



# Data Sheet

## RISH Multi 12S...18S

Analog - Digital multimeters



Measure



Control



Record



Analyze

# Specifications RISH multi 12S... 16S

Meas. function	Measuring range						Resolution	Input impedance		Inherent deviation of the digital display ± (...% of meas. val. + ...digits) for reference condition					Overload capacity <sup>4)</sup>		Measuring function		
	RISHMulti	12S	13S	14S	15S	16S				12S	13S	14S	15S	16S	Overload value	Overload duration			
<b>V=</b>	30,00 mV	●	●	●	●	●	10 μV	> 10G Ω // < 40 pF	0,5 + 3 <sup>5)</sup>					1000 V	DC	cont.	<b>V=</b>		
	300,0mV	●	●	●	●	●	100 μV	> 10G Ω // < 40 pF	0,5 + 3										
	3,000 V	●	●	●	●	●	1 mV	11M Ω // < 40 pF	0,25 + 1										
	30,00 V	●	●	●	●	●	10 mV	10M Ω // < 40 pF	0,25 + 1										
	300,0 V	●	●	●	●	●	100 mV	10M Ω // < 40 pF	0,25 + 1										
	1000 V	●	●	●	●	●	1 V	10M Ω // < 40 pF	0,35 + 1										
<b>V~</b>	3,000 V	●	●	●	●	●1)	1 mV	11M Ω // < 40 pF	0,75 + 2(10... 300 D) 0,75 + 1 (> 300 D)					AC effective sinusoidal	cont.	<b>V~</b>			
	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											
<b>V<sub>~</sub></b>	3,000 V					●1)	1 mV	11M Ω // < 40 pF	---					0,75 + 3 (> 10 D)	cont.	<b>V<sub>~</sub></b>			
	30,00 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											
<b>Voltage drop. approx.</b>																			
<b>A=</b>	300,0 μA			●	●	●	100 nA	---	---	15 mV			1,0 + 5 (> 10D)		0,5 + 5 (> 10 D)	0,36 A	cont.	<b>A=</b>	
	3,000 mA	●	●	●	●	●	1 μA	15 mV	150 mV	150 mV			1,0 + 2		0,5 + 2				
	30,00 mA	●	●	●	●	●	10 μA	150 mV	150 mV	650 mV			0,25 + 2		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				
<b>A~</b>	3,000 mA			●	●		1 μA	---	---	150 mV			1,5 + 2 (> 10 D)		---	0,36 A	cont.	<b>A~</b>	
	30,00 mA	●	●				10 μA	150 mV	150 mV	---			---		---				
	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)		---				
<b>A<sub>~</sub></b>	30,00 A <sup>2)</sup>	●					10 mA	150 mV	---	---			1,5 + 2 (> 10 D)		---	0,36 A	cont.	<b>A<sub>~</sub></b>	
	300,0 A <sup>2)</sup>	●					100 mA	1 V	---	---			---		---				
<b>A<sub>~</sub></b>	3,000 mA					●1)	1 μA	---	---	150 mV			---		1,5 + 4 (> 10 D)	12 A	10 min	<b>A<sub>~</sub></b>	
	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)				
<b>No-load voltage</b>																			
<b>Ω</b>	30,00 Ω	●	●	●	●	●	10 m Ω	max. 3,2 V		0,5 + 3 <sup>5)</sup>					1000 V	DC	10 min	<b>Ω</b>	
	300,0 Ω	●	●	●	●	●	100 m Ω	max. 3,2 V		0,5 + 3									
	3,000 k Ω	●	●	●	●	●	1 Ω	max. 1,25 V		0,4 + 1									
	30,00 k Ω	●	●	●	●	●	10 Ω	max. 1,25 V		0,4 + 1									
	300,0 k Ω	●	●	●	●	●	100 Ω	max. 1,25 V		0,4 + 1									
	3,000 M Ω	●	●	●	●	●	1 k Ω	max. 1,25 V		0,6 + 1									
	30,00 M Ω	●	●	●	●	●	10 k Ω	max. 1,25 V		2,0 + 1									
<b>→</b>	2,000 V	●	●	●	●	●	1 mV	max. 3,2 V		0,25 + 1					0,1 + 1			<b>→</b>	
<b>F</b>								Discharge resistance	U <sub>0 max</sub>										
	30,00 nF					●	10 pF	250 k Ω	2,5 V	---					1,0 + 3 <sup>6)</sup>	1000 V DC / AC effective sinusoidal	10 min	<b>F</b>	
	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				
						●	10 nF	25 k Ω	2,5 V	---					3,0 + 3				
					●														
<b>Hz</b>							Sensor	F <sub>min</sub> V <sub>===</sub>	F <sub>min</sub> V <sub>~</sub>										
	300,0 Hz				●	●	0,1 Hz	1 Hz	45 Hz	---					0,5 + 1 <sup>8)</sup>	cont.	<b>Hz</b>		
	3,000 kHz				●	●	1 Hz	1 Hz	45 Hz	---									
	30,00 kHz					●	10 Hz	10 Hz	45 Hz	---									
						●	100 Hz	100 Hz	100 Hz	---									
100,0 kHz					●	100 Hz	100 Hz	100 Hz	---										
<b>%</b>	2,0... 98,0 %				●	●	0,1 %	1 Hz	---	---					1 Hz.....1kHz: ± 5 D <sup>9)</sup> 1Hz.....10kHz:±5 D/kHz <sup>9)</sup>		≤ 3 kHz: 1000V ≤ 30 kHz: 300V ≤ 100 kHz: 30 V	cont.	<b>%</b>
<b>°C</b>	- 200,0... + 200,0°C	●	●	●	●	●	0,1°C	Pt 100	---	---	2 Kelvin + 5 D <sup>10)</sup>					1000 V	DC	10 min	<b>°C</b>
	+ 200,0... + 850,0°C	●	●	●	●	●	0,1°C		---	---	1,0 + 5 <sup>10)</sup>								
	-100,0... + 200,0°C	●	●	●	●	●	0,1°C	Pt 1000	---	---	2 Kelvin + 2 D <sup>10)</sup>								
	+ 200,0 ... + 850,0°C	●	●	●	●	●	0,1°C		---	---	1,0 + 2 <sup>10)</sup>								

