



METRA BLANSKO

VALUE IS INSIDE

Metra 16S

Digital multimeter



Application

It is Analog Digital Multimeter which measures VAC, VDC, VAC+DC, Frequency, mA DC, mA (AC+DC), Resistance, continuity, Diode, Farad, AC current measurement.



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Product Features

Automatic Terminal Blocking System (ABS)

The automatic Terminal blocking system prevents incorrect connection of the test leads and incorrect selection of the measured quantity. This reduces danger to the user, the meter and the system to a remarkable extent.

Interface And Software com 100

The multimeters are fitted with a serial RS-232 C interface via which the measured values can be transmitted to a PC. These values, electrically isolated, are transmitted to the attachable interface adaptor with infrared light through the case*

MIN/MAX Value Storage

In addition to the display of the actual measured value, the minimum or maximum value can constantly be updated and stored.

Indication Of Negative Values On The Analog Scale

When measuring DC quantities, also negative values are shown on the analog scale so that variations of the measured value can be observed at the zero point.

Indication Of Negative Values On The Analog Scale

The measuring principle employed permits the measurement of the root-mean-square value (TRMS) of AC quantities and mixed quantities (AC and DC) regardless of the waveform.

Automatic Data Hold*

The DATA HOLD function makes it possible to hold the digitally displayed measured value. According to a patented method, it is ensured that no freak value but the actual measured value is held in the case of rapid changes in measured quantities. The held measured value appears on the digital display. The actual measured value continues to be shown on the analog scale.

Autoranging / Manual Range Selection

The measured values are selected with rotary switch. The measuring range is automatically matched to the measured value. The measuring range can also be selected manually via the AUTO/MAN push button.

Continuity Test

This permits testing for short circuit and open circuit. In addition to the display, a facility of sound signal is available.

Temperature Measurement

It is possible to use all models of multi series, in direct connection of temperature sensor Pt 100 / Pt 1000. The meters automatically detects the type of sensors connected to it & displays directly measured temperature.

Signalling in the case of a blown fuse

The display FUSE points to a blown fuse.

Power economizing circuit

The meter disconnects automatically when the measured value remains unchanged for about 10 minutes and no operating control was operated during this time. The disconnection facility can be disabled.

Overload Warning

A sound signal indication violation of the overload limits.

Protective holster for rough duty

A holster of soft rubber with tilt stand protects the meter against damage in the case of shock and drop. The rubber material makes for the meter to stand firmly even on vibrating surface.

Calibration

Automatic calibration is done through a developed calibration software with RS232 connection to the multimeter. Every multimeter is provided with the Test Certificate which is traceable to National / International standards.

