



500,000 COUNTS AUTORANGING TRUE RMS DIGITAL MULTIMETER WITH VFD FEATURE & PC INTERFACE

19 FUNCTIONS 59 RANGES

Model KM 869

SPECIAL FEATURES :

- Beep-Jack Audible & Visible Input Warning
- 41 Segment Analog Bar-graph
- Relative Zero Mode
- PC Interface Capability
- VFD-V & VFD-Hz readings
- Crest (Instantaneous Peak Hold) function
- T1-T2 differential Temperature readings.
- 500,000 counts stable DCV mode

FEATURES :

- DC Voltage Basic Accuracy 0.02%
- AC; AC+DC True RMS Conversion AC. AC+DC Voltage Bandwidth upto 100kHz (V) & 10kHz (A)
- 5-4/5 Digit 500,000 counts large easy to read LCD Dual display with white Backlight
- Fast Measurements, 5/sec; Fully Auto-Ranging
- Record MAX, MIN & AVG. Readings
- MAX & MIN readings & Data Hold Function
- dBm function with 20 selectable values
- High speed Capacitance measurement
- 1000V General Input Protection
- Logic & Line Level Frequency
- Logic Level Duty Cycle Readings & Diode Tester
- Fast Audible Continuity & Diode tester
- Auto Power Off

GENERAL SPECIFICATIONS

- * **Sensing** : AC, AC+DC True RMS
- * **Display** :
4-4/5 Digits 50,000 counts fast mode.
Selectable stable mode
5-4/5 Digits 500,000 counts for DC Voltage & 5 digits 99,999 counts for Hz
- * **Polarity** : Automatic
- * **Update Rate** :
4-4/5 Digits fast mode: 5 per second nominal;
5-4/5 Digits stable mode : 1.25 per second nominal;
41 Segments Bar-graph : 60 per second max
- * **Operating Temperature** : 0°C to 45°C
- * **Relative Humidity** : Max. 80% R.H. for Temperature up to 31°C decreasing linearly to 50% R.H. at 45°C
- * **Pollution degree** : 2
- * **Storage Temperature** : -20°C to 60°C, <80% R.H. (with battery removed)
- * **Altitude** : Operating below 2000m
- * **Temperature Coefficient** : nominal 0.15 x (specified accuracy)/°C @ (0°C ~ 18°C or 28°C ~ 45°C), or otherwise specified
- * **Power Consumption** :
6.5mA typical; 8mA for VFD ranges
- * **Low Battery** : Below approx 7V
- * **APO Timing** : Idle for 17 minutes
- * **APO Consumption** : 70 A typical
- * **Power Supply** : Single 9V battery
- * **Weight** : Approx. 635gm with holster
- * **Dimension** : 208(L) x 103(W) x 64.5(H) mm with holster.

ACCESSORIES :

Test lead (pair), Holster, Battery installed, User Manual, Carrying case, One BKP60 banana plug type-K Thermocouple.

SAFETY :

- Double insulation per IEC61010-1 2nd Ed., EN61010-1 2nd Ed., UL61010-1 2nd Ed., & CAN/CSA C22.2 No. 61010.1-0.92 to Category IV 1000V AC & DC.
- **Transient Protection** : 12 kV (1.2/50 s surge)
- **Terminals (to COM) Measurement Category** :
V/A/mA A : CAT IV 1000V AC & DC
- **Overload Protection** :
A & mA : 0.44A/1000V, IR 10kA or better, F Fuse
A : 11A/1000V, IR 20kA or better, F Fuse
V, mV, & Others : 1050Vrms, 1450Vpeak
- **EMC** : Meets EN61326-1:2006 (EN55022, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11)
In an RF field of 3V/m :
Capacitance function is not specified
Other function ranges :
Total Accuracy = Specified Accuracy + 100 dgts
Performance above 3V/m is not specified.
- Rugged fire retarded casing with battery access door
- Replaceable protective holster with probe-holders & Tilt-stand.
- 1000V (Ohm, Capacitance & all other Functions) Input protection.
- 1000V High Breaking Capacity fuses protection on Current inputs.
- LVD meets EN61010-1 CAT IV 1kV.



