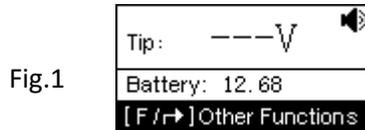


Functional Modes

1. VOLT & POLARITY TEST mode:

When the Probe is connected to a 12V or 24V battery, the probe is powered ON and the tip is floating (not contacting a circuit), the LCD backlight is on and the display will show as Fig. 1 below:



The battery voltage will be displayed. When the audio tone is turned ON the speaker symbol in the upper right corner of the display is normal and if it is OFF, a cross (X) will be displayed next to it. Once the probe tip is in contact with a circuit the LCD display will indicate the average voltage level (Tip Voltage) of the circuit. The red/green LED polarity indicator will respond also, showing whether the circuit is positive (+) or negative (-).

Another feature in this mode is the peak to peak V threshold detection and signal monitoring. When contacting a signal generating circuit such as a speaker wire with audio signals in it, the Probe detects the peak to peak signals and displays the peak to peak voltage on the display; the sound of the signals will be monitored and heard through the Probe speaker.

By default, the Threshold is set to 50V. The peak to peak threshold levels can be set by pressing ▼- or ▲+ key to select while in “Threshold Setting” screen (see display Fig.3 below) until the required setting and press ↵ key to confirm. This threshold Volt setting will be saved temporary in its memory and once the Probe is powered OFF, it will go back to its default 50V setting when powered ON again. See also Threshold Setting (Page 5) for detail.



2. RED/GREEN POLARITY INDICATOR & AUDIO TONE mode:

The RED/GREEN Polarity Indicator LED lights up when the probe tip voltage matches the battery voltage within ± 0.5 volts. This means that if the contact for a circuit that is not a good ground or a good hot, instantly it can be noticed that either each of the RED or GREEN Polarity Indicator LED will NOT light up.

The Audio Tone runs parallel to the RED/GREEN Polarity Indicator and will also NOT react when contacting a circuit that does not match the battery voltage within ± 0.5 volts.

3. CONTINUITY TO GROUND Check mode:

The Probe indicates is using two resistance levels for checking Continuity to Ground.

1. When the Probe tip has a resistance to ground **less than 20K Ohms but greater than 2K Ohms** the LCD display will indicate “**0.00V**” but no Green (-) LED lighting up.
2. When the resistance to ground is **less than 2K Ohms** the LCD display will indicate “**0.00V**” volts and also the **Green (-) LED** lighting up.

An application example:

The higher resistance [**>2KΩ to <20KΩ**] continuity function is useful for checking Spark Plug Wires; (disconnected from ignition) Solenoids and magnetic pickup coils.

The lower resistance [**<2KΩ**] continuity is for testing relay coils and wirings.

OTHER FUNCTIONS MODE:

[Ohm Test, (Frequency) Hz Test, High Peak V, Low Peak V, AVG P to P & Threshold]

Other Functions mode can be accessed when F/↵ key is pressed and the display changed to as in Fig. 5 below while it is in [VOLT & POLARITY] test mode (Fig. 4):



Fig. 4



Fig. 5

4. OHM Test (RANGE: 1Ω to 2,000Ω) mode

The Probe is able to check resistance ranges from 1Ω to 2KΩ. This Ohm Test can be accessed into while still in [Other Functions] menus (Fig. 6) below. While in this display, just press ↵ key will get into the test (Fig. 7). To quit the test, press F/↵ key again will exit back to VOLT & POLARITY function mode (Fig.4).



Fig. 6

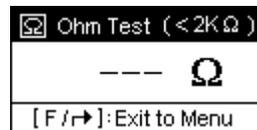
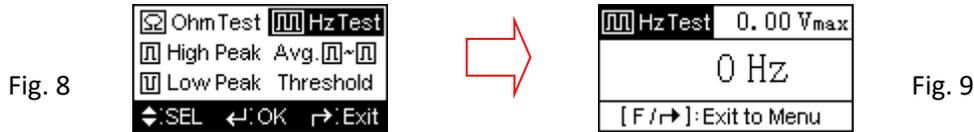


Fig. 7

5. [Frequency] Hz Test mode: (Range: up to 99,999Hz)

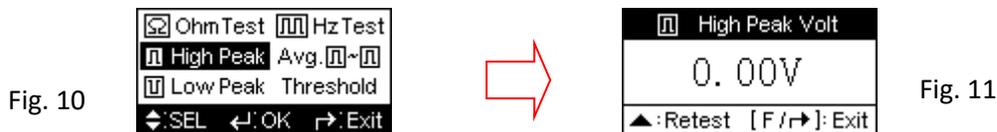
To measure Frequency in the circuit, select **Hz Test** [Fig.8] from the menu and press [**←**] key, the display will show as below (Fig. 9)



The Frequency measurement range is up to 99,999 Hz. To quit the test just press [F/r] key will return back to the menu [Fig. 8].

