

Low Amp Probe

EETA308D



Reference Manual

Snap-on®

SAFETY



WARNING

Risk of Personal injury

- Do not apply over 150 VAC (RMS) or DC.
- Do not change the battery while the instrument is attached to a power source. Make sure the unit power is "OFF" before opening the battery compartment.
- Keep yourself, test leads, clothing, and other objects clear of electrical connections and hot or moving engine parts.
- Do not use if the probe or any part of the probe (including the lead and connectors) appear to be damaged or if a malfunction of the instrument is suspected.



WARNING

Risk of electrical shock

- This product is intended for Measurement Category I (for example, automotive 12V systems). Do not use it for Measurement Categories II, III, and IV.
- Measurement Category I is for measurements performed on circuits not directly connected to MAINS or MAINS circuits (an example of MAINS circuit is 120VAC or 240VAC household or industrial circuits).
- Do not connect this product to MAINS or MAINS circuits
- Do not exceed voltage limits between inputs as indicated on the rating label.
- Use extreme caution when working with circuits that have greater than 40 VAC or 24 VDC
- Do not connect to damaged or un-insulated conductors.

SAFETY

Safety Standards

BSEN61010-1: 2001

BSEN61010-2-032: 2002

BSEN61010-031: 2002

150 V_{RMS}, Category I

Rated Transient Overvoltage 800V

Pollution Degree 2

EMC Standards

BSEN 61326-2-

2:2006 1998 FCC

Part 15 Class B

SAFETY

The following symbols appear on the products:



WARNING

Read instruction manual and safety messages before using product



Double/Reinforced Insulation.



Read all instructions completely before using this product.



To avoid electric shock; use caution during installation and use of this product. High voltages and currents may be present in circuit under test.



Complies with the relevant European standards



This equipment should for disposal, be separated as Waste Electrical and Electronic Equipment, according to the EU directive 2002/96/EC

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March 2011

Snap-on[®]

For Technical Assistance Call
1 800 424 7226 (North America)
+44 (0) 845 601 4736 (United Kingdom)

For technical assistance in all other markets, contact
your selling agent

The information, specifications and illustrations in this
manual are based on the latest information available
at the time of publication. The manufacturer reserves
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1.0 INTRODUCTION

The Snap-on Low Amp Current Probe measures AC or DC current with digital multimeters, oscilloscopes, and other suitable recording instruments. The probe provides accurate and reliable non-intrusive testing of ignition coils, injectors, fuel pumps, relays, electric motors, and parasitic draw. The jaws of the probe are designed with a built in hook feature to help isolate wires (refer to Figure 1).

Using advanced Hall Effect technology, the Snap-on Low Amp Probe accurately measures currents from 10 mA to 60 Amps with a resolution of 1mA over the frequency range of DC to 50 kHz. The probe has two scales, 0 to 20 Amps and 0 to 60 Amps. The Snap-on Low Amp Current Probe outputs an analog voltage based on current flow through the circuit. The output is millivolts AC or DC. For example, in the 0 to 20-Amp range, the probe output is 100 mV per 1 Amp. In the 0 to 60-Amp range, the probe output is 10 mV per 1 Amp.

