OPERATION MANUAL

RE856

Live Circuit Battery Tester

VALEN
Powering Excellence

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AUSTRALIA:
1300 734 253
sales@valen.com.au
valen.com.au

NEW ZEALAND:
0800 734 253
sales@valen.co.nz
valen.co.nz

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sales@valen.com.au
valen.com.au

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Features

- ☾ The RE856 Battery Tester is designed for measuring the internal resistance, open-circuit voltage and terminal temperature of the secondary batteries, including lead acid batteries, nickel-cadmium batteries, lithium ion batteries and nickel-metal hydride batteries.
- ☾ AC four terminal method to measure the internal resistance by eliminating lead resistance and contact resistance to get the accurate results.
- ☾ Dual display to show the internal resistance and voltage of the battery simultaneously.
- ☾ The RE856 has 99 sets of composite comparator function, which can be set at resistance and voltage values to get the reliable detection of battery deterioration.
- ☾ RE856 also comes with pin type leads which can easily contact the battery electrodes supplied as standard to get accurate 4 terminal measurement.
- ☾ Clip type leads with temperature sensor.
- ☾ Clamp adaptor for DC current measurements.
- ☾ Manual and auto data memory and read stores up to 999 data sets.
- ☾ Auto datalogging micro SD Card 4GB up to 99 blocks.
- ☾ USB PC interface.

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Names & Functions of Parts

11 13 14

DCA CLAMP ADAPTOR

TEMP. SENSOR

SENSE SOURCE

⚠
⎓ 60V MAX
INPUT

SENSE SOURCE

12 15 16

1

2 4

3 5

◄M   ◄◗▼   ▲Zero   R►

7

6 TIME   COMP   HOLD   8

40mΩ 400mΩ 4Ω
4mΩ 40Ω
OFF 400Ω

9

10

17

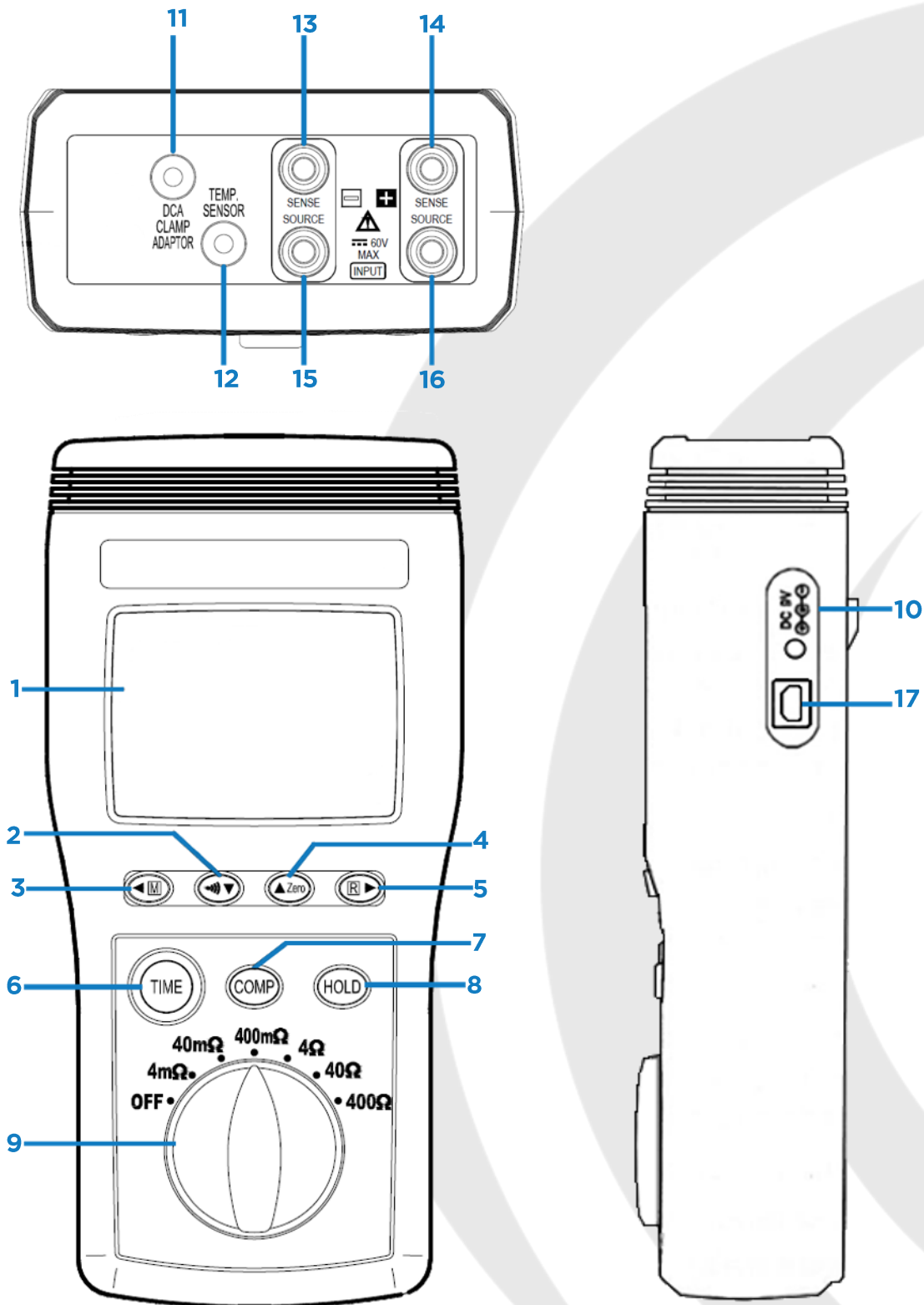**AUSTRALIA:**
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Switches and Input Terminals

1. **LCD Display**
2. 🔇▼ key:
   a. To turn the beeper on or off
   b. To decrease the displayed value
   c. Hold this key for 2 seconds to change the temperature units
3. ◀Ⓜ key:
   a. To store one set of readings to memory
   b. To move the cursor to the left
   c. Hold this key for 2 seconds to auto-memory mode, press this key again to exit
   d. Hold this key for 4 seconds to auto data logging mode, press this key again to exit
4. ▲Zero key:
   a. To turn the zero adjustment function on or off
   b. To increase the displayed value
5. Ⓡ▶ key:
   a. To manually record data reading mode, press this key again to exit
   b. To move the cursor to the right
6. TIME key:
   a. To change the day-hour, minute:seconds
   b. Hold this key for 2 seconds to set the real-time setting mode, press this key again to exit
   c. Hold this key for 4 seconds to set the auto-memory and data logging interval time setting mode, press this key again to exit.
7. COMP key:
   a. To turn the comparator function on and off
   b. Hold this key for 2 seconds to set the comparator setting mode, press this key again to exit.
8. HOLD key:
   a. To turn the data hold function on and off
   b. Hold this key for 2 seconds to turn the auto-hold function on, press this key again to exit.
9. **Rotary Switch**: Power on/off and resistance range selector switch.
10. **AC Adaptor input jack**: Connects to the black plug of the AC adaptor.
11. **DCA Clamp Adaptor input jack**: Connects to the yellow plug of the SCA current adaptor.
12. **Temp. Sensor input jack**: Connects to the blue plug of the clip type test lead.
13. **SENSE – Input Terminal**: Connects to the blue banana plug of the test lead.
14. **SENSE + Input Terminal**: Connects to the yellow banana plug of the test lead.
15. **SOURCE – Input Terminal**: Connects to the black banana plug of the test lead.
16. **SOURCE + Input Terminal**: Connects to the red banana plug of the test lead.
17. **USB Cable Interface**: PC interface connector.