6. HIGH PEAK VOLT mode:

The [High Peak] test monitors the probed circuit and captures the highest detected voltage. To enter into this test, while in [Other Functions] Menu display (Fig.6) press **▼**- key to select [**High Peak**] Fig. 10 and then press **←** key will access into the test (Fig. 11).The display will indicate a reading of “0.00V” with the probe tip floating.



Probe the circuit and the Probe will instantly display and hold the highest voltage reading. This means the probe can be removed away from the circuit and the voltage reading remains displayed for viewing. To Reset the LCD display to “0.00V” reading, just press **▲**+ key.

An APPLICATION for the use of the [High Peak]:

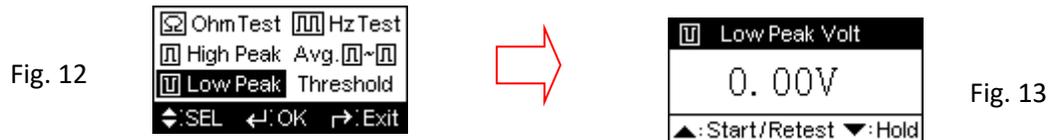
For an example, the circuit that is supposed to be OFF and is suspected of turning ON inappropriately or getting a signal for some reason, probing the circuit and monitoring it will instantly show as the circuit increases in voltage. The circuit can be monitored while wiggling wires and pulling on connectors to see if the voltage increases.

Since the maximum voltage reading is captured and held on the display, the reading can be inspected at a later time. This also allows us to probe deep areas (under dash) where viewing of the display is obstructed while probing the wire and then removes it for easy voltage readout.

If the probe is connected to the Starter terminal, it will capture the maximum Cranking Volts and will be able indicate any voltage drops in the wiring and Starter Solenoid connection.

7. LOW PEAK VOLT mode:

The [LOW PEAK] test monitors a positive circuit and captures the lowest voltage that it has dropped to. To enter into this test mode, while in [Other Functions] Menu display, press ▼- key to select [Low Peak] Fig. 12 and then press ↵ key will access into the test (Fig. 13). The display will indicate a reading of "0.00V" with the probe tip floating because there is no Voltage present.



Probe the positive circuit that intended to be tested and press ▲+ key to start the measuring process. The LCD display will show the lowest detected voltage of the circuit during the test. If the circuit drops in voltage at anytime, a new lowest reading will be captured and displayed. Pressing ▼- key will HOLD (Freeze) the captured Volt reading in the display while the probe tip is still in contact with the test circuit. This action allows the HOLD (Freeze) display to be viewed later even the probe is removed from the test circuit. To clear or reset the LCD display, just press ▲+ key again and if repeated tests to be performed, use these same procedures as described.

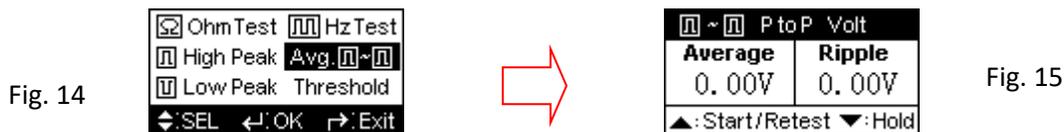
An APPLICATION for the use of the [LOW PEAK]:

For an example, the probed circuit that is suspected of having a loose connection and the voltage drops, causing something to turn OFF or malfunction. Probing the circuit and monitoring it will instantly show as the circuit drops in voltage. This circuit can be monitored while wiggling wires and pulling on connectors to see if the voltage drops.

Since the minimum voltage reading is captured and held on the display, it can be viewed at a later time. Cranking test can also be performed with this mode.

8. AVERAGE PEAK to PEAK mode:

The Peak to Peak Mode measures the difference between the positive and negative peak voltage levels over a one (1) second period. To enter into this test mode, while in [Other Functions] Menu display, press ▼- key to select [AVG P~P] Fig. 14 and then press ↵ key will access into the test (Fig. 15). The display will indicate readings of Average Tip "0.00V" and Ripple "0.00V" with the probe tip floating because there is no Voltage present.