Specifications

Meas. function	Measuring range					Resolution	Input impedance		Inherent deviation of the digital display ± (...% of meas. val. + ...digits) for reference condition					Overload capacity ⁴⁾		Measuring function			
	RISHMulti	12S	13S	14S	15S				16S	12S	13S	14S	15S	16S	Overload value		Overload duration		
V_{DC}	30.00 mV	●	●	●	●	●	10 μV	> 10G Ω // < 40 pF		0.5 + 3 ⁵⁾			0.5 + 3 ⁵⁾		1000 V	DC	cont.	V_{DC}	
	300.0mV	●	●	●	●	●	100 μV	> 10G Ω // < 40 pF		0.5 + 3			0.5 + 3						
	3.000 V	●	●	●	●	●	1 mV	11M Ω // < 40 pF		0.25 + 1			0.1 + 1						
	30.00 V	●	●	●	●	●	10 mV	10M Ω // < 40 pF		0.25 + 1			0.1 + 1						
	300.0 V	●	●	●	●	●	100 mV	10M Ω // < 40 pF		0.25 + 1			0.1 + 1						
	1000 V	●	●	●	●	●	1 V	10M Ω // < 40 pF		0.35 + 1			0.1 + 1						
V_~	3.000 V	●	●	●	●	●1)	1 mV	11M Ω // < 40 pF		0.75 + 2(10... 300 D) 0.75 + 1 (> 300 D)			0.75 + 3 (> 10 D)		AC effective sinusoidal		V_~		
	30.0 V	●	●	●	●	●1)	10 mV	10M Ω // < 40 pF											
	300.0 V	●	●	●	●	●1)	100 mV	10M Ω // < 40 pF											
	1000 V	●	●	●	●	●1)	1 V	10M Ω // < 40 pF											
V_~	3.000 V					●1)	1 mV	11M Ω // < 40 pF		---	---	---	---	0.75 + 3 (> 10 D)			V_~		
	30.0 V					●1)	10 mV	10M Ω // < 40 pF		---	---	---	---						
	300.0 V					●1)	100 mV	10M Ω // < 40 pF		---	---	---	---						
	1000 V					●1)	1 V	10M Ω // < 40 pF		---	---	---	---						
							Voltage drop. approx. 12S 13S 14S / 15S/16S												
A_{DC}	300.0 μA			●	●	●	100 nA	---	---	15 mV	---	1.0 + 5 (> 10D)		0.5 + 5 (> 10 D)		0.36 A	cont.	A_{DC}	
	3.000 mA	●	●	●	●	●	1 μA	15 mV	15 mV	150 mV	1.0 + 5 (> 10D)		1.0 + 2		0.5 + 2				
	30.00 mA	●	●	●	●	●	10 μA	150 mV	150 mV	650 mV	0.25 + 2		1.0 + 5 (<10 D)		0.5 + 5 (> 10 D)				
	300.0 mA	●	●	●	●	●	100 μA	1 V	1 V	1 V	1.0 + 2		---		0.5 + 2				
	3.000 A		●	●	●	●	1 mA	---	100 mV	100 mV	---	1.0 + 5 (> 10 D)		1.0 + 5 (> 10 D)					
	10.00 A		16A	●	●	●	10 mA	---	300/270mV	270 mV	---	1.0 + 2		1.0 + 2					
A_~	3.000 mA			●	●		1 μA	---	---	150 mV	---	1.5 + 2 (> 10 D)		---		0.36 A	cont.	A_~	
	30.00 mA	●	●				10 μA	150 mV	150 mV	---	1.5 + 2 (> 10 D)		---						
	300.0 mA	●	●	●	●		100 μA	1 V	1 V	1 V	1.5 + 2 (> 10D)		---						
	10.00 A		16A	●	●		10 mA	---	300/270mV	270 mV	---	1.5 + 2 (> 10 D)		---					
A_~ ⌂	30.00 A ⁹⁾	●					10 mA	150 mV	---	---	1.5 + 2 (> 10 D)	---	---	---	---	0.36 A	cont.	A_~ ⌂	
	300.0 A ⁹⁾	●					100 mA	1 V	---	---	---	---	---	---					
A_~ ⌂	3.000 mA					●1)	1 μA	---	---	150 mV	---	---	---	---	1.5 + 4 (> 10 D)	12 A	10 min	A_~ ⌂	
	300.0 mA					●1)	100 μA	---	---	1 V	---	---	---	---	1.5 + 4 (> 10 D)				
	10.00 A					●1)	10 mA	---	---	270 mV	---	---	---	---	1.75 + 4 (> 10 D)				
							No-load voltage												
Ω	30.00 Ω	●	●	●	●	●	10 m Ω	max. 3.2 V		0.5 + 3 ⁵⁾			0.4 + 3 ⁵⁾		1000 V	DC	10 min	Ω	
	300.0 Ω	●	●	●	●	●	100 m Ω	max. 3.2 V		0.5 + 3			0.4 + 3						
	3.000 k Ω	●	●	●	●	●	1 Ω	max. 1.25 V		0.4 + 1			0.2 + 1						
	30.00 k Ω	●	●	●	●	●	10 Ω	max. 1.25 V		0.4 + 1			0.2 + 1						
	300.0 k Ω	●	●	●	●	●	100 Ω	max. 1.25 V		0.4 + 1			0.2 + 1						
	3.000 M Ω	●	●	●	●	●	1 k Ω	max. 1.25 V		0.6 + 1			0.4 + 1						
	30.00 M Ω	●	●	●	●	●	10 k Ω	max. 1.25 V		2.0 + 1			2.0 + 1						
	2.000 V	●	●	●	●	●	1 mV	max. 3.2 V		0.25 + 1			0.1 + 1						
							Discharge resistance	U ₀ max											
F	30.00 nF				●	●	10 pF	250 k Ω	2.5 V	---	---	---	1.0 + 3 ⁶⁾		1000 V DC / AC effective sinusoidal	10 min	F		
	300.0 nF				●	●	100 pF	250 k Ω	2.5 V	---	---	---	1.0 + 3						
	3.000 μF				●	●	1 nF	25 k Ω	2.5 V	---	---	---	1.0 + 3						
	30.00 μF				●	●	10 nF	25 k Ω	2.5 V	---	---	---	3.0 + 3						
							Sensor	F _{min} V _{DC}	F _{min} V _~										
Hz	300.0 Hz				●	●	0.1 Hz	1 Hz	45 Hz	---	---	---	0.5 + 1 ⁸⁾		≤ 3 kHz: 1000V ≤ 30 kHz: 300V ≤100 kHz: 30 V	cont.	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 %	1 Hz	---	---	---	---	1 Hz.....1kHz: ± 5 D ⁹⁾ 1Hz.....10kHz:±5 D/kHz ⁹⁾				%		
°C	- 200.0... + 200.0°C	●	●	●	●	●	0.1°C	Pt 100	---	---	2 Kelvin + 5 D ¹⁰⁾			1000 V	DC	10 min	°C		
	+ 200.0... + 850.0°C	●	●	●	●	●	0.1°C		---	---	1.0 + 5 ¹⁰⁾								
	-100.0... + 200.0°C	●	●	●	●	●	0.1°C	Pt 1000	---	---	2 Kelvin + 2 D ¹⁰⁾			AC effective sinusoidal					
	+ 200.0 ... + 850.0°C	●	●	●	●	●	0.1°C		---	---	1.0 + 2 ¹⁰⁾								

