

# Ziegler

Redefine Innovative Metering

# Technical Datasheet

ZDM 1X3 series & 1730

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DIGITAL MULTIMETER

# ZDM 1X3 series & 1730

## DIGITAL MULTIMETER

[ZDM 123](#) | [ZDM 133](#) | [ZDM 134](#) | [ZDM 135](#) | [ZDM 136](#) | [ZDM 1730](#)

Ziegler 1x3 series & 1730 Digital Multimeters are designed to offer accuracy in measurement complimented with Reliability. 1x3 series & 1730 Digital Multimeters are industrial grade multimeters suitable for all industrial applications.

### Product Features

- Available in 3  $\frac{3}{4}$  digits & 3100 counts
- Available with 4  $\frac{3}{4}$  digits, 31000 counts in ZDM 1730
- Basic accuracy of 0.1% in Trms ZDM 163 & 0.25% in rest models
- Basic Accuracy of 0.05% in ZDM 1730
- Rugged, Reliable & Robust meters
- Automatic terminal blocking system (ABS) to avoid wrong connections & enhance safety
- Comes with protective holster for rough duty applications
- Auto Power OFF Facility
- Measurement of AC/DC voltage & current upto 1000V & 10A respectively
- Digital display with backlight & Analog bar graph
- Auto Ranging & Manual Ranging
- Measurement of Resistance, Capacitance, Frequency, Temperature
- Continuity Testing, Diode Test
- Min/Max & Data hold facility
- 3years warranty
- Basic accuracy of 0.1% in Trms ZDM 163 & 0.25% in rest models
- Current measurement upto 16A in ZDM 133
- Current measurement upto 300A in ZDM 123 with external clip on CT
- CAT IV 600V, CAT III 1000V protection in all models except ZDM 133 available with CAT II 1000V, CAT III 600V protection
- Power economizing circuit, the meter disconnects automatically when the measured value remains unchanged for about 10 minutes & no operating control was operated during this time
- ZDM 1730 comes with Event counter, measurement of the duration of the event, time counter (stop watch), data compare, dB measurement, wide-range capacitance measurement



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### Fact Sheet

<b>Display</b>	
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	
<b>Digital</b>	
Display	7 segment
Height of numerals	For ZDM 123....163: 15mm For ZDM 1730 : 12mm
Number of Counts	For ZDM 123....163: 3 ¾ digits 3100 counts For ZDM 1730 : 4 ¾ digits 31000 counts
Over range display	“OL” is displayed
Polarity display	“-” sign is displayed when positive pole at “⊥”
Sampling rate	2 readings/sec, On Ω, °C : 1 readings/s
<b>Analog</b>	
Indication	LCD scale with pointer
Scale length	55 mm on V $\equiv$ and A $\equiv$ ; 47 mm on all other ranges
Scaling	+5.....0.... ± 35 with 35 scales divisions on $\equiv$ 0.....30 with 30 scales division on all other range
Polarity Indication	With automatic reversal
Over range indication	By triangle
Sampling rate	20 readings/sec; On Ohms 10 readings/s
<b>Applied rules and standards</b>	
IEC 61010-1:2001 DIN EN 61010 part 1 VDE 0411 -1	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN 43751 IS 13875	Digital measuring instruments
EN 61326:2002	Generic emission standard; Residential, commercial & light industry
EN 61326:2002	Generic immunity standard; residential, commercial and light industry
VDI/VDE 3540	Reliability of measuring and control equipment
DIN EN 60529 DIN VDE 0470 part 1	Test equipment and test procedures -Degrees of protection provided by enclosures (IP Code)

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### Technical Specification ZDM 123...163

