

Data Sheet

RISH Max - 14
Analog-Digital Multi



Application

RISH Max digital multimeters are suited for universal, general applications in the electrical and electronics fields, as well as in radio and television service, training and education.

They are of especially flat design, and thus fit into any bag. The protective cover, which is provided as standard equipment, can be opened at an angle for convenient reading from the workbench, and provides for easy transport.

Product Features

Selection of input resistance for voltage measurement

In addition to the usual voltage input with one resistance value of 10 M Ω , which is selected via \sim or $V \rightleftharpoons$, this measuring instrument provides the electrician with an additional selector switch position for $V_{400K\Omega}$ with an input resistance of approx. 400 k Ω . This allows for the avoidance of negative influences from capacitive coupling during voltage measurements in power supply systems.

Effective value for distorted waveform

The built-in effective value transducer allows for effective value measurement (TRMS) independent of waveform for alternating magnitudes (AC).

Hold

By pressing the HOLD/ON key, the currently displayed measurement value can be held and "HOLD" is simultaneously displayed.

Min/Max

The minimum and maximum values which were present at the input of the measuring instrument after activation of the MIN MAX mode can be selectively 'retained' with the MIN MAX function. The most important application is the determination of the minimum or maximum value during long term observation of measurement quantities. MIN/MAX has no effect on the analog display; it continues to display the current measurement value.

Automatic/manual measuring range selection

The measurement quantities are chosen with the rotary selector switch. The measuring range is automatically adjusted to the measurement value. The measuring range can also be manually selected with the AUTO/MAN button.

Characteristic values for Rish Max 14

Meas. Function	Measuring Range	Resolution	Input Impedance 100 pF//X Ω		Digital display inherent deviation at reference condition $\pm(\dots\%$ of rdg. + \dots digits)	Overload capacity ¹⁾	
			V \rightleftharpoons / \sim	V $_{400K\Omega}$		Overload value	Overload Duration
V	400.0mV	100 μ V	>20M Ω	~400K Ω	0.75+2	720V \rightleftharpoons	Continuous
	4.000V	1mV	11M Ω	~400K Ω	0.5+2		
	40.00V	10mV	10M Ω	~400K Ω			
	400.0V	100mV	10M Ω	~400K Ω			
V $_{400K\Omega}$	600V	1V	10M Ω	~400K Ω	1.5+5 ³⁾	720V \sim effective sine	Continuous
	400.0mV ²⁾	100 μ V	>20M Ω	~400K Ω			
	4.000V ²⁾	1mV	11M Ω	~400K Ω			
	40.00V ²⁾	10mV	10M Ω	~400K Ω			
	400.0V ²⁾	100mV	10M Ω	~400K Ω			
A	40.00mA	10 μ A	450mV		0.8+2	480mA	Continuous
	400.0mA	100 μ A	1.5V				
A \sim	10.00A ⁶⁾	10mA	750mV		1.5+5	⁶⁾	⁶⁾
	40.0mA ²⁾	10 μ A	450mV		1+5 ³⁾	480mA	Continuous
	400.0mA ²⁾	100 μ A	1.5V		2+5 ³⁾	⁶⁾	⁶⁾
10.00A ^{6) 2)}	10mA	750mV					
			Approx. voltage drop at max. meas. current				

Diode and continuity testing

This provides for the testing of the polarity of diodes, as well as inspection for short-circuits and circuit interruptions. In addition to the display, resistance of less than 40 Ω are indicated with an acoustic signal.

Overload warning

An acoustic signal occurs, if the range limit value is exceeded.

Energy saving circuit

The instrument is switched off automatically if the measuring elements have been activated for a long time.



Protective cover for rough operating conditions

A protective cover of ABS with a built-in stand protects the instrument against jolts and falls. It also secures the test probes for one-hand operation, and allows for winding of the measurement cable which provides protection during transport.

Calibration

Rish max series multimeters are calibrated using Fluke 5500 & Wavetek 9100. These sources are calibrated at regular intervals.

Theft protection

Company name and name of the user can be entered into the field next to the display with an indelible etching needle for identification of the owner.

- Input resistance can be selected for voltage measurements.
- Direct and alternating voltages from 400mV ... 600V.
- Direct and alternating currents from 40mA ... 10A.
- Resistance from 400 Ω ... 40M Ω .
- Capacitance from 4nF ... 40 μ F with relative operation.
- Frequencies from 10Hz to 400KHz.
- Diode measurement and continuity testing.
- MIN, MAX and Hold measurement storage.

