**Mastech VA18B**

# Mastech VA18B Auto/Manual Ranging Digital Multimeter with USB Interface

User Instruction Manual

## 1. Introduction

This manual provides detailed instructions for the safe and effective operation of the Mastech VA18B Auto/Manual Ranging Digital Multimeter. The VA18B is a versatile tool designed for electrical measurements, featuring auto/manual ranging capabilities and a USB interface for data logging to a personal computer. Please read this manual thoroughly before using the device to ensure proper functionality and safety.

## 2. Safety Information

Always adhere to the following safety precautions to prevent personal injury or damage to the multimeter or equipment under test.

- Do not exceed the maximum input limits for any function.
- Use extreme caution when working with voltages above 30V AC RMS, 42V peak, or 60V DC. These voltages pose a shock hazard.
- Ensure the test leads are in good condition and properly seated in the input terminals.
- Never connect the test leads to a voltage source when the function switch is set to current, resistance, or diode/continuity test.
- Always turn off the circuit power and discharge all high-voltage capacitors before performing resistance, continuity, or diode tests.
- Replace the battery immediately when the low battery indicator appears to ensure accurate readings.
- Do not operate the multimeter if it appears damaged or if the case is open.
- Refer to the IEC 1010 CATII 1000V safety standard for appropriate measurement categories.

## 3. Product Overview

The Mastech VA18B is a compact and robust digital multimeter. Familiarize yourself with its components before

operation.


Figure 3.1: Front view of the Mastech VA18B Digital Multimeter with its integrated kickstand extended for easy viewing.


Figure 3.2: Top view highlighting the optical port for USB connectivity, enabling data transfer to a PC.


Figure 3.3: Angled view displaying the input jacks (10A, uA mA, COM, V Ω C) and the central rotary function switch.

| Basic functions | Range | | | |
|---|---|---|---|---|
| | VA16 | VA19 | VA18B | VA38 |
| DC Voltage | 200m/2/20/200/1000V (±0.8%~±1.2%) | up to 600V | 0.1mV ~ 1000V± (0.5%+3digits) | 50mV/500mV/5V/50V/500V/1000V (±(0.03%+10)) |
| AC Voltage | 200m/2/20/200/700V (±0.8%~±1.5%) | up to 600V | 1mV ~ 700V± (1%+3digits)40Hz ~ 500Hz | 50mV/500mV/5V/50V/500V/1000V(±(0.5%+40)) |
| DC Current | 200u/2m/20m/200mA ±1.8%, 10A±3% | up to 10 Amps | 0.1μA ~ 10A± (1.2%+3digits) | 500μA/5000μA/50mA/500mA/5A/10A(±(0.15%+15)) |
| AC Current | 200u/2m/20m/200mA ±1.8%, 10A±3% | up to 10 Amps | 0.1μA ~ 10A± (1.5%+3digits)40Hz ~ 200Hz | 500μA/5000μA/50mA/500mA/5A/10A(±(0.75%+20)) |
| Resistance | 200/2k/20k/200k/2MΩ±0.8%, 20MΩ±1.0%, 200MΩ±5.0% | up to 40MΩ | 0.1Ω ~ 60MΩ± (0.8%+2digits) | 500Ω/5KΩ/50KΩ/500KΩ/5MΩ((±0.1%+10))<br>50MΩ((±0.5%+10)) |
| Frequency | | up to 100KHz | 1Hz~1MHz± (0.2%+5digits) | linear Frequency 5Hz~200KHz(±(0.006%+4) )<br>Logic Frequency5Hz~2MHz(±(0.006%+4) ) |
| Duty Cycle | | 0.1%--99.9%±3.0% | 1Hz~1MHz± (0.2%+5digits) | 5%~95%(±(2%+5)) |
| Capacitance | | 200uF/400nF | 0.1nF~300μF± (4%+8digits) | 0.01nf ~ 5000μF |
| Temperature | | -20℃ to 1000℃ | -55~1000℃ (K Type) | |
| **Special functions** | **VA16** | **VA19** | **VA18B** | **VA38** |
| Counts | 1999 | 3999 | 5999 | 50000 |
| Diode test | • | • | • | • |
| continuity test | • | • | • | • |
| Auto power off | | • | • | • |
| DATA HOLD | • | • | • | • |
| to ranges and manual range | | • | • | • |
| True RMS | | | • | • |
| BACK LIGHT | • | • | • | • |
| Battery test | 1.5/6/9V | | | |
| Relative measurement | | • | | • |
| Low Battery Indication | • | • | • | • |
| Polarity Indication | • | • | • | • |
| Overload protection | • | • | • | • |
| PC-LINK Software | | | • | • |
| **Extend functions** | **VA16** | **VA19** | **VA18B** | **VA38** |
| | * Telephone Line test (RJ11)<br>* Lan test (RJ45)<br>* Tests for open circuits, shorts, miswires, reversals, and split pairs.<br>* SHIELD detection tests a cable's shield integrity. | * Humidity 30%--95% RH<br>* Temperature -20℃ to 1000℃ * Light 4000 lux to 40000 lux<br>* Sound 35 to 100 dB | * USB port connect to PC<br>* Relative measurement * Electronic protection system<br>* In conformity with IEC1010 CATII 1000V | *Large LCD with full angel<br>*DBm measurement<br>*Maximum value/minimum value measurement<br>*50-segment analog bar display. |

Figure 3.4: The complete package contents, including the multimeter, test leads, USB cable, PC-LINK software CD, and operating manual.