Meas. function	Measuring range					Resol- ution	Input impedance			Inherent deviation of the digital display ± (...% of meas. val. + ...digits) for reference condition					4) Overload capacity		Measuring function		
	ZDM	123	133	143	153		163	123	133	143	153	163	Overload value	Overload duration					
V <sub>DC</sub>	30.00 mV	●	●	●	●	●	10 μV	> 10G // < 40 pF			0.5 + 3 <sup>5)</sup>		0.5 + 3 <sup>5)</sup>		1000 V DC	cont.	V <sub>DC</sub>		
	300.0mV	●	●	●	●	●	100 μV	> 10G // < 40 pF			0.5 + 3		0.5 + 3						
	3.000 V	●	●	●	●	●	1 mV	11M // < 40 pF			0.25 + 1		0.1 + 1						
	30.00 V	●	●	●	●	●	10 mV	10M // < 40 pF			0.25 + 1		0.1 + 1						
	300.0 V	●	●	●	●	●	100 mV	10M // < 40 pF			0.25 + 1		0.1 + 1						
	1000 V	●	●	●	●	●	1 V	10M // < 40 pF			0.35 + 1		0.1 + 1						
V <sub>AC</sub>	3.000 V	●	●	●	●	●	1 mV	11M // < 40 pF			0.75 + 2(10... 300 D) 0.75 + 1 (> 300 D)		0.75 + 3 (> 10 D)		AC effective sinusoidal	cont.	V <sub>AC</sub>		
	30.0 V	●	●	●	●	●	10 mV	10M // < 40 pF											
	300.0 V	●	●	●	●	●	100 mV	10M // < 40 pF											
	1000 V	●	●	●	●	●	1 V	10M // < 40 pF											
	3000 V	●	●	●	●	●	1 mV	11M // < 40 pF											
V <sub>RES</sub>	3.000 V					●	1 mV	11M // < 40 pF			---		0.75 + 3 (> 10 D)		V <sub>RES</sub>				
	30.0 V					●	10 mV	10M // < 40 pF			---								
	300.0 V					●	100 mV	10M // < 40 pF			---								
	1000 V					●	1 V	10M // < 40 pF			---								
Voltage drop. approx.							123	133	143 / 153/163										
A <sub>DC</sub>	300.0 A					●	100 nA	---			---		1.0 + 5 (> 10D)		0.5 + 5 (> 10 D)		0.36 A	cont.	A <sub>DC</sub>
	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 <sub>AC</sub>	3.000 mA					●	1 μA	---			---		1.5 + 2 (> 10 D)		---		0.36 A	cont.	A <sub>AC</sub>
	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 (> 10 D)		---		---				
	10.00 A			16A	●	●	10 mA	---	300/270mV	270 mV	---		1.5 + 2 (> 10 D)		---				
A <sub>RES</sub>	30.00 A <sup>2)</sup>	●					10 mA	150 mV	---	---	1.5 + 2 (> 10 D)		---		---		0.36 A	cont.	A <sub>RES</sub>
	300.0 A <sup>2)</sup>	●					100 mA	1 V	---	---	---		---		---				
A <sub>RES</sub>	3.000 mA					●	1 μA	---	---	150 mV	---		---		1.5 + 4 (> 10 D)		12 A	10 min	A <sub>RES</sub>
	300.0 mA					●	100 μA	---	---	1 V	---		---		1.5 + 4 (> 10 D)				
	10.00 A					●	10 mA	---	---	270 mV	---		---		1.75 + 4 (> 10 D)				
	No-load voltage																		
Ω	30.00 Ω	●	●	●	●	●	10 mΩ	max. 3.2 V			0.5 + 3 <sup>3)</sup>		0.4 + 3 <sup>5)</sup>		1000 VDC/ AC effective sinusoidal	10 min	Ω		
	300.0 Ω	●	●	●	●	●	100 mΩ	max. 3.2 V			0.5 + 3		0.4 + 3						
	3.000 kΩ	●	●	●	●	●	1 Ω	max. 1.25 V			0.4 + 1		0.2 + 1						
	30.00 kΩ	●	●	●	●	●	10 Ω	max. 1.25 V			0.4 + 1		0.2 + 1						
	300.0 kΩ	●	●	●	●	●	100 Ω	max. 1.25 V			0.4 + 1		0.2 + 1						
	3.000 MΩ	●	●	●	●	●	1 kΩ	max. 1.25 V			0.6 + 1		0.4 + 1						
	30.00 MΩ	●	●	●	●	●	10 kΩ	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		▶				
F	Discharge resistance							U <sub>0 max</sub>											
	30.00 nF					●	10 pF	250 kΩ	2.5 V	---		---		1.0 + 3 <sup>6)</sup>		1000 V DC/AC effective sinusoidal	10 min	F	
	300.0 nF					●	100 pF	250 kΩ	2.5 V	---		---		1.0 + 3					
	3.000 μF					●	1 nF	25 kΩ	2.5 V	---		---		1.0 + 3					
	30.00 μF					●	10 nF	25 kΩ	2.5 V	---		---		3.0 + 3					
Sensor							F <sub>min</sub> V	F <sub>min</sub> V ~											
Hz	300.0 Hz					●	0.1 Hz	1 Hz	45 Hz	---		---		0.5 + 1 <sup>8)</sup>		≤ 3kHz: 1000V ≤ 30kHz: 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 <sup>9)</sup> 1Hz.....10kHz: ± 5 D/kHz <sup>9)</sup>				%	
°C	+ 200.0... + 200.0° C	●	●	●	●	●	0.1° C	Pt 100		---		2 Kelvin + 5 D <sup>10)</sup>		1000 VDC AC effective sinusoidal		10 min	°C		
	+ 200.0... + 850.0° C	●	●	●	●	●	0.1° C	Pt 100		---		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	Pt 1000		---		1.0 + 2 <sup>10)</sup>							