Meas. Function	Measuring Range	Resolution	Input Impedance 100 pF//XΩ	Digital display inherent deviation at reference condition +(...% of rdg. + ...digits)	Overload capacity ¹⁾	
			V $\overline{-}$ / ~ V _{400KΩ}		Overload value	Overload Duration
			Open - circuit voltage			
Ω	400.0Ω	100mΩ	approx. 0.5V	0.8+5	420 V DC/AC effective sine	10 min
	4.000KΩ	1Ω		—		
	40.00KΩ	10Ω		0.8+2		
	400.0KΩ	100Ω		1+5		
	4000KΩ	1KΩ		2+5		
	40.00MΩ	10KΩ				
BUZZER	400.0Ω	100mΩ		Acoustic signal for 0... < 40Ω		
DIODE	3.000V	1mV	approx. 3V	2+10		
F	4.000nF	1pF		3+40 ⁴⁾	420 V DC/AC effective sine	10 min
	40.00nF	10pF		3+10 ⁴⁾		
	400.0nF	100pF		3+10		
	4.000μF	1nF		5+10		
	40.00μF	10nF	fmin			
Hz ⁵⁾	100.00Hz	0.01Hz	10Hz	0.2+2	≤1KHz : 600V ≤10KHz : 400V ≤400KHz : 40V	Continuous
	1.0000KHz	0.1Hz	10Hz			
	10.000KHz	1Hz	10Hz			
	100.00KHz	10Hz	10Hz			
	400.0KHz	100Hz	100Hz			

- At 0°C ... + 40 °C
- Effective value measurement (TRMS) for *RISH Max 14* TRMS measurement is independent of waveform.
- The specified inherent deviation is valid for *RISH Max 14* from an indication of '0200'
- With zero adjustment 'REL' ; without zero adjustment +300 digits in 4nF range +30 digits in 40nF range
- Indication of the frequency measurement expanded up to 9999 digits.
- max. 10 A/30 min
12 A/5 min
16 A/30 sec

Reference Conditions

Ambient temperature	+ 23 °C ± 2 K
Relative humidity	45 % ... 55 %
Frequency of meas. quantity	Sine 50 Hz
Operating voltage	8 V ± 0.1 V
Battery	

Power Supply

Battery	9 V flat cell battery Zinc-carbon cell per IEC 6 F 22 Alkaline manganese dry cell per IEC 6 LR 61
Service life	Zinc-carbon cell: approx. 150 hours Alkaline manganese dry cell approx. 300 hours
Battery test	Automatic display of „ ” symbol when battery voltage falls below following value: approx. 7V

Fusing

Fuse for ranges up to 400 mA	FF 1.6 / 500 V; 6.3 mm x 32mm Breaking capacity 50 kA at 500 V ~ and non-reactive load, cos φ < 0.2; protects all current measuring ranges up to 400mA in connection with power diodes
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Fuse for
10 A range

FF 16A/ 500 V; 6.3 mm x 32 mm
breaking capacity 50 kA at 500 V
~ and non-reactive load, cos φ < 0.2

Ambient Conditions

Operating temperature range
Storage temperature range
Climate classification

-10 °C ... + 50 °C
- 25 °C ... + 70 °C
(without batteries)
2z/-10/50/70/75%
in correspondence with
VDI/VDE 3540
45 ... 75 %
up to 2000 m

Relative humidity
Elevation

Display

LCD display field (50 mm x 30 mm) with analog and digital display and with display of measurement unit, type of current and various special functions.

Digital

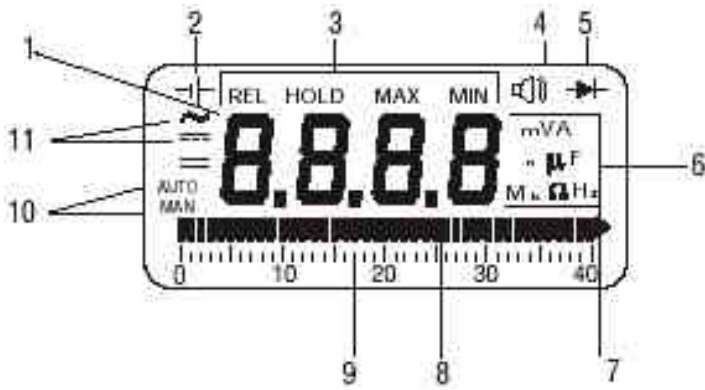
Display
Character height
Number of digits
Overflow display
Polarity display
Measurement rate

7 segment
10 mm
3/4 digit ≅ 3999 steps
,4000' with blinking ,4'
,-' sign is displayed when plus pole at , ⊥ '
3 measurement/s for V, I, Ω .
1 measurement/s for capacitive and frequency measurements..