## 3.1. Display and Controls

- **LCD Display:** Shows measurement readings, units, and function indicators. Features a backlight for low-light conditions.
- **Rotary Switch:** Selects the desired measurement function (e.g., VDC, VAC, ADC, AAC, Resistance, Capacitance, Frequency, Temperature, Diode, Continuity).
- **Function Buttons:**
    - **SELECT:** Toggles between different measurement modes within a single rotary switch position (e.g., AC/DC, Diode/Continuity).
    - **RANG:** Switches between auto-ranging and manual-ranging modes.
    - **REL:** Activates relative measurement mode.
    - **Hz/DUTY:** Toggles between frequency and duty cycle measurements.
    - **HOLD/LIGHT:** Freezes the current display reading; long press activates/deactivates the backlight.
    - **MAX/MIN:** Records and displays the maximum and minimum measured values.
- **Input Jacks:**
    - **10A:** Input for high current measurements (up to 10A).
    - **uA mA:** Input for microampere and milliampere current measurements.
    - **COM:** Common (negative) input for all measurements.
    - **V Ω C:** Input for voltage, resistance, capacitance, frequency, duty cycle, diode, continuity, and temperature measurements.
- **Optical Port:** Located at the top, used for connecting the multimeter to a PC via the provided USB cable for

data logging.

## 4. Setup

### 4.1. Battery Installation

The Mastech VA18B is powered by a 9V battery. To install or replace the battery:

1. Ensure the multimeter is turned OFF and disconnect all test leads.
2. Locate the battery compartment cover on the rear of the unit.
3. Unscrew the retaining screw(s) and remove the cover.
4. Connect a new 9V battery to the battery clip, observing correct polarity.
5. Place the battery into the compartment and replace the cover, securing it with the screw(s).

### 4.2. Connecting Test Leads

Always connect the common (black) test lead to the 'COM' jack first, then connect the red test lead to the appropriate input jack for your measurement.

- For Voltage, Resistance, Capacitance, Frequency, Diode, Continuity, and Temperature: Connect the red lead to the **V Ω C** jack.
- For Current (uA/mA): Connect the red lead to the **uA mA** jack.
- For High Current (10A): Connect the red lead to the **10A** jack.

### 4.3. USB Interface Setup

The VA18B includes a USB interface for connecting to a PC for data logging. To set up the USB interface:

1. Install the PC-LINK software from the provided CD onto your computer.
2. Connect the supplied USB cable to the optical port on the top of the multimeter and to an available USB port on your computer.
3. Launch the PC-LINK software. The software should detect the multimeter and begin receiving data. Note that the USB interface is primarily for data capture and does not typically allow for remote control of the multimeter's functions.

## 5. Operating Instructions

This section outlines the basic steps for performing common measurements with your VA18B multimeter.

### 5.1. DC Voltage Measurement (VDC)

1. Set the rotary switch to the **VDC** position.
2. Connect the black test lead to the **COM** jack and the red test lead to the **V Ω C** jack.
3. Connect the test probes across the component or circuit to be measured, in parallel.
4. Read the voltage value on the LCD display.

### 5.2. AC Voltage Measurement (VAC)

1. Set the rotary switch to the **VAC** position.
2. Connect the black test lead to the **COM** jack and the red test lead to the **V Ω C** jack.
3. Connect the test probes across the AC voltage source, in parallel.
4. Read the voltage value on the LCD display.

### 5.3. DC/AC Current Measurement (ADC/AAC)

1. Determine the expected current range. For microampere/milliampere, set the rotary switch to **uA mA**. For high current (up to 10A), set to **10A**.
2. Press the **SELECT** button to toggle between DC and AC current if necessary.
3. Connect the black test lead to the **COM** jack. Connect the red test lead to the **uA mA** jack or the **10A** jack, depending on the selected range.
4. Turn off power to the circuit. Break the circuit and connect the multimeter in series with the load.
5. Restore power to the circuit.
6. Read the current value on the LCD display.
7. After measurement, turn off power, disconnect the multimeter, and restore the circuit.

### 5.4. Resistance Measurement (Ω)

1. Set the rotary switch to the **Ω** position.
2. Connect the black test lead to the **COM** jack and the red test lead to the **V Ω C** jack.
3. Ensure the circuit is de-energized and all capacitors are discharged.
4. Connect the test probes across the component to be measured.
5. Read the resistance value on the LCD display.

