⁶⁾ ; Hz (A>C) ⁽⁶⁾ ; 1000 V Hz (A) ⁽⁷⁾	Max. 10 s
Hz (A)	1.0000 kHz	0.1 Hz						
Hz (A>C)	10.000 kHz	1 Hz						
Hz (V)	100.00 kHz	10 Hz						
Hz (A)	30.00 kHz	10 Hz			10 Hz			
					10 Hz			
						$\pm(\dots \% \text{rdg.} + \dots \text{d})$		
°C/°F	K (NiCr-Ni)	-250.0 ... +1372.0 °C				$1\% + 5 \text{ K}^{(9)}$	1000 V DC/AC RMS Sine	Max. 10 s

¹⁾ Values of less than 200 digits are suppressed in the mV range.

15 (20) ... 45 ... 65 Hz ... 20 (1) kHz sinusoidal. See influence error on page 4.

²⁾ At 0° ... + 40° C

³⁾ Displays up to max. 5.1 V, "OL" in excess of 5.1 V.

⁴⁾ Applies to measurements at film capacitors

⁵⁾ Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point

⁶⁾ Overload capacity of the voltage measurement input:

power limiting: frequency x voltage max. $3 \times 10^5 \text{ V} \times \text{Hz}$ for $U > 100 \text{ V}$

⁷⁾ Overload capacity of the current measurement input:

See current measuring ranges for maximum current values.

⁸⁾ Input sensitivity, sinusoidal signal, 10% to 100% of the measuring range

⁹⁾ Plus sensor deviation

¹⁰⁾ Residual value deviates within 1 ... 30 d from the zero point due to TRMS converter when probe tips are short-circuited

Key: R = measuring range, d = digit(s), rdg. = measured value (reading)



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CAT IV



DKD Calibration Certificate