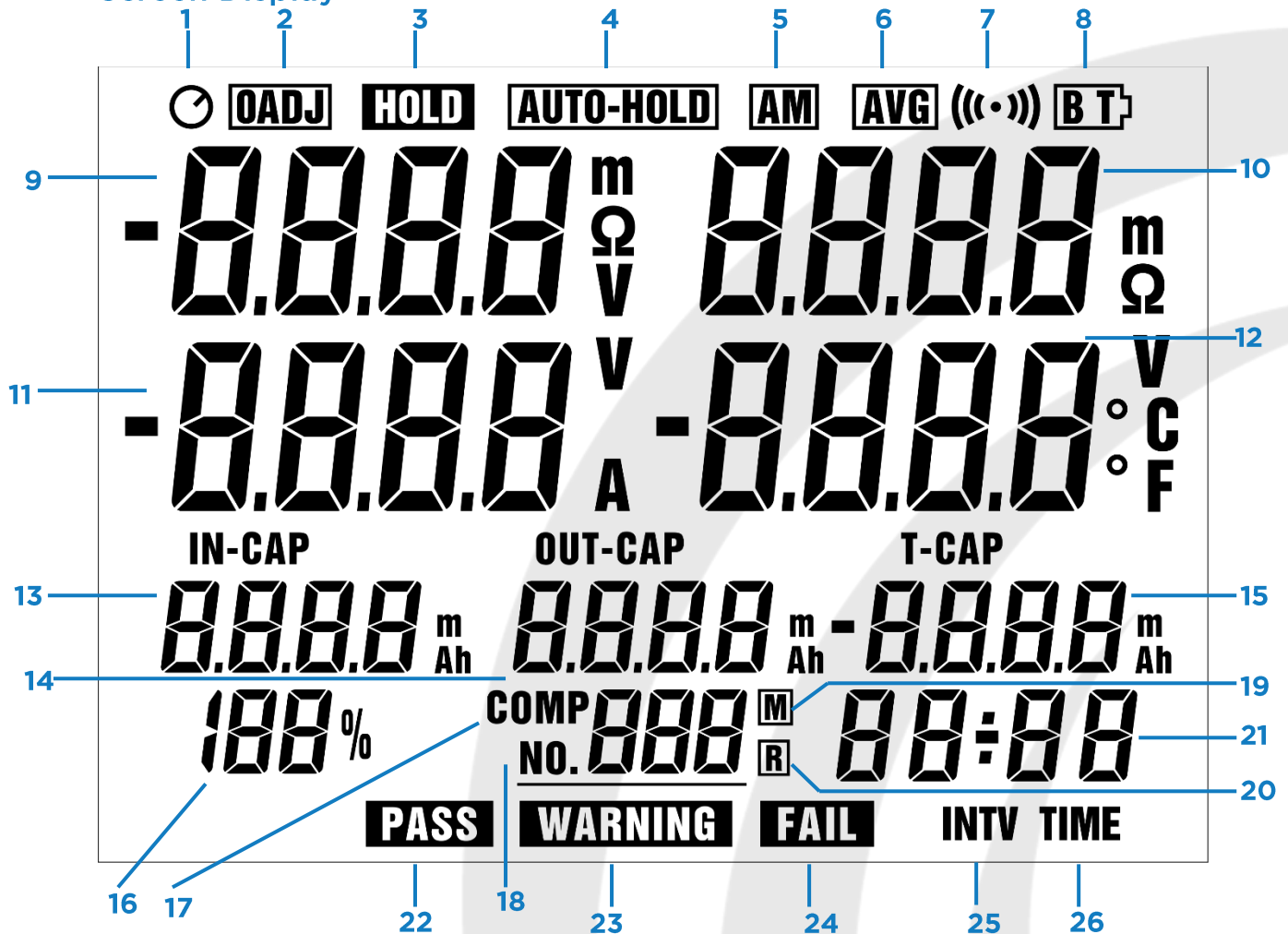**AUSTRALIA:**
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Screen Display

1. ⊘: Auto power off function is enabled
2. OADJ: Resistance zero adjustment function is on
3. HOLD: Display is locked
4. AUTO-HOLD: Auto-hold function is on
5. AM: Auto-memory function is on
6. AVG: Average function is on
7. ((•)): Beeper is turned on
8. BT: The battery is low
9. -8.8.8.8 mΩV: Measured voltage or comparator resistance high limit setting
10. 8.8.8.8 mΩ: Measured resistance or comparator resistance low limit setting
11. -8.8.8.8 VA: Measured DC current or comparator voltage low limit setting
12. -8.8.8.8 VCF: Measured temperature or comparator voltage low limit setting
13. 8.8.8.8 mAh: Measured battery charge capacity

14. $\boxed{8.8.8.8}$ ᵐₐₕ: Measured battery discharge capacity

15. $\boxed{-8.8.8.8}$ ᵐₐₕ: Measured battery total capacity (**T-CAP** = **IN-CAP** - **OUT-CAP**)

16. $\boxed{188}$ %: The calculated remaining capacity of the battery

17. **COMP**: Shown when the comparator function is on

18. ₙₒ.$\boxed{888}$: Indicates the number of data memory (1-999) or the comparator table number (1-99)

19. Ⓜ: Flashes once when data is stored to memory

20. Ⓡ: Shown when the read function is on

21. $\boxed{88:88}$: indicates the elapsed time or the real time (day : hour : minute : second)

22. **PASS** : Indicates that the tested battery is satisfactory for operation

23. **WARNING** : Indicates that the tested battery is beginning to deteriorate

24. **FAIL** : indicates that the tested battery has deteriorated

25. **INTV** : Shown when setting memory interval time function is on

26. **TIME** : Shown when setting real time function is on

Specifications

General Specifications

Measuring Method	Resistance: AC four-terminal method
	Temperature: NTC thermistor
	DC current: Hall sensor
A/D Conversion	Dual slope method
Display	LCD
Sampling Rate	1.3 sets (resistance, voltage, temperature and DC current measurements)/second
Open-circuit Terminal Voltage	5V max.
Input Over Range	'OL' display
Low Battery Detection	BT displayed
Test current fault detection	'- - - -' displayed
Auto Power Off	If no key operated for 10 minutes
Averaging Function	OFF, 4, 8 or 16 times
Beeper Function	For warning and fail results (can be turned on or off)
Comparator Setting	Resistance / voltage high / low limits
No. of Comparator Settings	99 sets
Comparator Output	LCD display of **PASS** , **WARNING** or **FAIL** results and beeper for warning and fail results

Voltage \ Resistance	Low	In	High
Low	WARNING	WARNING	FAIL
High	PASS	WARNING	FAIL

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Manual and Auto Data Memory	999 sets (can be read by meter and downloaded by PC)
Auto Datalogging	Micro SD Card 4GB (max. 99 blocks)
Operating Environment	0°C to +40°C 80% RH (no condensation)
Storage Environment	-10°C to +50°C 80% RH (no condensation)
Power Source	Meter = six AA size 1.5V alkaline batteries
	DCA Current Adaptor = one 9V battery
Maximum Power Consumption	1.0VA
Continuous Operating Time	5.5 hours approx.
Maximum Altitude Value Usable	2000m or less
Size	Meter = 198 (L) x 94 (W) x 49mm (T)
	DCA Current Adaptor = 193 (L) x 69 (W) x 31mm (T)
Weight	Meter = 530g approx. (including batteries)
	DCA Current Adaptor = 240g approx. (including batteries)
Accessories	Clip-type test lead with temperature sensor, pin-type test lead, DCA current adaptor, zero adjustment board, instruction manual, batteries, AC adaptor, USB cable, CD PC software (also available at www.valen.com.au), carrying case.

