Thsinde 18B+ Review

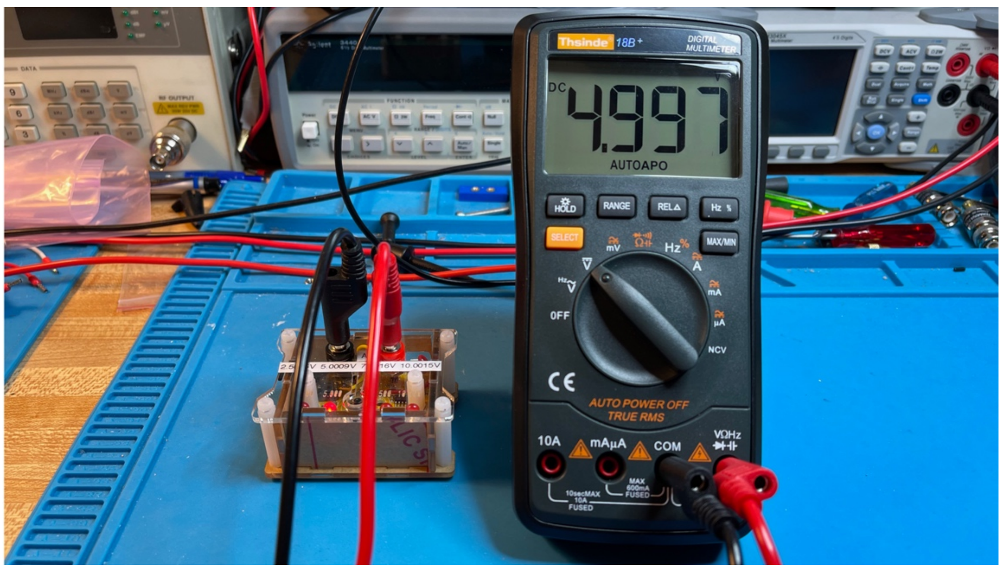
Introduction

Hi, I am Tom, amateur radio call sigh N8FDY. This is a review of the Thsinde 18B+ multimeter for use in hobby electronic project primarily related to amateur radio.

Disclaimer

I am not a professional, I am a hobbyist. This review is not sponsored; I bought this multimeter with my own money. I only used and tested this multimeter in CAT I and CAT II environments. I do not have a way to review or test the safety of this meter. I leave the CAT III and CAT IV environments to trained and licensed professionals.   It may seem like I am a Fluke fan boy, but I recognize their flaws along with their advantages. There may be unintended mistakes and/or errors in this review.

Overview



I am testing and demonstrating this Thsinde 18B+ multimeter that I purchased from Amazon.com for $20.95. I only used it in a CAT I and CAT II environment.

CAT I is for measurements on circuits not directly connected to mains. For example, battery operated electronics, or radio gear connected to 13V DC power supply.

CAT II is for measurements performed on circuits directly connected to the 120V (240V in some countries) power outlets at least 15 feet from the distribution panel. For example, your 120V AC to 13V DC power supply or a vintage piece of ham radio gear we lovingly call “boat anchors” that plug into a 120V AC outlet.

First, we will look at the features of the multimeter, then we will look at the accuracy of the meter. We will then go over the ergonomics. We will wrap up with the pros, cons and conclusion.

I will not be using the test leads that came with the meter. I have not liked any test leads that came with multimeters except the Fluke TL175 TwistGuard® test leads that were bundled with the Fluke 87V MAX. I also use Probe Master Series 8000 Test Leads.