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

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

8) Range 3 V  $\approx$  U<sub>E</sub> = 1,5 V<sub>rms</sub> ... 100 V<sub>rms</sub>

30 V  $\approx$  U<sub>E</sub> = 15 V<sub>rms</sub> ... 300V<sub>rms</sub>

300 V  $\approx$  U<sub>E</sub> = 150 V<sub>rms</sub> ... 1000V<sub>rms</sub>

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

10) Without sensor



Measure



Control



Record



Analyze

# Specifications RISH multi 18S

Meas. function	Measuring range	Resolution	Input impedance		Inherent error of the digital display ± (...% of rdg.+... digits) at reference conditions		Overload capacity <sup>2)</sup>		Meas. function	
			—	— <sup>1)</sup> — <sup>1)</sup>	—	— <sup>1)</sup> — <sup>1)</sup>	Overload value	Overload duration		
<b>V</b>	300.00 mV	10 µV	>10 G Ω	5 M Ω // < 40 pF	0.05 + 3; 0.05 + 20 <sup>3)</sup>	1.0 + 30 (> 600 Digit)	1000 V DC AC RMS sinusoidal	cont.	<b>V</b>	
	3.0000 V	100 µV	11 M Ω	5 M Ω // < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)				
	30.000 V	1 mV	10 M Ω	5 M Ω // < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)				
	300.00 V	10 mV	10 M Ω	5 M Ω // < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)				
	1000.0 V	100 mV	10 M Ω	5 M Ω // < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)				
<b>dB</b>	See table below		—	as at V~	—	± 0.5 dB <sup>4)</sup>			<b>dB</b>	
			<b>Voltage drop. approx.</b>							
			—	— <sup>1)</sup>	—	— <sup>1)</sup>				
<b>mA</b>	300.00 µA	10 nA	15 mV	15 mV	0.2 + 20	1.2 + 30 (> 300 Digit)	0.36 A	cont.	<b>mA</b>	
	3.0000 mA	100 nA	150 mV	150 mV	0.2 + 10	1.2 + 30 (> 300 Digit)				
	30.000 mA	1 µA	30 mV	30 mV	0.05 + 10	1.2 + 50 (> 300 Digit)				
	300.00 mA	10 µA	300 mV	300 mV	0.2 + 10	1.2 + 30 (> 300 Digit)				
<b>A</b>	3.0000 A	100 µA	150 mV	150 mV	0.5 + 10	1.2 + 50 (> 300 Digit)	12A <sup>5)</sup>	5 min	<b>A</b>	
	10.000 A	1 mA	400 mV	400 mV	0.5 + 10	1.2 + 30 (> 300 Digit)				
			<b>No-load voltage</b>	<b>Short circuit current</b>						
<b>Ω</b>	300.00 Ω	10 m Ω	max. 4.00 V	max. 1 mA	0.1 + 6; 0.1 + 30 <sup>3)</sup>		1000 V DC AC RMS sinusoidal	1 min	<b>Ω</b>	
	3.0000 k Ω	100 m Ω	max. 1.25 V	max. 100 µA	0.1 + 6					
	30.000 k Ω	1 Ω	max. 1.25 V	max. 10 µA	0.1 + 6					
	300.00 k Ω	10 Ω	max. 1.25 V	max. 1 µA	0.1 + 6					