1) TRMS measurement

2) Direct display with clip-on transformer 1000:1

4) At 0 °C... + 40 °C

5) With zero setting; w/o zero setting + 35 digits

6) With zero setting; w/o zero setting + 50 digits

7) Multi 13S (w/o 16 A fuse!) : 16A cont., 20A for 5 min;

Multi 14S... 16S: 12A for 5 min, 16A for 30s

8) Range 3 V ≤ U_E = 1,5 V_{rms}... 100 V_{rms}

30 V ≤ U_E = 15 V_{rms}... 300V_{rms}

300 V ≤ U_E = 150 V_{rms}... 1000V_{rms}

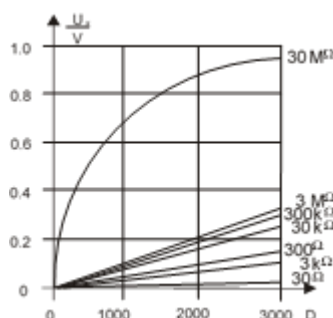
9) On the range 3V rectangular signal positive at one end 5 ... 15 V, f = const., not 163.84 Hz or integer multiple

10) Without sensor

Reference conditions Measuring current with diode test and / or continuity test 18S Influence quantities and variations for 12S... 16S

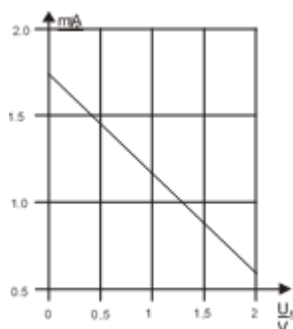
Ambient temperature	+23°C ± 2K
Relative humidity	45%... 55%
Frequency of the measured quantity	45 Hz... 65 Hz
Waveform of the measured quantity	Sinusoidal
Battery voltage	8V ± 0.1 V

Measuring voltage with resistance measurement 12S ... 16S



Voltage U_x across to be measured as a function of measuring range and display.