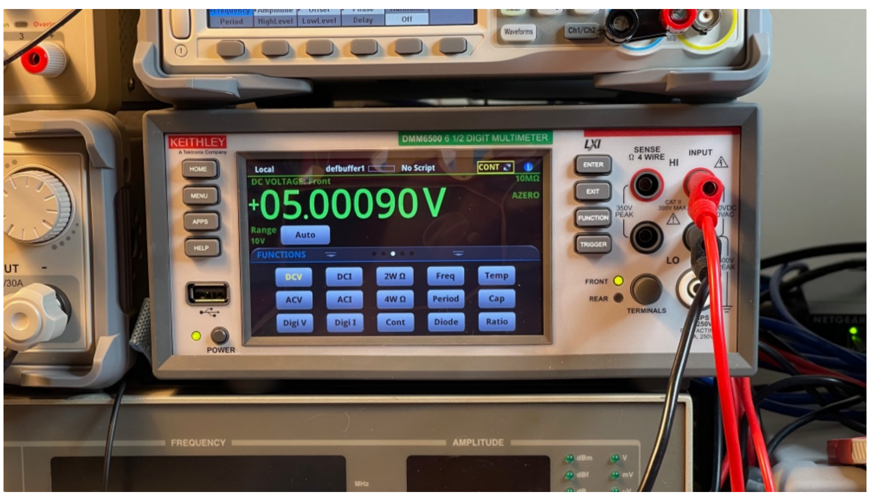
Objectives

This review was produced to help you decide if the Thsinde 18B+ multimeter will fit your purpose and budget. This is part of a series of multimeters reviews.
A good multimeter for hobby electronic projects should be able to measure millivolts, volts, microamps, milliamps, amps, ohms, nanofarads and microfarads.
If you want to measure picofarads, nanohenry, microhenry or reactance you will need a LCR meters. I cover the two LCR meters I own in another review.

Features

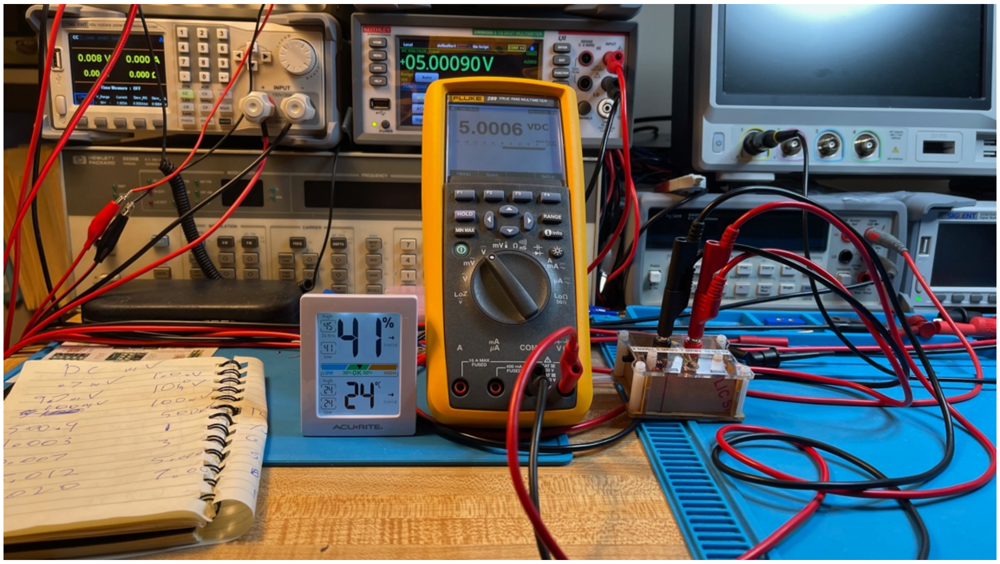
- 6,000 Count
- Basic DC Accuracy ±(0.5% + 3)
- True-RMS
- Min/Max
- Rel/Delta
- Non-contact Voltage sensor (NVC)
- Extra Set of Test Leads and Alligator Clips
- 9V Battery Included
- 30-day return from Amazon

Accuracy



I do not have reference standards, instead I use a Keithley DMM6500 6.5 digit bench multimeter that was calibrated recently to measure voltages, currents, resistances and capacitances. I take a reading from the Keithley and based on the Keithley stated tolerance for that range and reading, I compute the lowest and highest value the reading could be, then I take the meter under test and take a reading. I calculate the meter under test reading uncertainty value and subtract it from the lowest value and add it to the highest value and if the reading is within the range of the lower and higher limits it meets meters under test accuracy specification.
For example, I have a voltage source that is 5 Volts. I take a reading with the Keithley and I get a value of 5.00090 and based on the Keithley specifications for that range ±(0.0025% of reading + 0.0005% of range), that value could be anywhere from 5.00072 to 5.00108. I then use the meter under test (for this example my Fluke 289, my most accurate hand help meter) reading of 5.0006. The Fluke 289's accuracy at this range is ±(0.025% of reading + 2 least significant digits) for an uncertainty value of 0.00145015 Volts. So, subtracting this from the lowest value the Keithley reading gives us 4.99927V for the low value limit and adding to the

highest value the Keithley gives us 5.00253V for the high value limit. The meter under test reading (5.0006) is within the limits, so the meter under test meets it accuracy target for 5 volts.