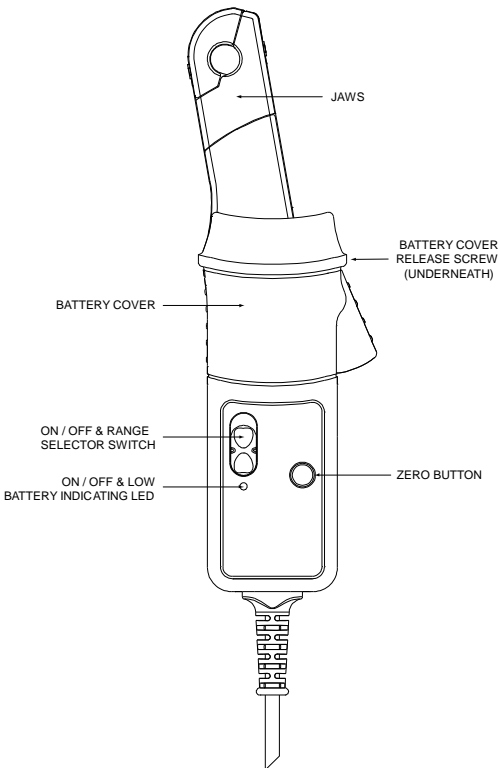


Figure 1

2.0 SPECIFICATIONS

2.1 Electrical Data

Current ranges	: 20A / 60A AC PEAK or DC
Measuring range	: +/- 20A / 60A
Output sensitivity	: 100mV / 10mV/A
Accuracy (20A Range)	: +/- 1% of reading +/- 5mA
Accuracy (60A Range)	: +/- 2% of reading +/- 50mA
Resolution	: +/- 1mA / 10mA
Load impedance	: >10kOhm and \leq 100pF
Conductor position	
Sensitivity reading	: +/- 1% relative to center reading
Frequency range	: DC to 50kHz (-3dB)
Temperature coefficient	: +/- 0.1% of reading / °C
Power supply	: 9V Alkaline, PP3/MN1604 : 50 Hours, low battery indicator
Working voltage (see Safety Standards section)	: 150V AC (RMS) or DC.

2.2 General Data

Maximum conductor size	: 12mm diameter
Output connection	: 4mm safety plugs
Output zero	: Auto zero via push button
Cable length	: 1.5 meters
Operating temperature range :	: 0 to +50 °C / 32 to +122 °F
Storage temperature range:	-20 to +85 °C / -4 to +1 85 °F
Operating humidity	: 15% to 85% (non condensing)
Weight	: 250g / 0.55lb

3.0 OPERATING INSTRUCTIONS

Refer to Figure. 1 on page 2

3.1 Connecting the probe

To connect the probe to the test equipment, connect the red plug of the probe connector to CH1 and the black to GND/COM.

3.2 Switch on

When the probe is turned on, the **RED LED** illuminates. You will also notice that when the battery voltage is too low for normal operation, the **LED** flashes, to warn the user that the battery needs to be changed. The Battery Replacement procedure is described in section 5.0.

3.3 Low Amp Current Probe Zero Adjustment

The Snap-on Low Amp Current Probe has a push button auto zero feature. The output zero offset voltage of the probe may change due to thermal shifts and other environmental conditions.

To adjust the output voltage to zero:

1. Ensure that the probe is away from the current carrying conductor.
2. Connect the Low Amp Current Probe to your instrument and select the voltage scale to view the reading.
3. Turn the Low Amp Current Probe on by using the On/Off and Range Selector switch to select the 20A or 60A scale. Press the Zero button.

3.4 Error Factor

Current probes work by reading the magnetic field around a conductor. The error factor is the amount of induced error or false reading from a current probe. Some current probes can have an error factor of over 100 mA. This induced error reading can be caused by many magnetic fields. Any device that generates a magnetic field can induce an error. Even the earth's magnetic field has an influence on current probes. To reduce the error factor, zero the Low Amp Current Probe in the same direction and inclination as intended use!

3.5 Reading the mV scale

When reading the millivolt scale, remember that a probe setting of 100mV equals 1 Amp (20Amp scale on the Snap-on Low Amp Current Probe). Similarly:

A reading of: 0.8mV = 8mA

A reading of: 1.8mV = 18mA

A reading of: 21.8mV = 218mA

A reading of: 100mV = 1000mA or 1A

3.6 Current Measurement Applications

3.6.1 Parasitic Draw Measurement

Recommended Probe Setting: 20A scale

Note: Before taking measurements or clamping the probe jaws around any wire, complete the **Setup** steps below.

Setup

1. Use the On/Off and Range Selector switch to select the 20A setting.
2. Perform the Low Amp Current Probe Zero Adjustment procedure (refer to section 3.3).

Test

To measure parasitic draw:

1. Clamp the Low Amp Current Probe jaws around the B+ supply wire to the power distribution box, or to the positive or negative battery cable.

The parasitic draw readings display.