Measuring current with diode test and / or continuity test 12S ... 16S



Measuring current I_x as a function of the displayed voltage U_x on the device under test

Influence quantities and variations for 12S ... 16S

Influence quantity	Influence range	Measured quantity/ measuring range	Variation ¹ ±(...% of meas. val. + ... digits)
Temperature	0 °C.... +21°C and +25°C...+40°C	30/300 mV–	1 + 3
		3...300 V–	0,15 + 1
		1000 V–	0,2 + 1
		V~	0,4 + 2
		300 uA ²	0,5 + 1
		300 mA–	0,5 + 1
		3 A/10 (16) A–	0,5 + 1
		A~	0,75 + 1
		30 Ω ²	0,15 + 1
		3 kΩ... 3 MΩ	0,25 + 1
		30 MΩ	1 + 1
		30 nF ² ...3uF	0,5 + 2
		30 uF	2 + 2
		Hz	0,5 + 1
		%	±5 D
		-200...+200 °C	0,5 K + 2
		+200 + 850 °C	0,5 K + 2

Influence quantity	Influence range	Measured quantity/ measuring range	Variation ¹ ±(...% of meas. val. + ... digits)
Frequency of the measured quantity	>65Hz...400Hz	3...300V~	2 + 3
	>400Hz...1kHz		2 + 3
	30Hz...<45Hz	1000V~	3 + 3
	>65Hz...1kHz		2 + 3
Battery voltage	— — ³ ...<7,9V >8,1...10V	V–	±2D
		V~	±4D
		A–	±4D
		A~	±6D
		30Ω/300Ω/°C	±4D
		3kΩ...30MΩ	±3D
		nF, uF	±1D
		Hz	±1D
Relative humidity	75% 3 days Meter off	V~ A~ Ω F Hz % °C	1x Intrinsic error
			±1D
Data			±1D
Min/Max		V~, A~	±2D

1 With temperature; Error data is per 10 K change in temperature. With frequency; Error data is valid from a display of 300 digits.

2 With zero setting

3 From the time the symbol "—|—" appears.

Display

LCD field (65 mm x 30 mm) with analog indication and digital display and with annunciators for unit of measurement, function and various special functions.

Analog

Indication

Scale length

Scaling

Polarity indication

Overrange indication

Sampling rate

Digital

height of numerals

Number of counts

Overrange display

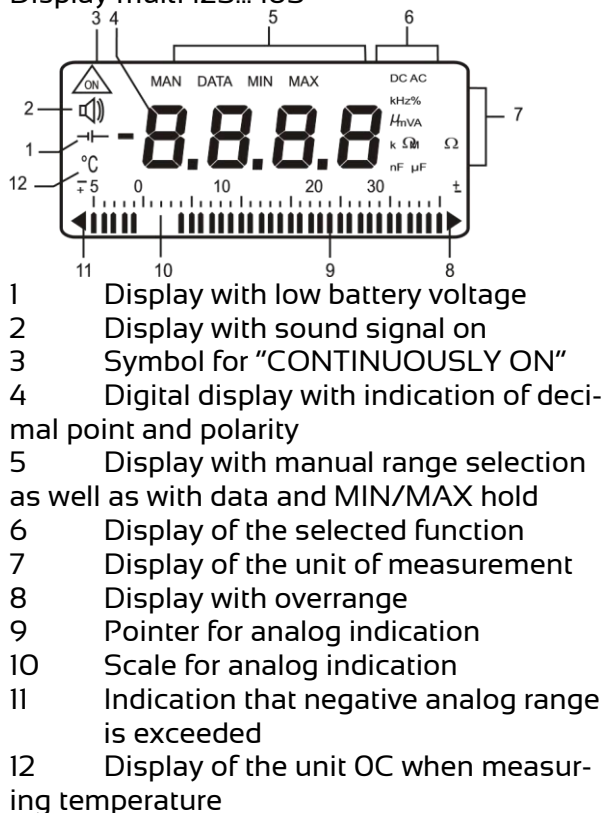
Polarity display

Sampling rate

LCD scale with pointer
55 mm on V– and A–
47 mm on all other ranges
+ 5...0...+ 30 with 35 scale divisions on–,
0...30 with 30 scale divisions on all other ranges
With automatic reversal
By triangle
20 readings/s
On 10 readings/s