Probe the circuit that intended to test and press ▲+ key to start the measuring process. The LCD display will show the detected Tip voltage and the Ripple (P to P) voltage readings. Pressing ▼- key will HOLD (Freeze) the Voltage readings in the display while the probe tip is still in contact with the test circuit. This action allows the HOLD display to be viewed later even the probe is removed from the test circuit. To clear or rest the LCD display, just press ▲+ key again and if repeated tests to be performed, use these same procedures as described.

Having this test feature can measure and monitor for example, the diode rectifier in a charging system while the engine is running. The display of Average Tip Volts and Ripple Volts (P to P) readings will provide the technician the data necessary to determine if a diode rectifier is defective or not.

A normal peak to peak reading while testing a charging circuit is usually under 1 volt. If a defective rectifier is present the peak to peak reading will be over 1 volt and possibly over 3 volts. When probing in this Mode, the display shows activity of circuits such as fuel injectors, distributor pick-ups, cam and crank sensors, oxygen sensors, wheel speed sensors, Hall Effect sensors. Measures fly back voltage of injectors will quickly fix the problem.

9. THRESHOLD SETTING mode:

Threshold Setting is used for adjusting the threshold voltage level for Peak to Peak Detection and Signal Monitoring in VOLT & POLARITY test mode. To enter into this setting mode, while in [Other Functions] Menu display, press ▼- key to select [Threshold] Fig. 16 and then press ↵ key will access into the test (Fig. 17).The display will indicate the threshold voltage level setting menu starting from 0.2V, 0.5V, 1.0V, 2.0V, 5.0V, 10V and 50V.

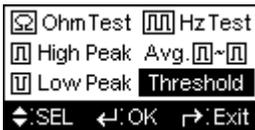


Fig. 16

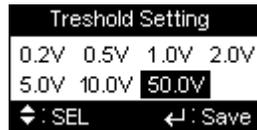


Fig. 17

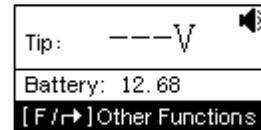


Fig. 18

By default, the threshold level always stayed at 50V. While in this mode, every pressing ▲+ or ▼- key will proceed to the next threshold level and press ↵ key if the level selected is confirmed. The display will change to Fig. 18 while it is saved in its temporary memory. This selected threshold level will be lost once the probe is power down. It will revert back to its default 50V level when power up again.

Application example: Audio installer would find the 0.2V threshold setting is convenient when diagnosing trouble sound signals.

10. POWER FEED mode:

While it is in **VOLT & POLARITY** test mode (Fig. 19), pressing either ▲ + or ▼ - key will instantly access into power feed mode [Fig. 20 or 21 below].

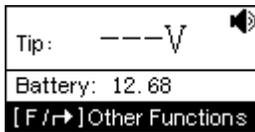


Fig. 19

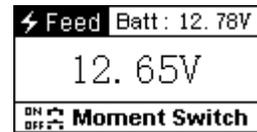


Fig. 20

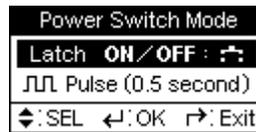
Pressing and hold ▲+ key will get into Positive (+) power feed Voltage output (see Fig. 20 above). Likewise, pressing and hold ▼- key will get into Negative (-) power feed Voltage output (Fig. 21). If none of the key is pressed, it will always remain on the initial test screen (Fig. 19).



Fig. 21

To access into other switching mode (**Latch or Pulse**), just press [↵] key once, the menu display screen will appear (Fig. 22)

Fig. 22

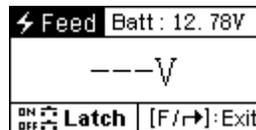


1. LATCH mode:

When the power switch is selected to **Latch** mode, just press either ▲+ or ▼- key once the probe can continuously power out without having to press and keep holding either one of the keys. To release power, press ▲(+) or ▼(-) again.

If Latch switch mode is selected, choose [Latch] see Fig. 22 above and press [↵] will get access into the power feed mode (Fig. 23).

Fig. 23



Now pressing either ▲(+) or ▼(-) key once (Fig. 24 & Fig. 25 below), the power will stay ON until a second press on either one of the keys will release the hold and stop the power feed and it will return to Fig. 23 display screen.