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- 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) ZDM 133 (Without 16 A fuse): 16 A Cont., 20A for 5 min;  
  
ZDM 143...163: 12A for 5 min ,16A for 30s
  
- 8) Range  $3V \sim U_s = 1.5 V_{rms} \dots 100 V_{rms}$   
  
 $30 V \sim U_s = 15 V_{rms} \dots 300 V_{rms}$   
  
 $300V \sim U_s = 150 V_{rms} \dots 1000 V_{rms}$
  
- 9) On the range  $3V \sim$  rectangular signal positive at one end  $5 \dots 15 V$ ,  $f = \text{const.}$ , not 163.84 Hz or  
  
integer multiple
  
- 10) Without sensor

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### Technical Specifications 1730

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

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### dB ranges

Measuring ranges	Display span at reference voltage $U = 0.775 \text{ V}$	Display span at reference voltage $U_{ref} (\text{V})$
300 mV ~ 3 V ~ 30 V ~ 300 V ~ 1000 V ~	- 48 dB... - 8 dB - 38 dB... + 12 dB - 18 dB... + 32 dB + 2dB... + 52 dB + 22 dB... + 63 dB	- 40 dB... + 110 dB -60 dB... + 100 dB - 80 dB... + 80 dB - 100 dB... + 60 dB - 110 dB... + 40 dB
	Display (dB) = $20 \log U_x(\text{V}) / 0.775 \text{ V}$	Display (dB) = $20 \log U_x(\text{V}) / U_{ref} (\text{V})$

- 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) 16A for 30s
- 6) Lowest measurable frequency with a sinusoidal measuring signal which is symmetrical to zero
- 7) Range: 3 V  $\overline{\sim}$  :  $U_e = 1\text{V eff/rms} \dots 10 \text{ V eff/rms}$   
30 V  $\overline{\sim}$  :  $U_e = 10\text{V eff/rms} \dots 100 \text{ V eff/rms}$   
300 V  $\overline{\sim}$  :  $U_e = 100\text{V eff/rms} \dots 1000 \text{ V eff/rms}$
- 8) Without sensor