	3.0000 M Ω	100 Ω	max. 1.25 V	max. 0.1 µA	0.1 + 6					
	30.000 M Ω	1k Ω	max. 1.25 V	max. 0.1 µA	1.0 + 6					
<b>→ </b>	3.0000 V-	1mV	max. 4.00 V	—	0.2 + 3				<b>→ </b>	
			<b>Discharge resist.</b>	<b>U<sub>0max</sub></b>						
<b>F</b>	3.000 nF	1 pF	1.5 M Ω	4 V	1.0 + 8; 1.0 + 60 <sup>3)</sup>		1000 V DC AC RMS sinusoidal	1 min	<b>F</b>	
	30.00 nF	10 pF	1.5 M Ω	4 V	1.0 + 8; 1.0 + 30 <sup>3)</sup>					
	300.0 nF	100 pF	150 k Ω	4 V	1.0 + 3					
	3.000 µF	1 nF	150 k Ω	4 V	1.0 + 3					
	30.00 µF	10 nF	15 k Ω	2 V	1.0 + 3					
	300.0 µF	100 nF	1.5 k Ω	2 V	5.0 + 6					
	3000 µF	1 µF	1.5 k Ω	2 V	5.0 + 6					
	10000 µF	10 µF	1.5 k Ω	2 V	5.0 + 6					
			<b>f<sub>min</sub></b> <sup>6)</sup>							
<b>Hz</b>	300.00 Hz	0.01 Hz	10 Hz		0.1 + 3 <sup>7)</sup>	≤ 3 kHz; 1000 V	cont.	<b>Hz</b>		
	3.0000 kHz	0.1 Hz	10 Hz							
	30.000 kHz	1 Hz	10 Hz							
	100.00 kHz	10 Hz	100 Hz							
<b>°C</b>	Pt 100	- 200.0... + 100.0 °C	0.1 °C	—	—	0.5 Kelvin + 3 <sup>8)</sup>	1000 V DC AC rms sine	1 min.	<b>°C</b>	
		+ 100.0... + 850.0 °C	0.1 °C	—	—	0.5 + 3 <sup>8)</sup>				
	Pt 1000	- 100.0... + 100.0 °C	0.1 °C	—	—	—				0.5 Kelvin + 3 <sup>8)</sup>
		+ 100.0... + 850.0 °C	0.1 °C	—	—	—				0.5 + 3 <sup>8)</sup>

### dB ranges

Measuring ranges	Display span at reference voltage U = 0.775 V	Display span at reference voltage U <sub>ref</sub> (V)
300 mV ~ 3 V~	- 48 dB... - 8 dB	- 40 dB... + 110 dB
30 V~	- 38 dB... + 12 dB	- 60 dB... + 100 dB
300 V~	- 18 dB... + 32 dB	- 80 dB... + 80 dB
1000 V~	+ 2dB... + 52 dB	- 100 dB... + 60 dB
	+ 22 dB... + 63 dB	- 110 dB... + 40 dB
	Display (dB) = 20 lg U <sub>x</sub> (V) / 0.775 V	Display (dB) = 20 lg U <sub>x</sub> (V) / U <sub>ref</sub> (V)

1) TRMS measurement values < 100 digit (<500 digit for measuring range 300mV) will be suppressed

2) At - 10 °C... + 40 °C

3) With zero adjuster; without zero adjuster

4) At a resolution of 0.01 dB

5) 16 A for 30s

6) Lowest measurable frequency with a sinusoidal measuring signal which is symmetrical to zero

7) Range 3 V  $\overline{\sim}$  : U<sub>e</sub> = 1V<sub>eff/rms</sub> ... 10 V<sub>eff/rms</sub>

30 V  $\overline{\sim}$  : U<sub>e</sub> = 10V<sub>eff/rms</sub> ... 100 V<sub>eff/rms</sub>

300 V  $\overline{\sim}$  : U<sub>e</sub> = 100V<sub>eff/rms</sub> ... 1000 V<sub>eff/rms</sub>

8) Without sensor



Measure



Control



Record



Analyze