Analog

Display
Scale length
Scaling
Polarity display
Overflow display
Measurement rate

LCD scale with bar graph display
40 mm
0...40 with 40 scale division with automatic reversal
Bar with triangle
20 measurement/s



RISH Max display

- 1 Digital display with comma and polarity display
- 2 Low Battery Indication
- 3 Display for REL and HOLD as well MIN MAX storage
- 4 Continuity test display: speaker symbol appears when acoustic signal is switched on
- 5 Display for diode measurement
- 6 Measurement unit display
- 7 Display for exceeding of measuring range
- 8 Indicator for analog display
- 9 Scale for analog display
- 10 Display for automatic or manual measuring range selection
- 11 Display for selected type of current (AC or DC)

Influence variables and effects

Influence variable	Influence range	Meas. Quantity / Meas. Range	Influence Effect	
Temperature	0 °C ... +21 °C and +25 °C ... +40 °C	V $\bar{\cdot}$	0.1 x intrinsic error / K	
		V \sim		
		A $\bar{\cdot}$		
		A \sim		
		Ω		
		F		
		Hz		
Waveform	Crest factor CF	1 ... 1.4	4, 40, 400V, mA, A ²⁾	$\pm 1\%$ of rdg.
		> 1.4 ... 5		$\pm 5\%$ of rdg.
Measuring Magnitude Waveform ¹⁾	The allowable crest factor CF of the alternating magnitude to be measured is dependent upon the displayed value:			

- 1) For unknown waveform (crest factor CF > 2) measurement to be made with manual range selection
- 2) Except for sine waveform

Influence variable	Influence range (max. resolution)	Frequency	Inherent Error at Ref. (...%rdg + ...digits)
Frequency V _{AC}	4, 40, 400V	20Hz ... <50Hz >50Hz ... 500Hz	2 + 3
	400mV, 600V	20Hz ... <50Hz >50Hz ... 100Hz	2 + 3

Influence Variable	Influence Range	Meas. Quantity / Meas. Range	Influence Effect
Relative humidity	55 ... 75%	V \approx	1 x Inherent error
		A \approx	
		Ω	
		F	
		Hz	

Influence Variable	Interference Magnitude	Meas. Quantity / Meas. Range	Attenuation	
Common Mode Interference Voltage	600V DC/AC 50Hz sinusoidal	All V DC	>100 dB	
	600V DC	All V DC	>100 dB	
	600V AC 50Hz sinusoidal	400mV / 4V AC		>80 dB
		40V AC		>63 dB
		400V AC		>43 dB
	600V /		23 dB	
Series - Mode Interference voltage	AC 50/60 Hz	V D	43 dB	
	MAX. 600V DC	V A	55 dB	

Aux. Voltage Influence (without $\bar{\cdot}$ display)

all ranges except AC : ± 5 D
AC range : ± 20 D

Applicable regulations and standards

IEC 1010-1 DIN EN 61010 Part 1 VDE 0411 - 1	Safety regulations for electrical measuring, control, regulation and laboratory devices
DIN 43751 IS 13875	Digital measuring instruments Digital measuring instruments
DIN EN 50081 Part 1	Generic emission standard residential, commercial and light industry
DIN EN 50082 Part 1	Generic immunity standard residential, commercial and light industry
VDI/VDE 3540	Reliability of measuring, control and regulation instruments
DIN EN 60529 DIN VDE 0470 Part 1	Test instruments and test procedures Degree of protection provided by enclosures (IP code)

Electrical safety

Protection class	II per IEC 1010-1/EN 61010-1/VDE 0411-1	
Overvoltage Classification	II	III
Nominal voltage	600 V	300 V
Contamination level	2	2
Test voltage	3.7 kV ~IEC 1010-1/EN 61010-1 VDE 0411-1	

Mechanical Design

Protection	Instruments: IP 50 Connector sockets: IP 20
Dimensions	W x H x D: 92 mm x 154 mm x 25 mm
Weight	Approx. 0.2 Kg with battery

Included equipment

- 1 Probe set
- 1 Multimeter
- 1 Copy Operating Instructions
- 1 Protective Case with tilt stand

Designation	Order Code
Analog-Digital multimeter with TRMS	33050
RISH Max Fuse 1.6A	42124
RISH Max Fuse 16A	42198
RISH Max Probe Set	42199
Safety cover RISHmax 14	42200



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