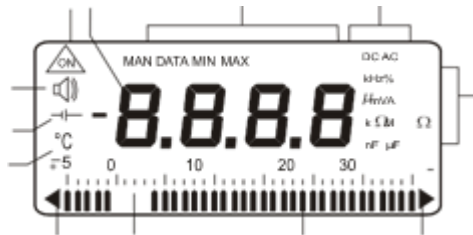
### Mechanical design

Protection	Meters: IP 50 Connector sockets: IP 20
Dimensions	<b>W x H x D</b> 84 mm x 195 mm x 35 mm
Weight	Approx. 0.35 Kg with battery
<b>Reference conditions for accuracy</b>	
Ambient Temperature	23°+2K
Relative Humidity	45%...55%
Frequency	45...65Hz
Waveform of measured quantity	Sinusoidal
Battery Voltage	8V + 0.1 V
<b>Environmental conditions</b>	
Operating temperature	For ZDM 123....163: -10....50°C; For ZDM 1730 : -20.....50°C;
Storage temperature	- 25 to +70°C(excl. batteries)
Climatic class	For ZDM 123....163: 2z/-10/50/70/75% with reference to VDI/VDE 3540; FOR ZDM 1730: 2z/-20/50/70/75% with reference to VDI/VDE 3540;
Altitude above sea level	Upto 2000m

# ZDM 1X3 series & 1730

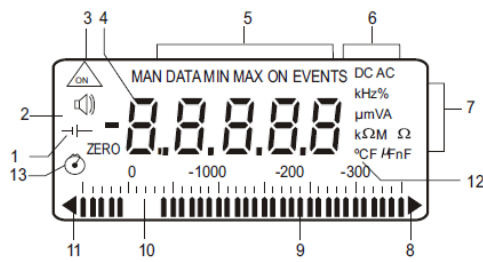
## DIGITAL MULTIMETER

### Display 123...163



- 1 Display with low battery voltage
- 2 Display with sound signal on
- 3 Digital display with indication of decimal point and polarity

### Display 1730



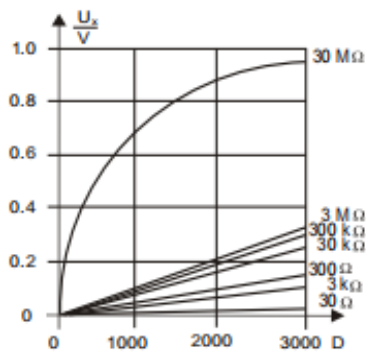
- 4 Display with manual range selection as well as with data and MIN/MAX hold
- 5 Display of the selected function
- 6 Display of the unit of measurement
- 7 Display with over range
- 8 Pointer for analog indication
- 9 Scale for analog indication
- 10 Indication that negative analog range is exceeded
- 11 Display of the unit OC when measuring temperature
- 12 Display with time counter switched on



# ZDM 1X3 series & 1730

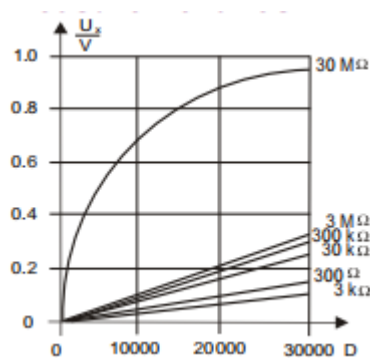
## DIGITAL MULTIMETER

### Measuring voltage with resistance measurement: ZDM 123....163



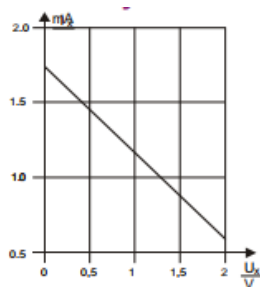
Voltage  $U_x$  across the resistance  $R_x$  to be measured as a function of measuring range and display.

### Measuring voltage with resistance measurement:1730



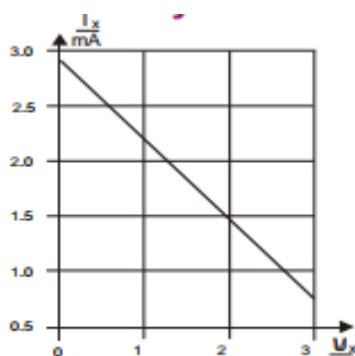
Voltage  $U_x$  across the resistance  $R_x$  to be measured as a function of measuring range and display.