Software CD

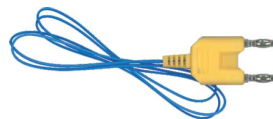
OPTIONAL ACCESSORIES :

PC interface kit, Bkb32 banana pins to K-type socket plug adaptor & Magnetic Hanger.

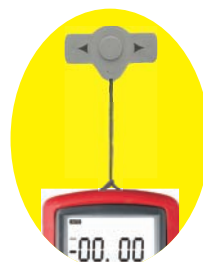
Current Clamp CA300, Current Clamp Adaptor CA500, CA1000, CA2000, High Voltage Probe PD-28.



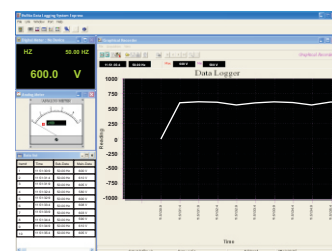
Software Cable



Thermocouple



Magnetic Hanger



Software



Fuse

Accuracy is (%readings digits+number of digits) or otherwise specified, at 23°C±5°C & less than 75% R.H. True RMS Voltage & Current accuracies are specified from 5% to 100% of range or otherwise specified. Maximum Crest Factor < 3:1 at full scale & <6:1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

DC VOLTAGE

Range	Resolution	Accuracy *
500.00 mV	10 V	±(0.02%rdg+2dgts)
5.0000 V	100 V	±(0.02%rdg+2dgts)
50.000 V	1 mV	±(0.03%rdg+2dgts)
500.00 V	10 mV	±(0.04%rdg+2dgts)
1000.0 V	100 mV	±(0.15%rdg+2dgts)

* In 500,000 mode the basic resolution is 1 V

NMRR : >60dB @ 50/60Hz

CMRR : >120dB @ DC, 50/60Hz, Rs=1k

Input Impedance : 10M , 60pF nominal
(80pF nominal for 500mV range)

AC, DC^{AC} & AC+DC^{AC} VOLTAGE

Range	Resolution	Accuracy *
20Hz ~ 45Hz		
500.00 mV	10 V	±(1.5%rdg+40dgts)
5.0000 V	100 V	±(1.5%rdg+40dgts)
50.000 V	1 mV	±(1.5%rdg+40dgts)
500.00 V	10 mV	Unspec'd
1000.0 V	100 mV	Unspec'd
DC, 45Hz ~ 300Hz		
500.00 mV	10 V	±(0.35%rdg+20dgts)
5.0000 V	100 V	±(0.8%rdg+30dgts)
50.000 V	1 mV	±(0.8%rdg+30dgts)
500.00 V	10 mV	±(0.5%rdg+40dgts)
1000.0 V	100 mV	±(0.5%rdg+40dgts)
300Hz ~ 5kHz		
500.00 mV	10 V	±(0.35%rdg+20dgts)
5.0000 V	100 V	±(0.5%rdg+40dgts)
50.000 V	1 mV	±(0.5%rdg+40dgts)
500.00 V	10 mV	±(0.5%rdg+40dgts)
1000.0 V	100 mV	±(0.8%rdg+40dgts) (300Hz ~ 1kHz)
5kHz ~ 20kHz		
500.00 mV	10 V	±(0.5%rdg+30dgts)
5.0000 V	100 V	±(0.8%rdg+40dgts)
50.000 V	1 mV	±(0.8%rdg+40dgts)
500.00 V	10 mV	±(0.5%rdg+40dgts)
1000.0 V	100 mV	Unspec'd
20kHz ~ 100kHz		
500.00 mV	10 V	±(2.5%rdg+40dgts)
5.0000 V	100 V	±(4.0%rdg+40dgts)**
50.000 V	1 mV	±(4.0%rdg+40dgts)**
500.00 V	10 mV	Unspec'd
1000.0 V	100 mV	Unspec'd

* From 5% to 10% of range : Specified accuracy + 80 dgts

** From 5% to 10% of range : Specified accuracy + 180 dgts

From 10% to 15% of range : Specified accuracy + 100 dgts

CMRR : >75dB @ DC to 60Hz, Rs=1k

Input Impedance : 10M , 60pF nominal
(80pF nominal for 500mV range)

Residual reading less than 50 digits with test leads shorted.