Electrical Specifications

Conditions to Guarantee Accuracy

Temperature	23°C ± 5°C
Humidity	80% RH or less (no condensation)
Temperature Coefficient	0.10 x (specified accuracy)/°C (<18°C or >28°C)
Zero Adjustment	After zero adjustment for each range
Resistance Measurement	

Range	Resolution	Measurement Current	Accuracy
4mΩ	1μΩ	40mA approx.	±(3% readings ± 20 digits)
40mΩ	10 μΩ	40mA approx.	
400mΩ	100 μΩ	4mA approx.	
4Ω	1mΩ	400μA approx.	±(0.8% reading ± 6 digits)
40Ω	10mΩ	40μA approx.	
400Ω	100mΩ	4μA approx.	

Measuring current frequency: 1kHz ± 30Hz

Voltage Measurement

Range	Resolution	Accuracy
6V	1mV	±(0.1% reading ± 6 digits)
60V	10mV	

Maximum Input Voltage: 60VDC maximum, no AC voltage input.

DANGER

Do not exceed the maximum permissible input voltage to the measurement terminal.
This could result in injury or damage to the unit.

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Temperature Measurement

Range	Resolution	Accuracy
-20°C to +60°C	0.1°C	±1.0°C
-4°F to +140°F	0.1°F	±1.8°F

DC Current Measurement

Range	Sensitivity	Resolution	Accuracy
600A	0.6A ~ 600.0A	0.1A	±(2.0% (reading ± 2 digit)

Optional Accessories: PROVA 15 (including plug wire)
DC Current Measurement

Range	Sensitivity	Resolution	Accuracy
4A	6mA ~ 4A	1mA	±(2.0% reading ± 2 digit)
30A	60mA ~ 30A	10mA	±(2.0% reading ± 3 digit)

Operation

Preparation

The following safety information must be observed to ensure maximum personal safety during the operation of this tester.

- ☾ To avoid electric shock when replacing the batteries first disconnect the leads from the object to be measured.
- ☾ When replacing the batteries, do not install old batteries with new ones and do not mix different types of batteries.
- ☾ Check the battery polarity carefully when inserting the batteries.
- ☾ Do not short circuit used batteries, disassemble them, or throw them in a fire. Doing so may cause the batteries to explode.
- ☾ Be sure to dispose of used batteries properly:
  - Remove the battery cover
  - Insert the batteries into the battery compartment

Operation

WARNING!

- ☾ Do not attempt to measure DC voltage exceeding 60V. Do not attempt to measure AC voltages. This could result in injury or damage to the unit.
- ☾ Do not attempt to measure the voltage of a generator. This would result in an AC voltage being applied to the voltage generating output terminals, which is dangerous.
- ☾ After measuring a high voltage battery, before continuing to measure a low voltage battery first short the measurement leads together. This will discharge the DC elimination capacitor which is connected across the leads. Otherwise an excess voltage may applied to the load voltage battery.

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1. Connect the RED test lead to the SOURCE + terminal.
   Connect the BLACK test lead to the SOURCE - terminal.
   Connect the YELLOW test lead to the SENSE + terminal.
   Connect the BLUE test lead to the SENSE - terminal.
2. Connect the BLUE miniature plug of the clip-type test lead with temperature sensors to the TEMP. SENSOR jack.
3. Rotate the resistance range switch to the desired position.
4. Carry out the zero adjustment (for details, see the Zero Adjust Function section).
5. Connect the red clip (probe) of the test lead to the positive (+) side of the battery to be tested and black clip (probe) to the negative (-) side.
   The outer shield conductors of the clip (probe) are connected to the SOURCE terminals, and the inner clip (probe) conductors are connected to the SENSE terminals. When contacting the clips (probe) with the battery terminals, press the inter clip (probe) conductors so they are pushed inside, and all of the SOURCE and SENSE conductors make good contact.
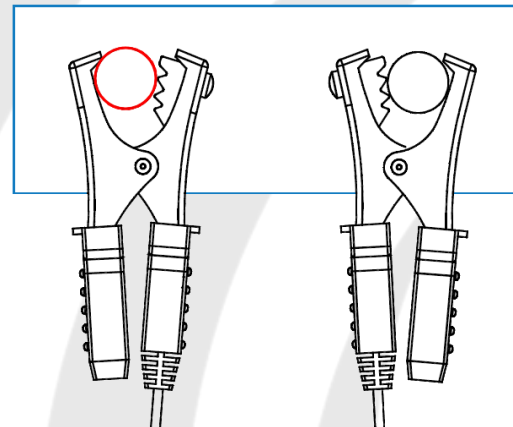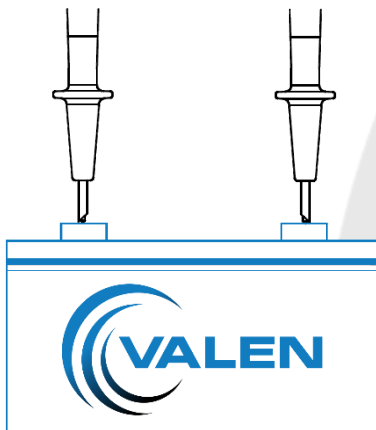
6. Read the battery internal resistance, DC voltage and temperature directly from the display.
   When using the clip type test lead, the temperature sensor is detected, and the temperature is automatically displayed.
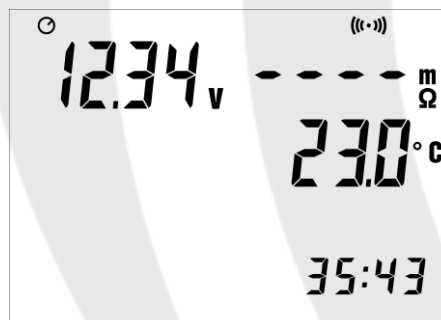
7. Press the ⬤ key for 2 seconds to change the displayed temperature unit.
   NOTE: When the measured DC voltage or battery internal resistance value is overload, 'OL' is displayed. A resistance indication '- - - -' means the AC test current fault that the measurement could not be made, because there is a break in the test lead circuit, or the leads are not making good contact with the object being measured, or if its resistance is extremely large compared with the measurement range.