DC Volts

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
1 mVDC	1.04	0.5% + 3	0.0352	0.96127	1.03873
10 mVDC	10.00	0.5% + 3	0.35	9.6462	10.3538
100 mVDC	100.00	0.5% + 3	0.8	99.1935	100.8065
500 mVDC	500.00	0.5% + 3	2.8	497.1815	502.8185
1 VDC	1.000	0.5% + 3	0.008	0.99197	1.00803
2.50053 VDC	2.498	0.5% + 3	0.01549	2.48492749	2.51613251
3 VDC	3.000	0.5% + 3	0.018	2.981875	3.018125
5.00089 VDC	4.997	0.5% + 3	0.027985	4.97272998	5.02905002
5.009 VDC	4.998	0.5% + 3	0.02799	4.98083478	5.03716523
7 VDC	6.99	0.5% + 3	0.06495	6.934825	7.065175
7.50158 VDC	7.49	0.5% + 3	0.06745	7.43389246	7.56926754
10.00148 VDC	10.00	0.5% + 3	0.07999	9.92118996	10.08177
106.1043 VDC	105.9	0.5% + 3	0.8295	105.269956	106.938644
209.039 VDC	208.8	0.5% + 3	1.344	207.680638	210.397362
307.801 VDC	307.4	0.5% + 3	1.837	305.945688	309.656312
417.995 VDC	417.5	0.5% + 3	2.3875	415.58478	420.40522
522.050 VDC	521.3	0.5% + 3	2.9065	519.116618	524.983382
652.581 VDC	651	0.5% + 3	6.255	646.293897	658.868103

The meter met its accuracy specifications for all the DC voltages I tested. The uniform 0.5% + 3 specification over the entire voltage range is very good for a $21 meter.

VDC Input	11 MΩ
mVDC input	20 MΩ

The VDC range input resistance is right in line with most meters. The mVDC range is twice as high as most meters in this group, which is good, so the meter is less likely to load down a high impedance circuit when checking millivolts.

AC Volts

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
100Hz Squarewave					
4.99899 VAC	4.956	0.8% + 5	0.044648	4.954352	5.043648
60 Hz Sinewave					
1.02 mVAC	1.02	0.8% + 5	0.50816	0.481228	1.558772
10 mVAC	10.04	0.8% + 5	0.58032	9.38368	10.61632
100.7 mVAC	100.1	0.8% + 5	1.3008	99.30878	102.09122
500 mVAC	500.5	0.8% + 5	4.504	494.896	505.104
1.000 VAC	1.000	0.8% + 5	0.013	0.9861	1.0139
3.012 VAC	3.001	0.8% + 5	0.029008	2.9781848	3.0458152
5.010 VAC	5.015	0.8% + 5	0.04512	4.958874	5.061126
7.003 VAC	7.00	0.8% + 5	0.106	6.8897982	7.1162018

The meter met its accuracy specifications for all the AC voltages I tested. In the group of 6,000 count meters I tested, the Thsinde 18B+ meters ACV accuracy is second only to the Fluke 87V and 87V MAX. That is very good for a $21 meter.

ACV 1V 3dB cutoff	3 kHz

The low frequency of the cutoff is typical of low-cost meters.

Current

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
AC 100Hz Squarewave					
0.999 mA	0.98	2.0%+30	0.0496	0.949	1.049
DC					
0.896 µA	0.9	0.8% + 10	1.0072	0	1.9041032
9.217 µA	9.1	0.8% + 10	1.0728	8.13955235	10.29444765
99.03 µA	98.5	0.8% + 10	1.788	97.1924365	100.8675635
131.86 µA	131.6	0.8% + 10	2.0528	129.747813	133.972187
1.0088 mA	1.000	2% + 30	0.32	0.68829604	1.32930396
9.9917 mA	9.99	2% + 30	0.4998	9.48940166	10.49399834
99.415 mA	99.1	2% + 30	4.982	94.408117	104.421883
1.000 A	1.003	2% + 30	0.05006	0.94949	1.05051
3.000 A	3.000	2% + 30	0.09	2.90838	3.09162

The meter met its accuracy specifications for all the current values I tested. Note the values under 10 µA will not be very accurate. This is typical of 6,000 count meters.