2. If a negative reading displays, open the probe jaws and clamp the probe in the opposite direction.

Note: Computer-controlled vehicles require a small amount of current to keep module memories alive. Refer to the appropriate vehicle service manual for module time-out and maximum parasitic draw information. The term “time-out” refers to the amount of time that modules operate, before going into sleep mode.

3.6.2 Fuel Pump Current Measurement

Recommended Probe Setting: 20A

Note: Before taking measurements or clamping the probe jaws around any wire, complete the Setup steps below.

Setup

1. Use the On/Off and Range Selector switch to select the 20A setting.
2. Perform the Low Amp Current Probe Zero Adjustment procedure (refer to section 3.3).

Test

Important Note: If the vehicle has more than one fuel pump, test each pump independently.

To measure fuel pump current:

1. Clamp the Low Amp Current Probe jaws around the fuel pump voltage supply circuit near the fuel tank or at the fuel pump relay.
2. Verify that the probe jaws are fully closed. The fuel pump current readings display.
3. If a negative waveform displays, open the probe jaws and clamp the probe in the opposite direction. Humps in the waveform represent the condition of the pump commutator and brushes (Figure 2). Waveform humps are considered normal.

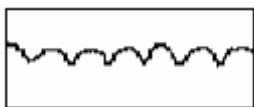


Figure 2.



Figure 3.

As brushes wear, the waveform will degrade, and the pump speed may slow down (refer to Figure 3).

Tech Note

If the fuel pump is difficult to access, it may be possible to check the fuel pump current at the fuse box (if applicable).

To check the fuel pump current at the fuse box:

1. Locate fuse box and remove the fuel pump fuse.
2. Install an inline fuse harness in place of the fuse.
3. Clamp the Low Amp Current Probe around the inline fuse harness.

Fuel Pump RPM Calculations

Most fuel pumps run at about 5000 to 6000 RPM and draw about 6 to 8 Amps. Pumps may cause driveability symptoms below 3000 RPM. Most fuel pump commutators have 8 segments. Using an 8-segment commutator as an example, RPM may be estimated by measuring the delta time of the 8 humps present in the waveform. One of the formulas to find RPM is 60,000 (the number of ms in a minute) divided by the time measurement of the 8 humps of the waveform. Let's say if in our example that the time measurement of the 8 humps is 12 ms, we would divide 60,000 by 12 to get 5000 RPM.

To measure amperage, measure the average voltage of the waveform and use $100\text{ mV} = 1\text{A}$ for calculation.

3.6.3 Ignition Coil Current Measurement

Recommended Probe Setting: 20A

Note: Before taking measurements or clamping the probe jaws around any wire, complete the Setup steps below.

Setup

1. Use the On/Off and Range Selector switch to select the 20A setting.
2. Perform the Low Amp Current Probe Zero Adjustment procedure (refer to section 3.3).

Test

To measure ignition coil current:

1. Clamp the Low Amp Current probe around the B+ side or the control side wire of the ignition coil. Do not clamp the probe around both wires.
2. Verify that the probe jaws are fully closed.
The ignition coil current readings display.
3. If a negative waveform appears, open the probe jaws and clamp the probe in opposite direction. The ignition coil waveform should have a gradual rise or ramp as current begins to flow (refer to Figure 4).

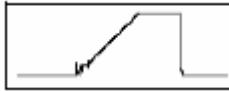


Figure 4.

If the vehicle is DIS equipped, current flow through each coil should be about the same. If the ignition coil waveform has a sharp rise at the beginning of the ramp upward, suspect shorted coil windings (refer to Figure 5).



Figure 5.

To measure amperage, measure the maximum voltage of the waveform and use $100 \text{ mV} = 1\text{A}$ for calculation.

Tech Note

If the ignition coil is difficult to access, it may be possible to check the ignition coil current at the fuse box (if applicable).

To check the ignition coil current at the fuse box:

1. Locate fuse box and remove the ignition or DIS fuse(s).
2. Install an inline fuse harness in place of the fuse.
3. Clamp the Low Amp Current Probe around the inline fuse harness.

3.6.4 Injector Current Measurement

Recommended Probe Setting: 20A

Note: Before taking measurements or clamping the probe jaws around any wire, complete the Setup steps below.