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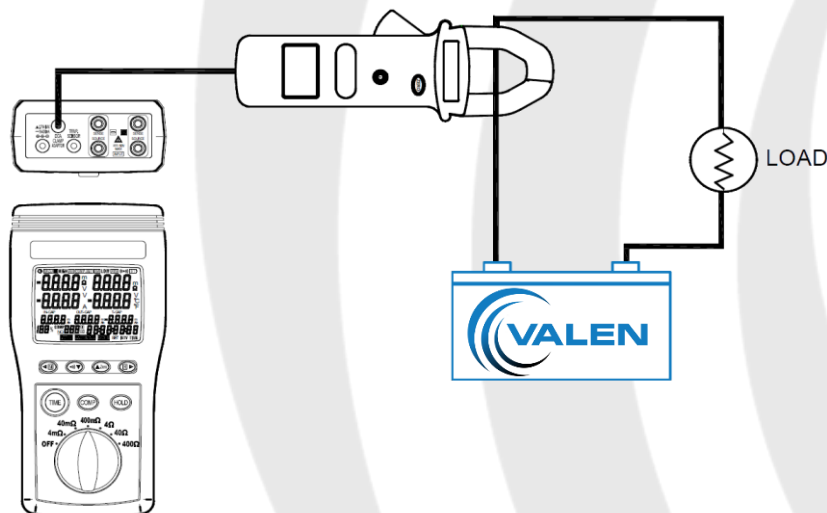📞 0800 734 253
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Zero Adjust Function

The zero-adjustment function is to zero the range of resistance. The reading during zero adjustment will be taken as zero and will be used to calibrate subsequent measurements.

Pin-type Test Lead Zero-Adjustment

Using the supplied zero-adjustment board, zero-adjustment can be carried out according to the AC four terminal method.

1. Rotate the resistance range switch to the desired position.
2. Press the ▲Zero key to turn on the zero-adjustment function on, the 0ADJ is displayed be flashing.
3. As shown in the image below, push the pin-type test leads onto two holes in the zero-adjustment board. Choose holes symmetrically on both sides of the centre screw, so that the distance between the leads is about equal to the distance when measuring the battery terminals.

About equal to the distance when measuring the battery terminals

Contact with SENSE

Contact with SOURCE
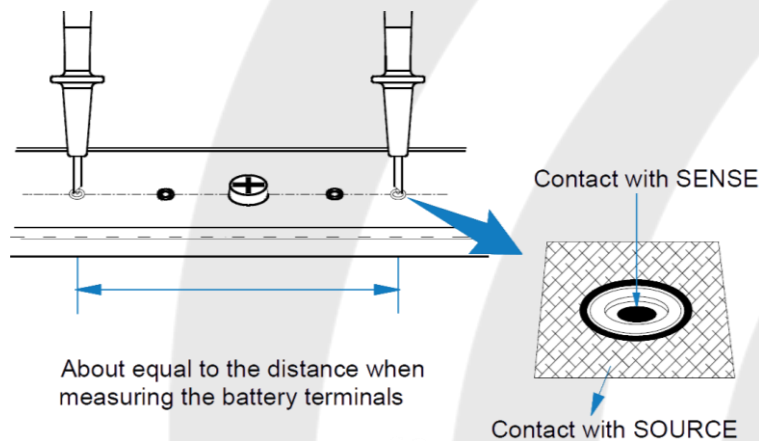
4. When the resistance reading is lower than 200 digits and stable, the zero-adjustment is automatically carried out, the 0ADJ will stop flashing and the beeper sound will stop.
5. Remove the pin-type test leads from the zero adjust board and start the measurement, connect the leads to the battery to be tested.
6. Press the ▲Zero key to exit this function.
   NOTE: if the terminal spacing of the battery to be measured is larger than the zero-adjustment board, use the outer most holes for adjustment. The zero-adjustment is valid for the currently selected range only, as long as the power remains on. Powering on the meter will reset all zero-adjustment values.

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Clip-type Test Lead Zero-Adjustment

Short the SOURCE and SENSE of the clip type test lead with the temperature sensor together as shown in the image below:
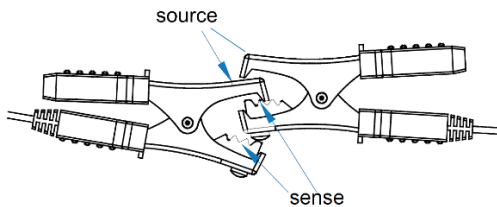
The other procedure is the same as the pin-type test lead zero adjustment.

Hold and Auto-hold Functions

Hold Function

Press the HOLD key, HOLD appears on the display and the display is locked. Press the HOLD key again to exit.

Auto-hold Function

1. Press the HOLD key for 2 seconds to start the auto-hold function, AUTO-HOLD appears on the display.
2. The meter holds the reading on the display until it detects a new stable reading. Then the meter beeps and displays the new reading. When the measured reading is stable, HOLD appears on the display.
3. Press the HOLD key again to exit.
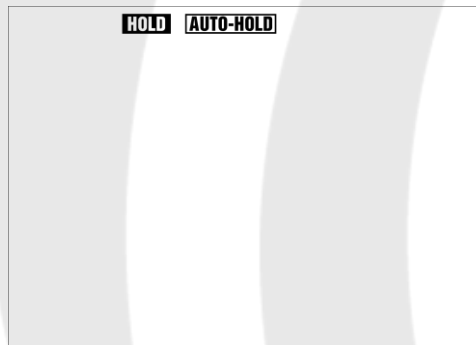
Moving Average Function

If the resistance measurement value is unstable, this can be corrected with the moving average function.

1. Press and hold down the TIME key, then rotate the resistance range switch to any range to turn on the meter, to samples select mode, '**SET**' appears on the display.
2. Press ▲Zero/ ▼ key to select the desired 'OFF (no average)', '4', '8' and '16' samples for the average.

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3. Press 🕐 key again to store the setting and exit.

SEt OFF	SEt 4	SEt 8	SEt 16

DC Current Measurement

1. Connect the yellow miniature plug of the DCA current adaptor to the meter DCA CLAMP ADAPTOR jack.
2. **USE DCA CURRENT ADAPTOR:**

   Press the ⊖ key of the DCA Current Adaptor to turn on the adaptor, the POWER LED will light. If the LOW BATTERY LED lights, you should replace the battery.

   USE PROVA 15 DCA CURRENT ADAPTOR:

   Press battery tester ▲Zero key for 3 seconds to select the decimal point of the current reading to 0.000A (for 4A range) or 0.00A (for 30A range).
3. Make sure the transformer jaw is empty, then press the ▲Zero key to null out stray magnetism, the LCD then shows 0.0A.
4. Clamp the current transducer (jaw) around one of the conductors under test. Make sure the clamp jaws are perfectly closed.
5. Read the meter current value.

Disable Auto Power Off Function

If no switch operation for 10 minutes, the meter automatically powers off. Auto data memory and continuous data logging mode will auto disable the auto power off function. For continuous measurement, in some case it may be necessary to disable the auto power off function.

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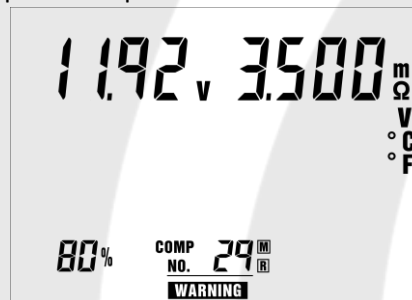✉ sales@valen.com.au
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1. Rotate the resistance range switch to OFF position, turn off the meter.
2. Press and hold down the [HOLD] key, then rotate the resistance range switch to any range to turn on the meter, the ⏀ symbol will disappear.