7 segment numerals /15mm
multi 12S...16S,
3¾ digit 3100 counts
"OL" is shown
"–" sign is shown,
When positive pole to "1"
2 readings/s
On Ω and °C:1 reading/s

Display multi 12S... 16S



Environmental conditions

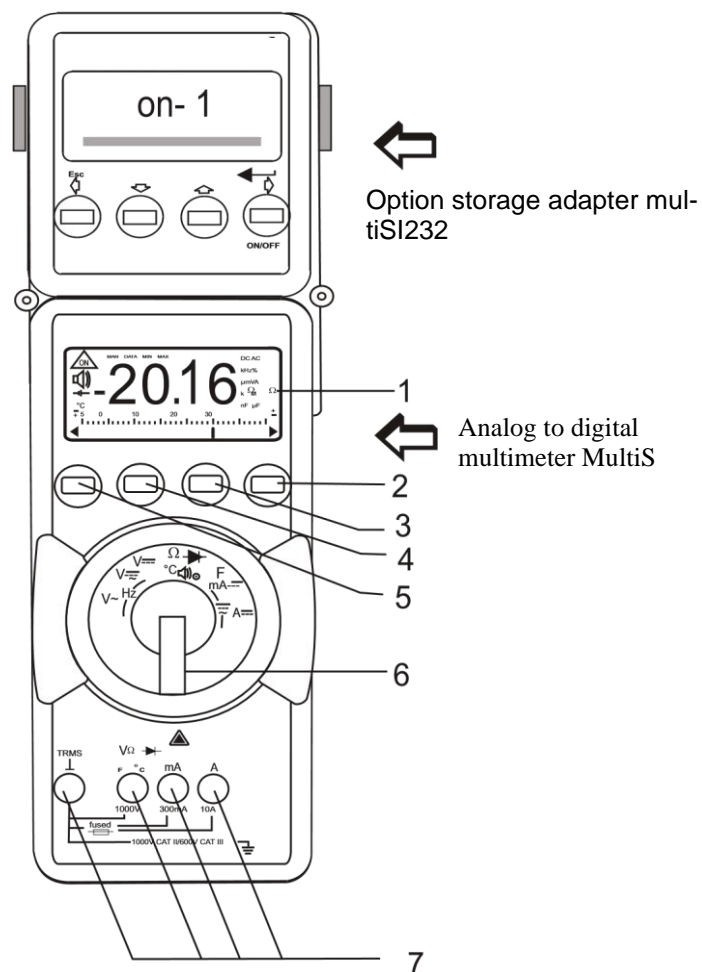
Operating temperature	-10 to +50°C
Storage temperature	-25 to +70°C
Relative humidity	<75% non condensing
Terminal protection	IP 50 for instrument and IP 20 for terminals
Altitude	Up to 2000 m

Applicable regulations and standards

EMC Immunity	ČSN EN 61326-1 ed.2
Immunity	ČSN EN 61010-1 ed.2
Safety	ČSN EN 61010-1 ed.2
IP for water & dust	ČSN EN 60529
Pollution degree	2
Installation category	CAT IV

Mechanical design

Protection	IP 50 for meters, IP 20 sockets
Dimension	200 x 91 x 54 mm
Weight	Approx. 0,35 kg with batteries



- 1 LC display
- 2 ON/OFF push-button
- 3 Push-button for data hold and MIN/MAX storage
- 4 Push-button for manual range selection
- 5 Multi-function push-button
- 6 Switch for measurement function
- 7 Connection sockets with automatic blocking system

Sales & service

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