Setup

1. Use the On/Off and Range Selector switch to select the 20A setting.
2. Perform the Low Amp Current Probe Zero Adjustment procedure (refer to section 3.3).

Test

To measure injector current:

1. Clamp the Low Amp Current Probe around the B+ side or the control side wire of injector. Do not clamp the probe around both wires.
2. Verify that the probe jaws are fully closed.
The injector current readings display.
3. If a negative waveform displays, open the jaws and clamp the probe in the opposite direction.

Tech Note

If injectors are difficult to access, it may be possible to check injector current at the fuse box (if applicable).

To check injector current at the fuse box:

1. Locate the fuse box and remove the injector fuse(s).
2. Install an inline fuse harness in place of the fuse.
3. Clamp the Low Amp Current Probe around the inline fuse harness.

On sequential fuel injected vehicles, each waveform represents current flow through one injector. On bank-fired injectors, each waveform represents current flow through the injector bank. The injector waveform should have a gradual rise or ramp as the current begins to flow through the injector or the injector bank. Current flow through each injector or injector bank should be about the same (refer to Figure 6).

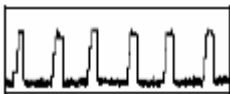


Figure 6.

If an injector or an injector bank has high current flow, suspect a shorted injector (refer to Figure 7).

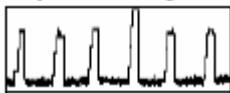


Figure 7.

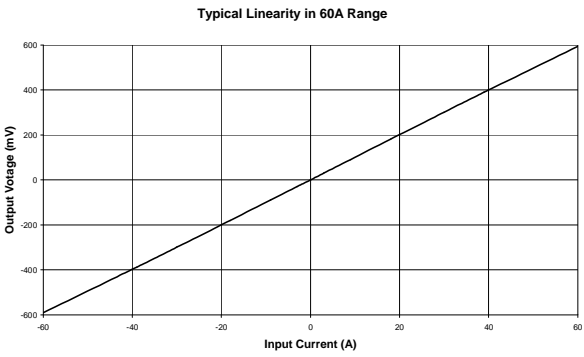
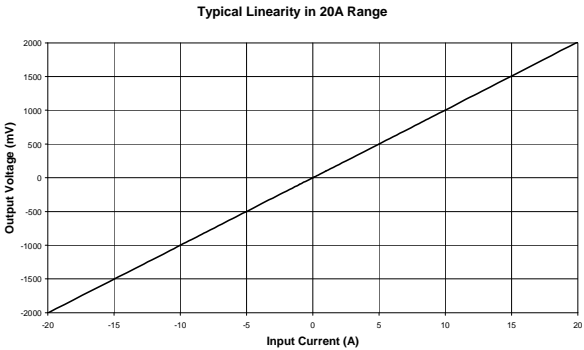
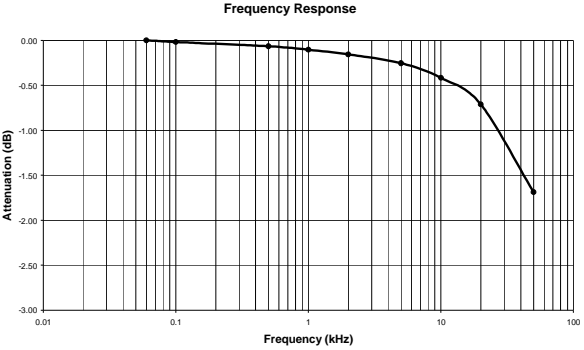
If an injector peak is missing, suspect an open injector, wiring, or defective PCM driver circuit (refer to Figure 8).



Figure 8.

To measure amperage, measure the maximum voltage of the waveform and use $100 \text{ mV} = 1 \text{ A}$ for calculation.

4.0 CURRENT PROBE CHARACTERISTICS



5.0 BATTERY REPLACEMENT

The **RED LED** flashes when the minimum operating voltage is approached, indicating that the battery needs to be replaced (refer to Figure 9). When replacing the battery, use the 9-volt alkaline (PP3/MN1604) type only. Using any other type of battery in the Snap-on Low Amp Current Probe will invalidate your warranty.