Setting the Real Time

1. Press the [TIME] key for 2 seconds, the 'SET TIME' appears on the display.
2. Press ▲Zero, •))▼, ◄M and R► keys to set up the real time; day : hour : minute : second.
3. Press the [TIME] key again to store the setting and exit.

Using Comparator Function (99 Sets)

Comparator

The comparator function compares the measured values with pre-set High and Low limit values for internal resistance and voltage and determines the range that the measuring value should be. Then displays the corresponding symbol and sounds a beeper with the WARNING and FAIL cases.

Comparator Settings

1. Rotate the resistance range switch to any range.
2. Press and hold down the [COMP] key for 2 seconds, the display will show **COMP** to the comparator setting mode.
3. Use ▲Zero or •))▼ key to change the comparator number, from 01 to 99.
4. Press R► key one time, the high limit resistance of the one digit will be flashing, use the ▲Zero and •))▼ keys to select the desired value. Repeat this step to set the next three digits, the decimal point, and the resistance units.
5. Press R► key one time, the low limit resistance of the one digit will be flashing, use the ▲Zero and •))▼ keys to select the desired value. Repeat this step to set the next three digits, the decimal point, and the resistance units.
6. Press R► key one time, the high limit voltage of the one digit will be flashing, use the ▲Zero and •))▼ keys to select the desired value. Repeat this step to set the next three digits and the decimal point.
7. Press R► key one time, the low limit voltage of the one digit will be flashing, use the ▲Zero and •))▼ keys to select the desired value. Repeat this step to set the next three digits and the decimal point.
8. Repeat step 3 to 7 to set the next comparator number.
9. Press the [COMP] key again to exit.
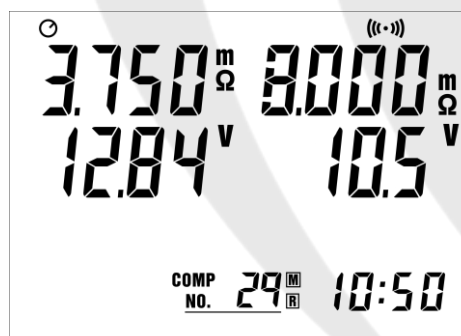
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
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Comparator Table

Voltage \ Resistance		Low Limit Resistance	High Limit Resistance	
		Low	Middle	High
Voltage Comparison Value	Low	**WARNING** Beeper	**WARNING** Beeper	**FAIL** Beeper
	High	**PASS**	**WARNING** Beeper	**FAIL** Beeper

Voltage comparison value = (high limit voltage value + low voltage value)/2

Start/Stop Controls for the Comparator

1. Press ⏷ key to set the beeper on, the ((•)) indication will appear on the display, and the beeper will sound when getting the **WARNING** or **FAIL** result. Press ⏷ again to set the beeper off.
2. Press the COMP key to start the comparator function, the **COMP** indication will appear on the display, and the comparator will be operating once the measurements are taken.
3. Press ▲Zero and ⏷ keys to select the desired comparator number (01-99). The selected comparator number remains in memory even when the power is turned off.
4. Press the COMP key again to stop the comparator function.

11.92v 3.500 mΩ V °C °F

80% COMP NO. 29 MR **WARNING**

Battery State of Charge Indication

Using the comparator settings, the battery high limit resistance, low limit resistance, high limit voltage and low limit voltage values are specified in *Comparator Settings*, and current measured the battery voltage and resistance values, then compute the battery state of charge (SOC) percentage.

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sales@valen.com.au
valen.com.au

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Battery Charge/Discharge Capacity Measurement

1. Disable auto power off function (see *Disable Auto Power Off Function*).
2. Perform the DC current measurement (see *DC Current Measurement* steps 1 to 3).
3. Connect the full discharged battery to the Battery Charger, using the DCA current adaptor clamp the current transducer (jaw) around the '+' conductor.
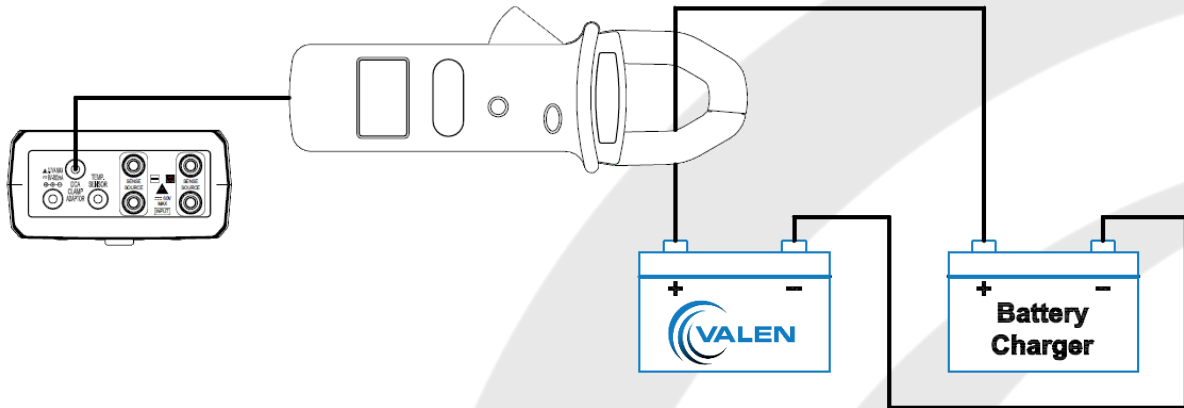
4. Power on the Battery Charger, the meter will be display the charge current value with a plus sign and the battery accumulated charging capacity (**IN-CAP**).
5. Connect the battery load to the battery and use DC current adaptor clamp the current transducer (jaw) around of the '+' conductor.
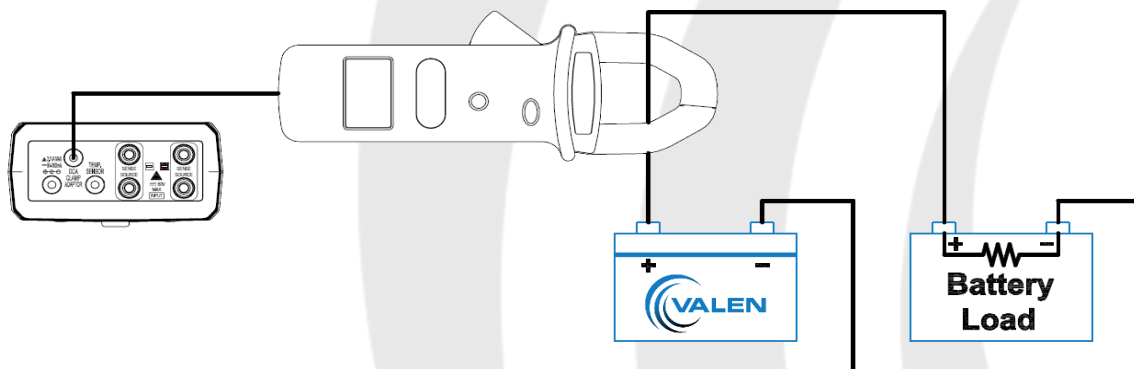
6. The meter will display the discharge current value with a minus sign and the battery accumulated discharge capacity (**OUT-CAP**).
7. The battery charge/discharge remained capacity is:

T-CAP = **IN-CAP** - **OUT-CAP**

Data Memory Function

Manual and Auto Data Memory Function (999 sets)

To Clear the Memorised Data

When the memory is full, the memory number '999' will appear on the display and memory function will be stopped.