### Measuring current with diode test and / or continuity test 123...163:



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

### Measuring current with diode test and / or continuity test 1730:



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

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## Influence Quantities and variations for ZDM 123 to 163

Influence quantity	Influence range	Measured quantity/ measuring range	Variation <sup>1)</sup> ± (...% of meas. val. +... digits)		
			123..143	153	163
Temperature	0 °C... + 21 °C and +25 °C... + 40 °C	30/300 mV —	1.0 + 3		1.0 + 1
		3... 300 V —	0.15 + 1		0.1 + 1
		1000 V —	0.2 + 1		0.1 + 1
		V ~	0.4 + 2		0.3 + 2
		300 μA <sup>2)</sup> ... 300 mA —	0.5 + 1		0.15 + 1
		3A / 10 (16) A —	0.5 + 1		
		A ~	0.75 + 1	0.75 + 3	
		30Ω <sup>2)</sup>	0.15 + 2		
		300Ω	0.25 + 2		0.15 + 2
		3 kΩ... 3 MΩ	0.15 + 1		0.1 + 1
		30 MΩ	1.0 + 1		0.6 + 1
		30 nF <sup>2)</sup> ... 3 μF	---	0.5 + 2	
		30 μF	---	2.0 + 2	
		Hz	---	0.5 + 1	
		%	---	+ 5 D	
	-200... + 200 °C	0.5 K + 2			
	+ 200... + 850 °C	0.5 + 2			
Frequency of the measured quantity	15 Hz... < 30 Hz	3 ... 300 V ~	---	---	1.0 + 3
	30 Hz... < 45 Hz		---	---	0.5 + 3
	> 65 Hz... 400Hz		2.0 + 3		0.5 + 3
	> 400 Hz... 1 kHz		2.0 + 3		1.0 + 3
	> 1kHz... 20 kHz	1000 V ~	---	---	2.0 + 3
	15 Hz... < 30 Hz		---	---	1.0 + 3
	30 Hz... < 45 Hz		---	---	0.5 + 3
	> 65 Hz... 1kHz	3.0 + 3		2.0 + 3	
	15 Hz... < 30 Hz	A ~	---	---	1.0 + 3
	30 Hz... <45 Hz		---	---	0.5 + 3
> 65 Hz... 1kHz	2.0 + 3		3.0 + 3		
Crest factor CF	1 ...3	V ~ 4), A ~ 4)	---	---	+ 1% of rdg.
	> 3 ...5		---	---	+ 3 % of rdg.
<p>The permissible crest factor CF of the AC quantity to be measured is a function of the displayed value :</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Waveform of the measured quantity <sup>3)</sup></p> <p>Voltage measurement</p> </div> <div style="text-align: center;"> <p>Current measurement</p> </div> </div>					

# ZDM 1X3 series & 1730

## DIGITAL MULTIMETER

Influence quantity	Influence range	Measured quantity / measuring range	Variation 123... 163
Battery voltage	$\text{-(}^{-5}) \dots < 7.9 \text{ V}$ $> 8.1 \text{ V} \dots 10.0 \text{ V}$	V =	$\pm 2 \text{ D}$
		V ~	$\pm 4 \text{ D}$
		A =	$\pm 4 \text{ D}$
		A ~	$\pm 6 \text{ D}$
		30 $\Omega$ / 300 $\Omega$ / °C	$\pm 4 \text{ D}$
		3 k ... 30 M $\Omega$	$\pm 3 \text{ D}$
		nF, $\mu\text{F}$	$\pm 1 \text{ D}$
		Hz	$\pm 1 \text{ D}$
		%	$\pm 1 \text{ D}$
Relative humidity	75 % 3 days Meter off	V = A = F Hz % °C	1x Intrinsic error
		DATA	$\pm 1 \text{ D}$
MIN / MAX		V = , A =	$\pm 2 \text{ D}$

- 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 With unknown waveform (crest factor CF > 2), the measurement must be made with manual range selection.
- 4 Except for sinusoidal waveform
- 5 From the time the symbol “ $\text{-(}^{-5})$ ” appears