A Shunt Resistance	.028 Ω
mA Shunt Resistance	1.57 Ω
µA Shunt Resistance	101.45 Ω

It is always good to know how much resistance you are adding to your circuit when you make current measurements.

Resistance

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
1.0054 Ω	1.0	0.8% + 5	0.508	0.49711454	1.51368546
10.007 Ω	9.7	0.8% + 5	0.5776	9.42834941	10.5856506

100.07 Ω	100.7	0.8% + 5	1.3056	98.7538941	101.386106
1.0011 kΩ	1.002	0.8% + 3	0.011016	0.99000292	1.01219708
10.001 kΩ	10.00	0.8% + 3	0.11	9.89018993	10.1118101
100.01 kΩ	100.0	0.8% + 3	1.1	98.9014993	101.118501
0.9936 MΩ	0.997	0.8% + 3	0.010976	0.98251864	1.00468136
9.97 MΩ	10.00	1% + 25	0.35	9.615912	10.324088

The meter met its accuracy specifications for all the resistance values I tested.

Resistance Test Voltage	
Low Range	1.02 V
Medium Range	0.93 V
High Range	0.50 V

Capacitance

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
0.0093 nF	N/A				
0.1024 nF	0.032	3.5% + 20	0.20112	0	0.3093392
1.008 nF	0.946	3.5% + 20	2.03311	0	3.054174
9.941 nF	9.883	3.5% + 20	0.365905	9.525331	10.356669
99.45 nF	99.31	3.5% + 20	3.67585	95.27635	103.62365
1.00081 µF	1.005	3.5% + 20	0.055175	0.9478926	1.0683074
10.916 µF	11.15	3.5% + 20	0.59025	10.272086	11.559914
113.83 µF	114.6	5% + 10	6.73	106.54468	121.11532
986.5 µF	986.1	5% + 10	59.305	917.2625	1055.7375

The meter met its accuracy specifications for all the capacitance values I tested. Note the values below 10 nF are not useful because of the high uncertainty relative to the value being measured. This is typical of 6,000 count meters.

Diode

Max Diode Voltage	3.245 V
Max Diode Current	1.49 mA

This will light some LEDs, for those who test LEDs with multimeters.

Continuity

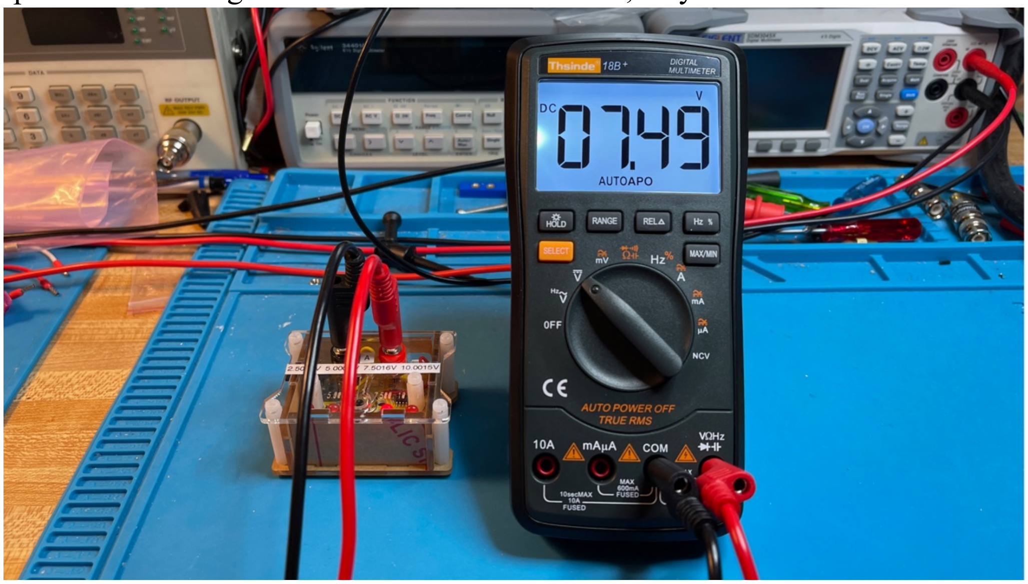
Not very fast but it does latch. Worked well with the better set of test leads that came with the meter.