1. Rotate the resistance range switch to the OFF position to turn off the meter.
2. Press and hold the ◀Ⓜ key then rotate the resistance range switch to turn on, the display shows 'CLr, YES, m, no' symbols.
3. Press ◀Ⓜ key to select 'YES' to clear the memorised data.

CLr
YES - no

To Manual Memorise the Reading

Memorise the reading one by one to the memory by pressing the ◀Ⓜ key, and 'NO.XXX Ⓜ' will appear on the display for one sec. to indicate the memorised location.

NO. 123 Ⓜ

To Auto Memorise the Reading

1. Press the ⏱ key for 4 seconds, the display will show SWT INTV. Using the ▲Zero or ⁛▼ keys, select the desired interval time from 3 seconds to 255 seconds. Press the ⏱ key to exit.
2. Press the ◀Ⓜ key for 2 seconds to auto memory mode, the **AM** symbol will appear on the display. When storing one reading, the 'NO.XXX Ⓜ' will appear on the display for one second to indicate the memorised location.
3. Press the ◀Ⓜ key again to exit.

AM
NO. 567 Ⓜ

To Recall the Memorised Reading

1. Press the Ⓡ▶ key to review the memorised readings. The display will show 'NO.XXX Ⓡ'.
2. Press the ▲Zero and ⁛▼ keys to scroll through them memorised readings.
3. Press Ⓡ▶ key again to stop viewing the memorised readings.
4. The memorised data can be read by transferring to PC.

NO. 123 Ⓡ
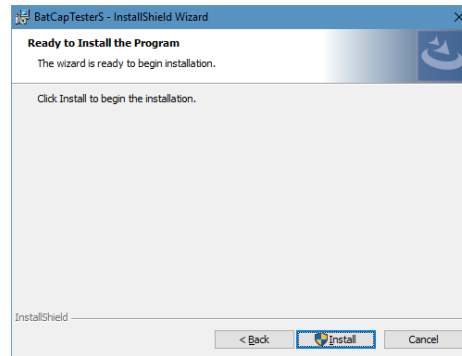
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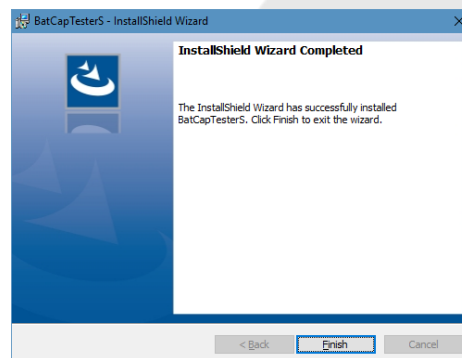**End-to-End Solution Provider of Industrial Batteries & Energy Storage**

Auto Datalogging Function

Micro SD Card 4GB (maximum 99 blocks)

1. Press the ⬤TIME key for 4 seconds, the display will show SET INTV. Using the 🔼Zero or 📶🔽 keys, select the desired interval time from 3 seconds to 255 seconds. Press the ⬤TIME key again to exit.
2. Press the ◀Ⓜ key for 4 seconds to begin the continuously logging mode, the display will show the Ⓜ symbol flashing.
3. Press the ◀Ⓜ key again to exit.
4. The continuous data logging cannot be read from the meter directly. Users can read the data by transferring to PC.
5. The continuous data logging cannot be cleared by the meter, only the PC.

Maintenance

Cleaning

☾ Repairs or servicing not covered in this manual should only be performed by qualified personnel. Please return the meter to REGAL ELECTRO if this is the case.

☾ Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instrument.

Battery Check & Replacement

☾ If the battery power is not sufficient, the B T symbol will be shown on the display. Replacement of six new 1.5V alkaline AA batteries is required.

☾ **Prevention of Battery Fluid Leakage:**

- When the battery power is low, replace the new batteries in order to avoid further battery fluid leakage possibility.
- When the meter will not be in use for a long period of time, please remove the batteries out of the meter to prevent the possibility of battery fluid leakage damage.

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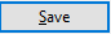Industrial Batteries & Energy Storage

SOFTWARE MANUAL

RE856

## Live Circuit Battery Tester

VALEN
Powering Excellence

Software

Hardware Requirements and Setup

PC Hardware Requirements:

- HDD, CD Rom, 486 PC or above, with available COM port/USB port
- EGA or higher
- 4M bytes or more memory size

PC Hardware Setup

1. Switch off all power related to the PC.
2. Connect the USB cable to an available port.
3. Switch on all related power.
4. Connect the optical plug end of the supplied cable to the meter.

Software Requirements and Setup

1. Start up Windows XP/7/8/10 operating system
2. Close all other applications
3. Insert the disk into the CD Drive
   (if autorun does not start, open the CD drive then run 'Install\setup)
4. Follow the onscreen instructions:

   a.
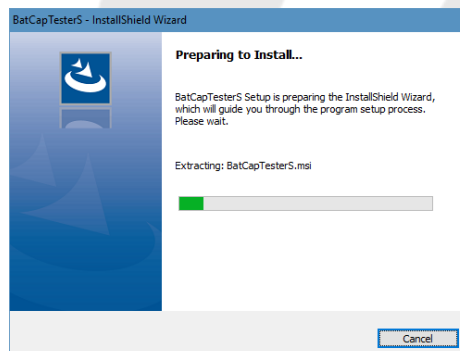
   b.
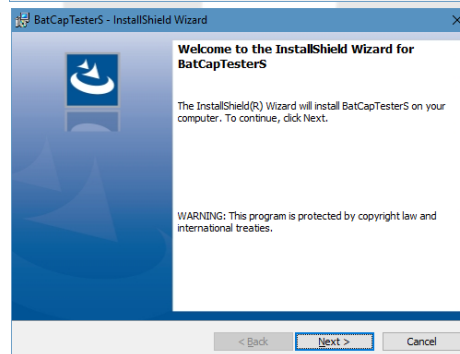
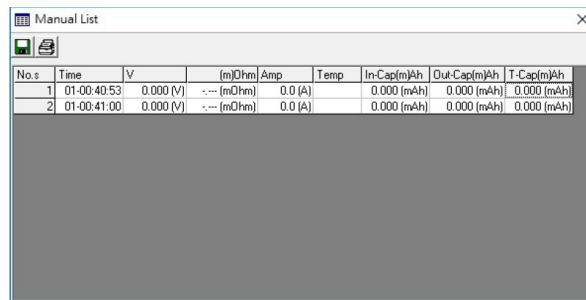AUSTRALIA:
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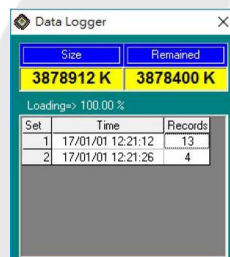Industrial Batteries & Energy Storage

c.

d. If a 'User Account Control' window opens asking 'Do you want to allow the following program from an unknown publisher to make changes to this computer?' Click Yes

e.