To replace the battery:

1. Unclamp the probe from the conductor.
2. Using the On/Off and Range Selector switch, turn the Low Amp probe off.
3. Disconnect the output leads from external equipment.
4. Loosen the captive screw that secures the battery cover.
5. Lift the cover through 30° and pull it clear of the probe body as shown in Figure 9. The battery is then accessible.
6. Insert the new 9-volt alkaline battery.
7. Replace the battery cover and re-tighten the battery cover release screw.

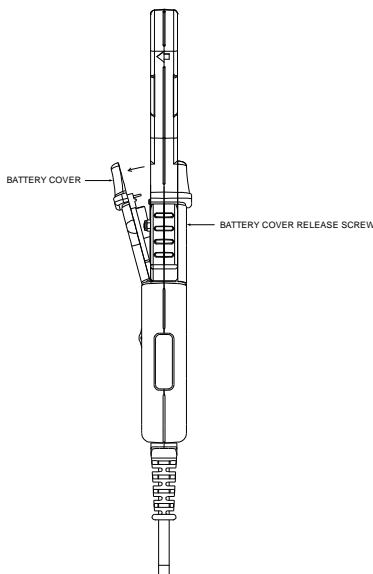


Figure 9

6.0 CLEANING

Clean the case periodically by wiping it with a damp cloth and detergent. Do not use abrasive cleaners or solvents. Do not immerse the probe in liquids.

7.0 WARRANTY

SNAP-ON INCORPORATED WARRANTS THAT SNAP-ON ELECTRONIC DIAGNOSTIC PRODUCTS ARE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS.

Snap-on will repair or replace this product if it fails to give satisfactory service due to defective workmanship or materials.

This warranty for Snap-on electronic diagnostic products is for ONE YEAR from the date of the original purchase. Repair or replacement shall be at the election and expense of Snap-on. Except where unreasonable, the product must be returned to Snap-on or a Snap-on dealer for warranty service. Snap-on does not provide any warranty for products subjected to abnormal use. Abnormal use includes misuse, modification, unreasonable use, neglect, lack of maintenance, use in production-related service, or use after the tool is significantly worn.

Consumable products are not covered by any warranty. Consumable products are goods, reasonably expected to be used up or damaged during use, including but not limited to filters, ribbons, printer paper, gases, oxygen sensors, batteries and air conditioning leak detector tips.

SNAP-ON SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL COST OR DAMAGES INCURRED BY THE PURCHASER OR OTHERS (including, without limitations, lost profits, revenues, anticipated sales, business opportunities, goodwill, or interruption of business and any other injury or damage). Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. This is your exclusive remedy and is in place of all other rights and remedies. You may have other rights, which vary from state to state or country.

SNAP-ON INCORPORATED


Kenosha, WI.
53141-1410

8.0 DECLARATION OF CONFORMITY

EC Declaration of Conformity		
Document number CE017		
We GMC-I PROSys 1 Potter Place, Skelmersdale, Lancashire WN8 9PH Certify that the product/s described below is/are in conformity with the following directive(s):		
2006/95/EC Low Voltage Directive for Electrical Safety		
Model	Order Number	Description
EETA308D	P-12.270.0	60A Open Loop Current Probe

The product/s has/have been assessed by application of the following standards or specifications:	
Low Voltage Directive	
BS EN 61010-1 : 2001 Safety requirements for electrical equipment for measurement, control and laboratory use.	150V Category Rating I Pollution Degree 2
BS EN 61010-2-032 : 2002 Particular requirements for handheld and hand manipulated current sensors for electrical test and measurement.	Type A

The product/s has/have been assessed by application of the following standards or specifications:	
EMC Directive	
BS EN 61326-2-2:2006 Safety requirements for electrical equipment for measurement, control and laboratory use.	Susceptibility Criteria A Emissions Class B

I certify for and on behalf of GMC-I PROSys Ltd. that the product/s mentioned above conform/s to the requirements mentioned above.			
Signature		Name	Desmond Ebenezer
Position	Technical Director	Date	03/08/2010

NOTES

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