### 5.5. Other Functions

- **Capacitance:** Set the rotary switch to the capacitance symbol. Ensure capacitors are discharged before testing.
- **Frequency/Duty Cycle:** Set the rotary switch to the Hz/% position. Use the **Hz/DUTY** button to toggle.
- **Diode Test/Continuity:** Set the rotary switch to the diode/continuity symbol. Use the **SELECT** button to toggle.
- **Temperature:** Set the rotary switch to the °C/°F position. Connect the temperature probe to the V Ω C and COM jacks.
- **Auto/Manual Ranging:** Press the **RANG** button to switch between automatic range selection and manual range selection. In manual mode, press **RANG** repeatedly to cycle through available ranges.
- **Data Hold:** Press the **HOLD** button to freeze the current reading on the display. Press again to release.
- **Backlight:** Long press the **LIGHT** button to turn the display backlight on or off.
- **MAX/MIN:** Press the **MAX/MIN** button to enter Max/Min recording mode. The display will show the maximum or minimum value recorded since activation. Press again to cycle between MAX, MIN, and current reading.
- **Relative Measurement (REL):** Press the **REL** button to store the current reading as a reference value. Subsequent measurements will be displayed as the difference from this reference. Press again to exit.

## 6. Maintenance

Proper maintenance ensures the longevity and accuracy of your multimeter.

### 6.1. Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Ensure the multimeter is completely dry before use.

### 6.2. Battery Replacement

Refer to Section 4.1 for battery replacement instructions. Always replace the battery when the low battery indicator is displayed to maintain measurement accuracy.

### 6.3. Fuse Replacement

If the current measurement function fails, the fuse may need replacement. Fuses are located inside the multimeter. Fuse replacement should only be performed by qualified personnel. Use only fuses of the specified type and rating.

## 7. Troubleshooting

If you encounter issues with your Mastech VA18B, refer to the following common problems and solutions.

- **No display or faint display:** Check battery installation and charge. Replace the 9V battery if necessary.
- **Incorrect readings:** Ensure test leads are correctly connected to the appropriate jacks for the selected function. Verify the rotary switch is set to the correct measurement type and range. Check battery level.
- **Current measurement not working:** Check the fuse. If blown, replace with a fuse of the correct rating (refer to fuse compartment markings).
- **USB data logging issues:** Ensure the PC-LINK software is correctly installed and running. Verify the USB cable is securely connected to both the multimeter's optical port and the computer. Check device manager for proper driver installation. Note that some users have reported challenges with the software's port recognition and real-time data capture limitations.
- **Multimeter turns off unexpectedly:** The VA18B features an auto-power-off function to conserve battery. This is normal behavior. To disable or adjust, refer to the full manual if such an option is available.

## 8. Specifications

Detailed technical specifications for the Mastech VA18B Digital Multimeter.

| Feature | Specification |
|---|---|
| Brand | Mastech |
| Model Number | VA18B |
| Measurement Type | Multimeter |
| Style | Digital |
| Power Source | Battery (9V), USB for data interface |
| Item Weight | 0.88 Pounds (approx. 400g) |
| Item Dimensions (L x W x H) | 19.2 x 5.5 x 9.5 Centimeters |
| Specification Met | CE, IEC 1010 CATII 1000V |
| DC Voltage Range | 0.1mV to 1000V (Accuracy: 0.5%+3 digits) |

| Feature | Specification |
|---|---|
| AC Voltage Range | 1mV to 700V (Accuracy: 1%+3 digits, 40Hz-500Hz) |
| DC Current Range | 0.1uA to 10A (Accuracy: 1.5%+3 digits) |
| AC Current Range | 0.1uA to 10A (Accuracy: 1.5%+3 digits, 40Hz-400Hz) |
| Resistance Range | 0.1Ω to 60MΩ (Accuracy: 0.8%+2 digits) |
| Frequency Range | 1Hz to 1MHz (Accuracy: 0.2%+5 digits) |
| Duty Cycle Range | 0.1% to 99.9% (Accuracy: 0.2%+5 digits) |
| Capacitance Range | 0.1nF to 6000uF (Accuracy: 2%+5 digits) |
| Temperature Range | -20°C to 1000°C (Accuracy: 1%+3 digits) |
| Display Counts | 5999 |
| Special Functions | Diode Test, Continuity Test, Auto Power Off, Data Hold, True RMS, Backlight, Battery Test, Relative Measurement, Low Battery Indication, Polarity Indication, Overload Protection, PC-LINK Software, USB Port, Temperature Probe |

## 9. Warranty Information

Mastech products are typically covered by a limited warranty against defects in materials and workmanship. Specific warranty terms, duration, and conditions may vary by region and retailer. Please refer to the warranty card included with your product or contact your point of purchase for detailed information. Keep your purchase receipt as proof of purchase for any warranty claims.

## 10. Support

For technical assistance, troubleshooting beyond this manual, or inquiries regarding your Mastech VA18B Digital Multimeter, please contact Mastech customer support or your authorized dealer. Contact information can usually be found on the manufacturer's official website or on the product packaging.

- **Manufacturer:** V&A (Mastech)
- **Online Resources:** Visit the official Mastech website for product updates, FAQs, and additional support materials.