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Online Operation

Run the Software

1. Click 'Run BatCapTesterS.exe icon on the desktop.

2. Main software screen
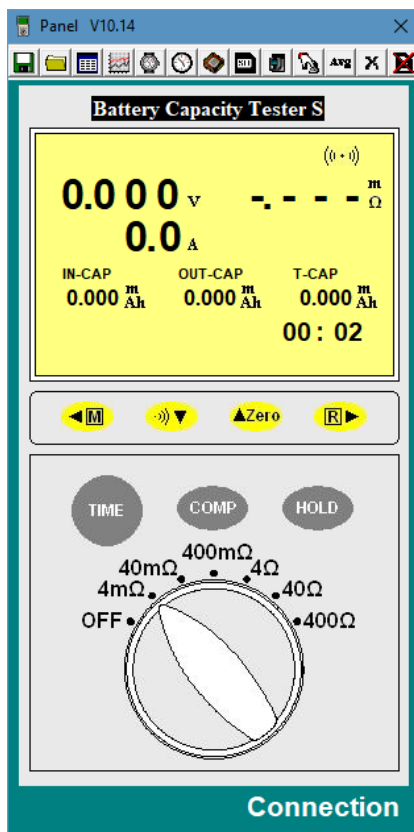
3. Click the [save icon] button in the top left hand corner of the main screen. A dialog box will open – input a file name then click [Save] to begin saving data to the file just created.
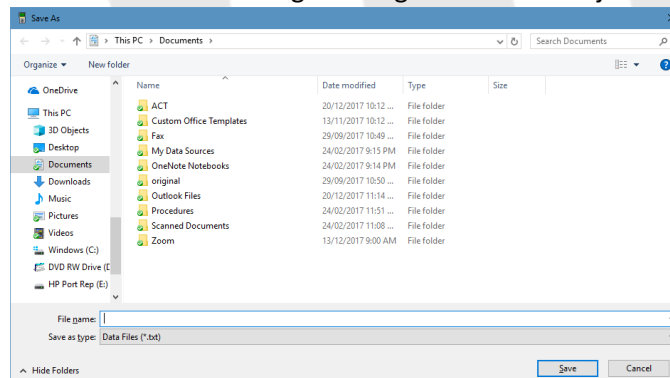
Click the [STOP] button to stop recording.

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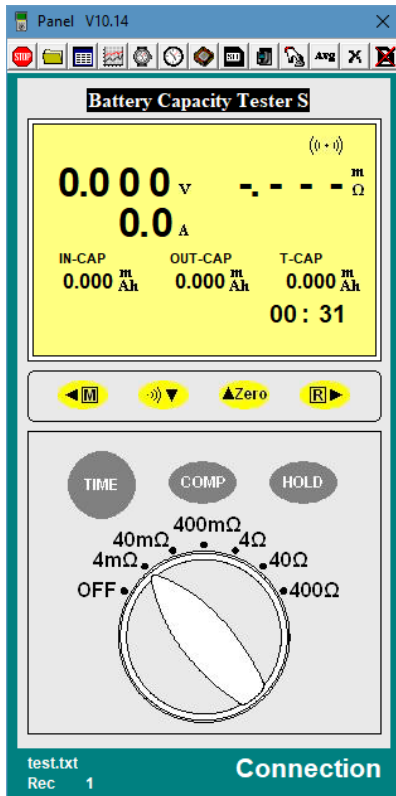
Download Data
Download Data from Hard Disk

Click the button second from the left of the main screen. A dialog box will open – input the file name/select a file and then click the [Open ▾] button.
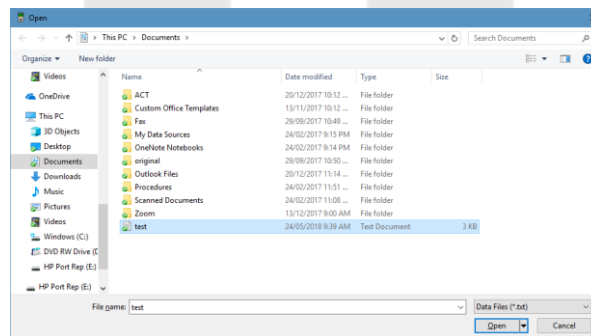
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Download Data from EEP ROM

Click the ⬢ button seventh from the left of the main screen.

Download Data from the SD Card

Click the 🆂🅳 button sixth from the right on the main screen. The Data logger window, shown below will open.
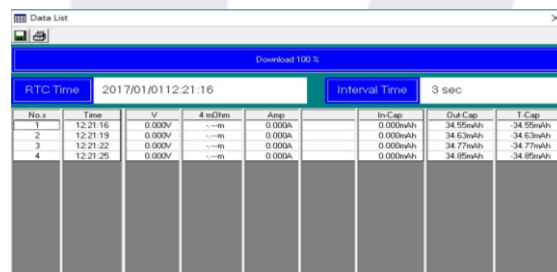
Click on a SET number to view the set's details. For example, in the window above, there are two sets from which to choose. The list below is an example of an opened set.

Data Convert

Excel

Open Microsoft Excel find the saved in Excel type, for example, test.xls.

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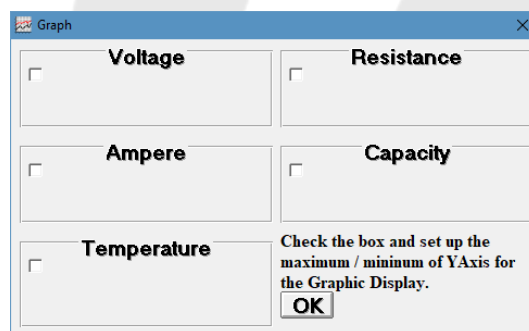Industrial Batteries & Energy Storage
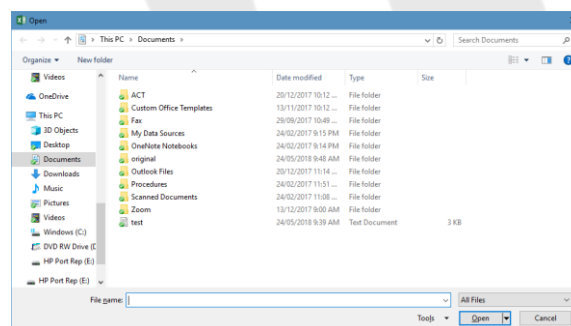
The 'Text Import Wizard' then appears. Follow the steps from 1 to 3 to complete.
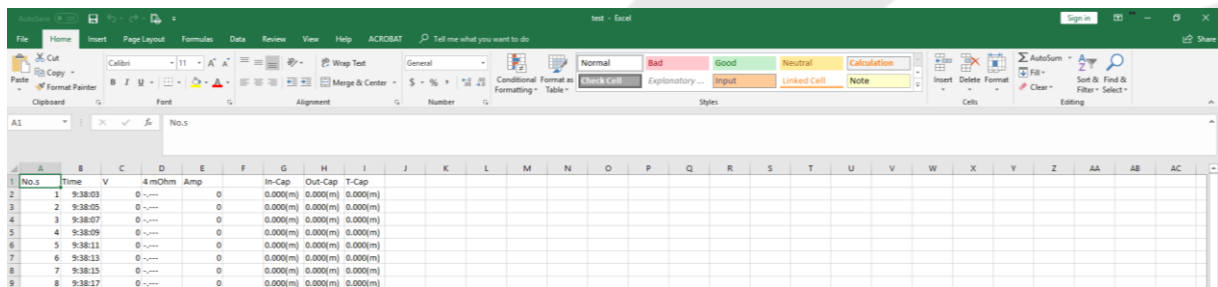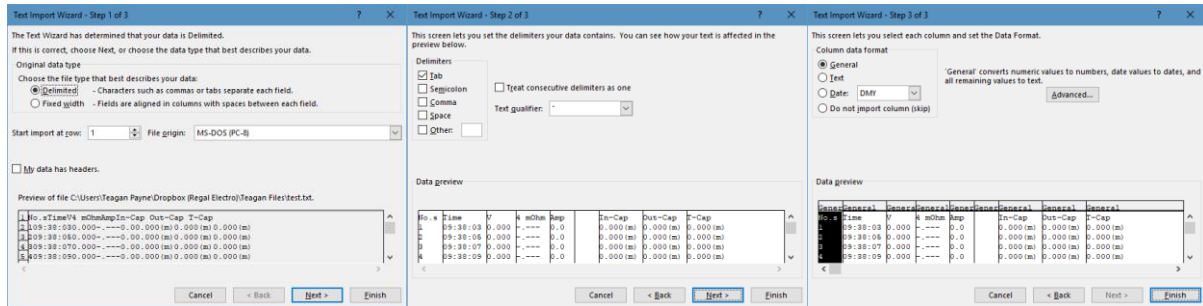
Graph