Test Leads

If you are in the market for this $21 meter you probably will not buy $40 Probe Master test leads to use with it, so I took a look at the included test leads. This meter came with two sets of test leads. This first set was more flexible than the usually cheap leads and looked like the tips were gold plated. The tips were clean, and work well with the continuity function. The second set were more rigid, and the tips felt oily and caused intermittent contact, so remember to clean new test lead tips. The second set came with alligator clips that did not fit very well.

Ergonomics

The rotary switch is easy to turn but you can accidently place it in the middle of two functions. The rotary switch beeps every time you change it and the meter beeps when you press any of the buttons.
The meter is wobbly and slippery when using the bail of a smooth surface.
The display is big with big easy-to-read numbers. The backlight is bright and even, except for the left edge hot spots. The backlight turns off after 14.5 seconds, way too short for me.

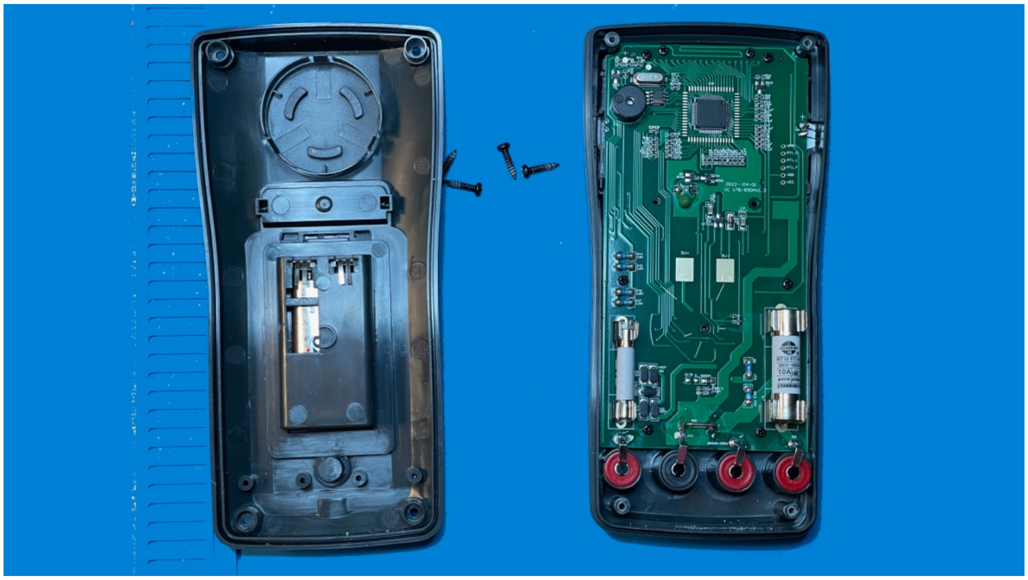


Battery

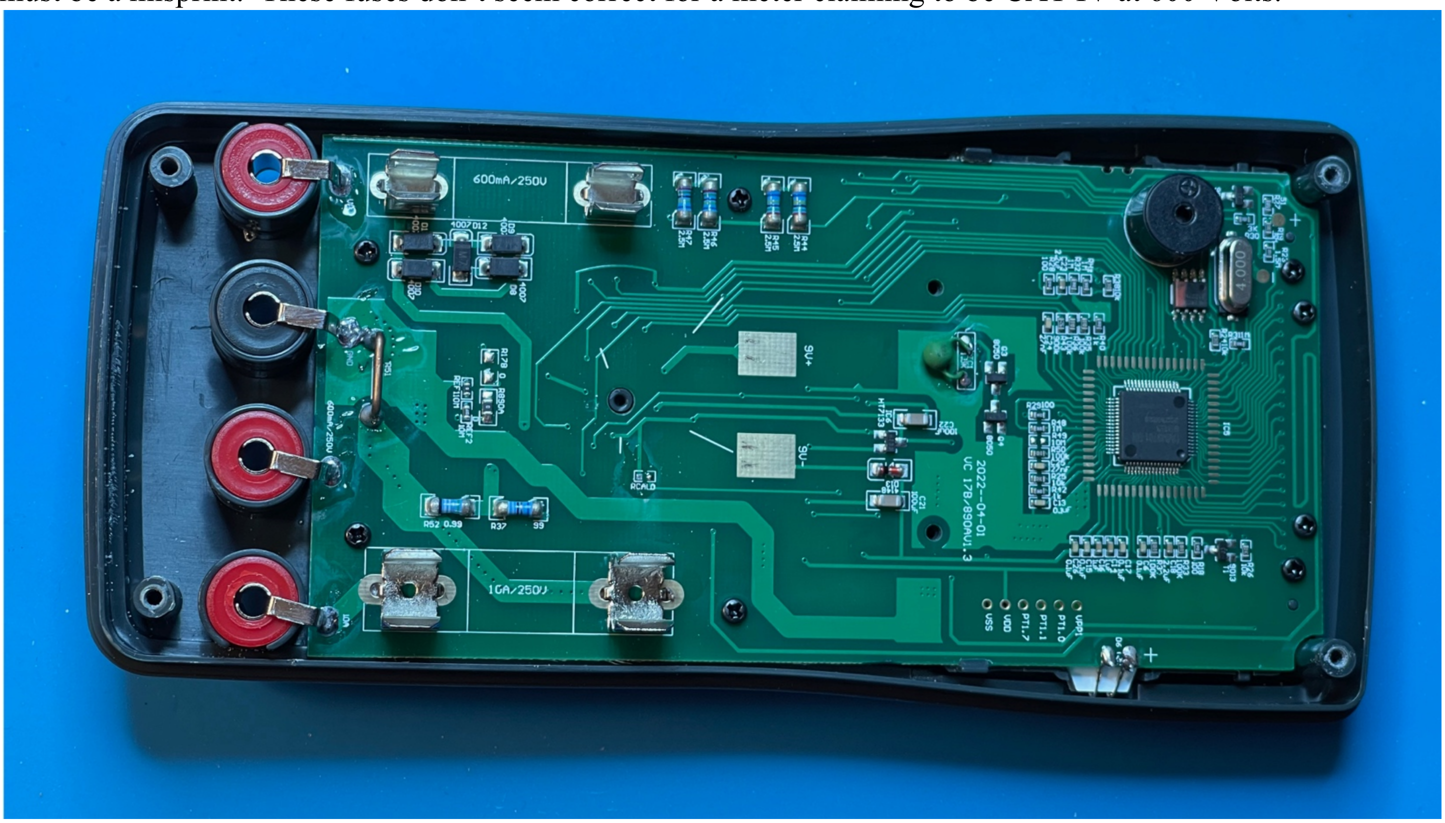
The meter uses a 9V battery accessible from the back by remove the battery cover. The battery cover has one Philips screw that mates with a brass insert. I speculate that the backlight is automatically turned off after 14.5 seconds because they are using a 9V instead of two or three AA batteries.

Fuses