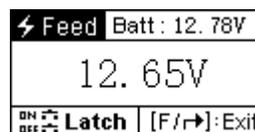


Fig. 24

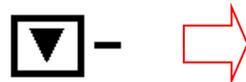


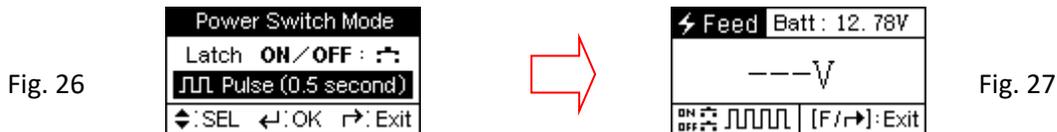
Fig. 25

To Exit this function, press **[F/↔]** key once, the display go back to the main test **[VOLT & POLARITY]** screen display (see Fig. 19).

2. PULSE mode:

When the Switch is on **Pulse** mode, the probe will cycle the Positive (+) or Negative (-) ground feed to the probe tip by pressing **▲(+)** or **▼(-)** key depending on the selected choice. It cycles ON for 1 second, then OFF for 1 second repeatedly at an interval of 0.5 sec. To stop the power cycling, press **▲(+)** or **▼(-)** key again.

To select Pulse mode, from the Power Switch Mode menu (see Fig. 26) select **[Pulse]** then press **[↵]** key to get access into it. The display will change to Fig. 27 as shown below:



Now pressing either **▲(+)** or **▼(-)** key once (Fig. 28 & Fig. 29 below), the power will stay ON until a second press on either one of the keys will release the hold and stop the power feed and it will return to Fig. 27 display screen.



To Exit this function, press **[F/↔]** key once, the display go back to the main test **[VOLT & POLARITY]** screen display (see Fig. 19).

11. TORCHLIGHT key

When the tester clamps are clamped onto the battery terminals, the front torchlight LEDs will light up. By default, the torchlight is always switched ON when the unit is powered up. To switch OFF the torchlight, press the **[Torch]** icon key once.

12. SPEAKER sound key

The sound of the speaker can be switched ON or OFF. By default, the sound is always switched ON when the unit is powered up (see Fig. 30 below). To switch OFF the sound, just press the [Speaker] icon key once and the display will change to Fig.31 when the sound is muted.

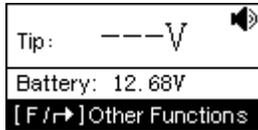


Fig. 30

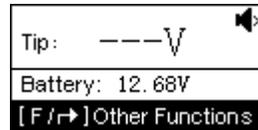


Fig. 31

Technical Specifications:

Power Input DC 12V or 24V Battery

Minimum Input Operating Power

DCV Measurement Range 0.00V to 70.00V maximum

Accuracy +/- 2%

Resistance Measurement Range 1 Ω to 2K Ω (2,000 Ω) maximum

Accuracy +/- 5%

Frequency (Hz) Measurement Range 0Hz to 99,999 Hz @ >2.0 V (max)

Frequency Volts display V (max)

Accuracy +/- 0.2%

Peak to Peak Voltage Measurement High Peak Volts, Low Peak Volts & Average (AC Ripples)

..... Volts with HOLD (Freeze) display functions

Continuity to Ground Measurement:

1st level (>2K to <20K Ω) Display (**0.00V**) is enabled

2nd level (<2K Ω) Green LED & Display (**0.00V**) are enabled

Accuracy +/-5%

Threshold Voltage Default: Set at 50V

Other selectable Settings 0.2V, 0.5V, 1.0V, 2.0V, 5.0V, 10V & 50V

Polarity Detection (Tip Voltage) Within +/- 0.5V of input voltage supply

Indications RED or GREEN indicator LED and TONE will turn ON.

Power Feed Output Voltage Depends on input battery supply volts

Power Feed Output selection Positive \blacktriangle (+) Voltage feed or Negative \blacktriangledown (-) Voltage feed

Power Output Switching Modes:

MOMENT Press \blacktriangle (+) or \blacktriangledown (-) and hold: **Power ON; Release: OFF**

LATCH Press \blacktriangle (+) or \blacktriangledown (-) once: **Power stay ON ; Press again: OFF**

PULSE (0.5 sec interval) Press \blacktriangle (+) or \blacktriangledown (-) once: **Pulse stay ON; Press again: OFF**

Over Load Protection 8.0 Amps [Manual RESET] Circuit Breaker

Reverse Polarity Protection Probe will not power ON when connected in reverse polarity.