Open a saved data file in the software program and then click the button forth from the left.
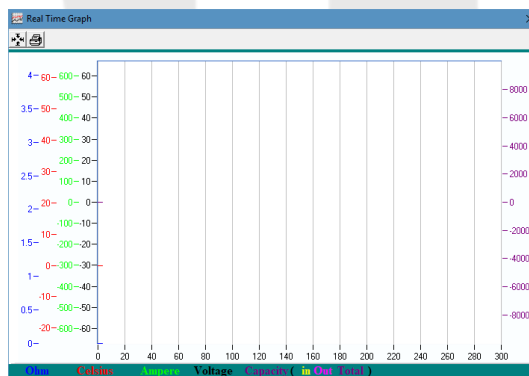
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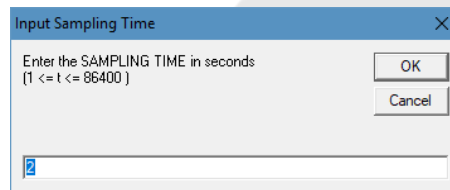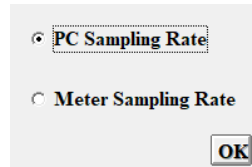
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Sampling Time

PC Sampling Rate

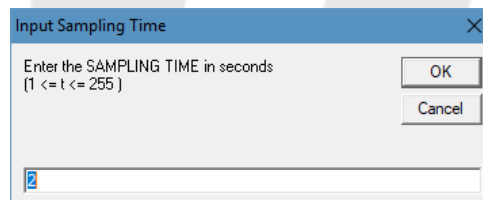PC sampling rate is the rate at which the PC collects readings while connected to the meter.
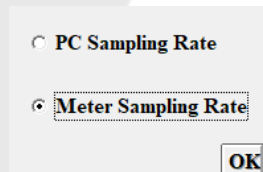
Click the 🌀 button fifth from the left on the main menu.
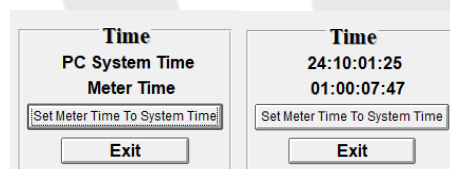

Meter Sampling Rate

Meter sampling rate is the rate at which the meter stores readings.

Click the 🌀 button fifth from the left on the main menu.

Real Time Cock (RTC)

Click the 🕐 button sixth from the main menu.

Click the PC System Time to show PC system time: 24:10:00:05 or Meter Time to show the meter time: 01:00:07:47.

Click Set Meter Time To System Time to set the meter time to the PC system time.

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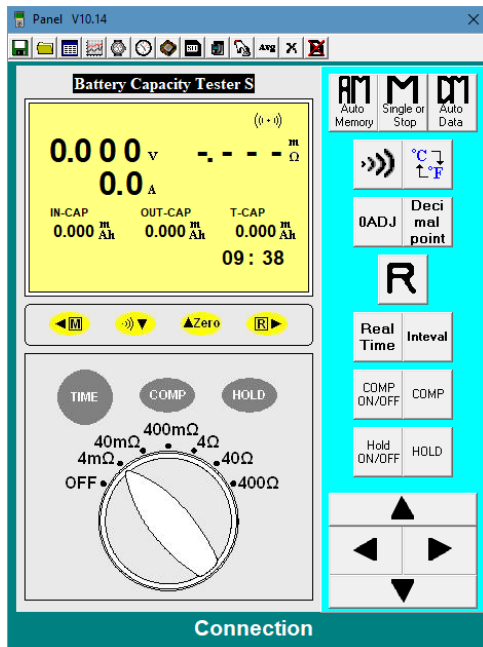✉ sales@valen.com.au
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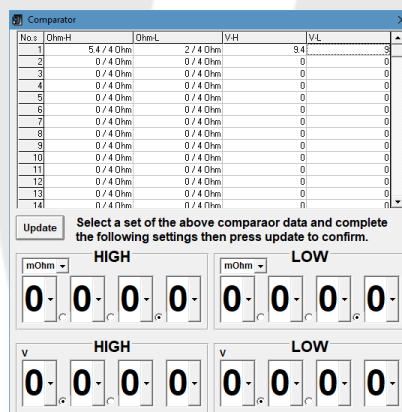Industrial Batteries & Energy Storage

Meter Buttons

Click the ⬚ button forth from the right on the main menu.

Set Comparator

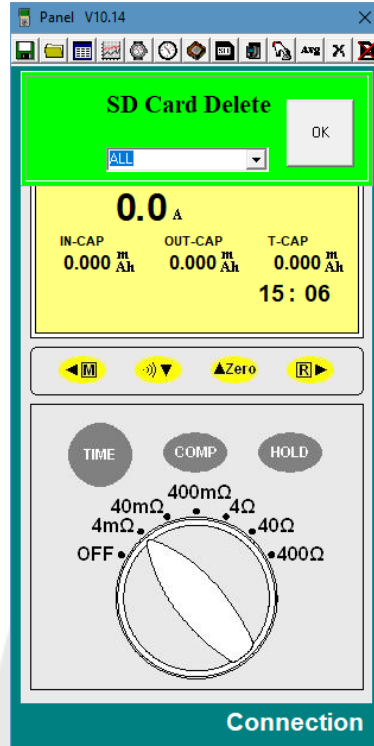Click the ⬚ button fifth from the right on the main menu. Click ⬚Update to set the meter.

Erase EEPROM

To erase EEPROM, click the ⬚ button second from the right on the main menu.

Click ⬚OK to confirm.

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Delete the SD Card Memory

To delete the SD Card memory, click the [X] button first from the right on the main menu.

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