# ZDM 1X3 series & 1730

## DIGITAL MULTIMETER

### Influence Quantities and variations for 1730

Influence quantity	Influence range	Measured quantity / measuring range <sup>1)</sup>	Variation <sup>2)</sup> ± (...% of meas. val. + ... digits)
Temperature	- 10 °C... + 21 °C and +25 °C... + 40 °C	V =	0.05 + 3
		V ~, V =	0.2 + 30
		300 µA / 3 mA	0.2 + 3
		30 mA =	0.1 + 3
		300 mA... 10 A =	0.2 + 3
		300 µA... 300 mA =	0.3 + 30
		3A / 10 A =	0.5 + 30
		300Ω	0.1 + 5
		3 k ... 3 MΩ	0.1 + 3
		30 MΩ	0.6 + 3
		30 nF... 3 µF	0.5 + 3
		30 µF	2.0 + 3
		Hz	0.1 + 3
		-200... + 100 °C	0.5 Kelvin + 2 D
+ 100... + 850 °C	0.5 + 2		
Frequency of the measured quantity	15 Hz... < 45 Hz	300 mV ~	1.0 + 20
	65 Hz... < 200 Hz		1.4 + 20
	> 15 Hz... < 30 Hz	3... 300 V ~	1.0 + 20
	> 30 Hz... < 45 Hz		0.5 + 20
	> 65 Hz... 400 Hz		1.0 + 20
	> 400 Hz... 1 kHz		2.0 + 20
	> 1 k Hz... 20 kHz		1.0 + 20
	15 Hz... < 30 Hz	1000 V ~	0.5 + 20
	30 Hz... < 45 Hz		2.0 + 20
	> 65 Hz... 1 kHz		1.0 + 20
	15 Hz... < 45 Hz	A ~	1.0 + 20
	> 65 Hz... 1 kHz		1.0 + 20
	Crest Factor 1...3	V ~ 4), A ~ 4)	± 1% of rdg.
	> 3...5		± 3% of rdg.

The permissible crest factor CF of the AC quantity to be measured is a function of the displayed value:

Waveform of the measured quantity<sup>3)</sup>

Voltage measurement

Current measurement

# ZDM 1X3 series & 1730

## DIGITAL MULTIMETER

Influence quantity	Influence range	Measured quantity / measuring range	Variation
Battery voltage	$\pm 5\%$ ... < 7.9 V > 8.1 V ... 10.0V	V $\bar{=}$	$\pm 6 D$
		V $\sim$	$\pm 30 D$
		A $\bar{=}$	$\pm 30 D$
		A $\sim$	$\pm (1\% \text{ of rdg.} + 10D)$
		$\Omega$	$\pm 10 D$
		3 nF... 30 $\mu$ F	$\pm 10 D$
		Hz	$\pm 6 D$
		$^{\circ}$ C	$\pm 5 D$
Relative humidity	75 % 3 days Meter off	V, dB, A, $\Omega$ , F, Hz $^{\circ}$ C	1x inherent deviation
DATA		V, dB, A, $\Omega$ , F, Hz	$\pm 20 D$
		F	$\pm 2 D$
MIN / MAX		V, dB, A, $\Omega$ , F, Hz	$\pm 10 D$
		$^{\circ}$ C, F	$\pm 1 D$

- 1 with zero setting
- 2 With temperature; Error data is per 10 K change in temperature. With frequency; Error data is valid from a display of 10% of the measuring range.
- 3 With unknown waveform (crest factor CF > 2), the measurement must be made with manual range selection.
- 4 Except for sinusoidal waveform
- 5 From the time the symbol “-|-” appears

### Scope of Delivery

- 1 Multimeter
- 1 Probe set
- 1 Copy Operating Instructions
- 1 Rubber holster with tilt stand and carrying strap warranty card
- 1 9V Battery

# Ziegler

Redefine Innovative Metering

**Ziegler Instrumentation UK Ltd.**

Central Buildings, Woodland close old woods Trading Estate, Torquay Devon, TQ2 7BB, United Kingdom  
+441803 616 800 | [info@ziegler-instrument.com](mailto:info@ziegler-instrument.com) | [ziegler-instrument.com](http://ziegler-instrument.com)