DC LOOP CURRENT %4~20mA

4mA : 0% (zero)
20mA : 100% (span)
Resolution : 0.01%
Accuracy : ±25d

DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
500.00 A	10 nA	±(0.15%rdg+20dgts)	0.15 mV/ A
5000.0 A	100 nA	±(0.1%rdg+20dgts)	0.15 mV/ A
50.000 mA	1 A	±(0.15%rdg+20dgts)	3.3 mV/mA
500.00 mA	10 A	±(0.15%rdg+30dgts)	3.3 mV/mA
5.0000 A	100 A	±(0.5%rdg+20dgts)	45 mV/A
10.000 A*	1 mA	±(0.5%rdg+20dgts)	45 mV/A

*10A continuous, >10A to 20A for 30 second max with 5 minutes cool down interval

AC, DC^{AC} & AC+DC^{AC} CURRENT

Range	Resolution	Accuracy	Burden Voltage
DC, 50Hz ~ 60Hz			
500.00 A	10 nA	±(0.5%rdg+50dgts)	0.15 mV/ A
5000.0 A	100 nA	±(0.5%rdg+50dgts)	0.15 mV/ A
50.000 mA	1 A	±(0.5%rdg+50dgts)	3.3 mV/mA
500.00 mA	10 A	±(0.5%rdg+50dgts)	3.3 mV/mA
5.0000 A	100 A	±(0.5%rdg+50dgts)	45 mV/A
10.000 A*	1 mA	±(0.5%rdg+50dgts)	45 mV/A
40Hz ~ 1kHz			
500.00 A	10 nA	±(0.7%rdg+50dgts)	0.15 mV/ A
5000.0 A	100 nA	±(0.7%rdg+50dgts)	0.15 mV/ A
50.000 mA	1 A	±(0.7%rdg+50dgts)	3.3 mV/mA
500.00 mA	10 A	±(0.7%rdg+50dgts)	3.3 mV/mA
5.0000 A	100 A	±(0.7%rdg+50dgts)	45 mV/A
10.000 A*	1 mA	±(0.7%rdg+50dgts)	45 mV/A
1kHz ~ 10kHz			
500.00 A	10 nA	±(2.0%rdg+50dgts)	0.15 mV/ A
5000.0 A	100 nA	±(2.0%rdg+50dgts)	0.15 mV/ A
50.000 mA	1 A	±(2.0%rdg+50dgts)	3.3 mV/mA
500.00 mA	10 A	±(2.0%rdg+50dgts)	3.3 mV/mA
5.0000 A	100 A	Unspec'd	45 mV/A
10.000 A*	1 mA	Unspec'd	45 mV/A

*10A continuous, >10A to 20A for 30 second max with 5 minutes cool down interval

~Hz LINE LEVEL FREQUENCY

AC Function Range	Sensitivity (Sine RMS)	Range
500 mV	100 mV	10Hz ~ 200kHz
5 V	0.5 V	10Hz ~ 200kHz
50 V	5 V	10Hz ~ 100kHz
500 V	50 V	10Hz ~ 100kHz
1000 V	500 V	10Hz ~ 10kHz
VFD 5 V	0.5V ~ 2 V*	10Hz ~ 440Hz
VFD 50 V	5V ~ 20 V*	10Hz ~ 440Hz
VFD 500 V	50V ~ 200V*	10Hz ~ 440Hz
500 A	50 A	10Hz ~ 10kHz
5000 A	500 A	10Hz ~ 10kHz
50 mA	5 mA	10Hz ~ 10kHz
500 mA	50 mA	10Hz ~ 10kHz
5 A	1 A	10Hz ~ 3kHz
10 A	10 A	10Hz ~ 3kHz

Accuracy : 0.02% + 4d

*VFD sensitivity linearly decreases from 200Hz to 440Hz

All specifications are subject to change without prior notice.