The fuses are only accessible by taking the meter apart. You need to remove 4 self-tapping screws that mate with plastic. Be careful reinserting the screws. Rotate them counterclockwise a bit so they catch in the previously-cut threads. Only use light pressure and do not overtighten.



The manual does not state what fuses to use. The PCB shows 600mA at 250V and a 1 GA at 250V. The GA must be a misprint. These fuses don't seem correct for a meter claiming to be CAT IV at 600 Volts.



Pros

- Inexpensive
- All my tests show that it meets the manuals stated accuracy specifications
- DCV accuracy very good for a $21 meter
- Very good AC volts accuracy
- Good AC µA accuracy
- Large easy-to-read numbers
- Bright backlight

Con

- No indication of any third-party safety testing

- Most current ranges have low accuracy
- Capacitance ranges have low accuracy
- Poorly written manual that contains obvious errors
- Beeps every time you change the function knob or push a button
- Backlight turns off too quickly
- Must disassemble meter to change fuses

Conclusion

The biggest drawback to the Thsinde 18B+ is that there no third-party safety testing. If you are on a very tight budget or want to experience using a multimeter at a low cost, give this a try.
It is good for voltages, OK for resistance, not so good for current and bad for capacitance measurements.
If you are new to using multimeters the manual is not very useful. You will need supplemental documentation.
In general, I would not recommend the Thsinde 18B+ to a friend, or even give it to anyone.