VFD AC VOLTAGE

Range	Resolution	Accuracy *
5Hz~20Hz		
5.0000 V	100 V	±(3%rdg+80dgts)
50.000 V	1 mV	±(3%rdg+80dgts)
500.00 V	10 mV	±(3%rdg+80dgts)
1000.0 V	100 mV	±(3%rdg+80dgts)
20Hz~200Hz		
5.0000 V	100 V	±(2%rdg+50dgts)
50.000 V	1 mV	±(2%rdg+50dgts)
500.00 V	10 mV	±(2%rdg+50dgts)
1000.0 V	100 mV	±(2%rdg+50dgts)
200Hz~440Hz		
5.0000 V	100 V	±(6%rdg+80dgts)**
50.000 V	1 mV	±(6%rdg+80dgts)**
500.00 V	10 mV	±(6%rdg+80dgts)**
1000.0 V	100 mV	±(6%rdg+80dgts)**

* Not specified for fundamental frequency >440Hz

**Accuracy linearly decreases from 2% + 50d @ 200Hz to 6%+80d @ 440Hz

dBm

Range & Accuracy are subjected to ACmV, ACV & reference impedance selected. Typical 600 reference impedance ranges:

At ACmV : -29.83dBm to -03.80dbm

At ACV : -01.09dBm to 62.22dBm

Input Impedance : 10M , 60pF nominal

Selectable reference impedance of 4, 8, 16, 32, 50, 75, 93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000 & 1200

CREST MODE (Instantaneous Peak Hold)

Accuracy : Specified accuracy ± 100 digits for changes >0.8ms in duration

Hz LOGIC LEVEL FREQUENCY

Range	Accuracy
5.000Hz ~ 1.0000MHz	0.002% + 4d

Sensitivity : 2.5Vp square wave

T1-T2 DUAL TYPE-K TEMPERATURE

Range	Accuracy*
-50.0°C to 1000.0°C	0.3% + 1.5°C
-58.0°F to 1832.0°F	0.3% + 3.0°F

* Thermocouple accuracy not included

Supplied thermocouple suitable for measurement upto 250°C.

OHMS

Range	Resolution	Accuracy
500.00	10 m	±(0.07%rdg+10dgts)
5.0000 k	100 m	±(0.07%rdg+2dgts)
50.000 k	1	±(0.1%rdg+2dgts)
500.00 k	10	±(0.1%rdg+2dgts)
5.0000 M	100	±(0.3%rdg+6dgts)
50.000 M	1 k	±(2.0%rdg+6dgts)
99.99 nS*	0.01 nS	±(2.0%rdg+10dgts)

Open Circuit Voltage : <1.3V DC (<3V DC for 500 range)

*From 0% to 10% of range : Specified accuracy + 30dgts

CAPACITANCE

Range	Resolution	Accuracy *
50.00 nF	10 pF	±(0.8%rdg+3dgts)
500.0 nF	100 pF	±(0.8%rdg+3dgts)
5.000 F	1 nF	±(1.5%rdg+3dgts)
50.00 F	10 nF	±(2.5%rdg+3dgts)
500.0 F**	100 nF	±(3.5%rdg+3dgts)
5.000 mF**	1 F	±(5.0%rdg+5dgts)
25.00 mF**	10 F	±(6.5%rdg+5dgts)

*Accuracies with film capacitor or better

**In manual-ranging mode, measurements not specified below

45.0 F / 0.450mF / 4.50mF (450 counts) for 500.0 F / 5.000mF / 25.00mF ranges respectively

%DUTY CYCLE

Range	Accuracy
0.1% ~ 99.99%	3d/kHz + 2d

Input Frequency : 5Hz -- 500kHz,
5V Logic Family

AUDIBLE CONTINUITY TESTER

Audible threshold	between 20 and 200
Response time	<100 s

DIODE TESTER

Range	2.0000V
Accuracy	1% + 1d
Test Current (Typical)	0.4mA
Open Circuit Voltage	<3.5V DC

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