

**To Connect to the Fuel Injector**

1. Connect the Inductive Pickup around a single drive wire going to an injector or bank of injectors. Confirm the pickup is connected properly by selecting the Drive Time function. If Drive time is full scale at Idle, the Pickup is on Backwards.

**Measurements**

1. Peak Amps is the peak current driving the injector. It is regulated by the driver. Typical peak readings are from 1 to 4 amps for a current regulated injector driver, and about 1 amp for a resistance limited injector driver. Peak Amps automatically selects the proper range. Be sure to note which range LED is active.
2. Build Time, is the time it takes the amperage to reach its maximum. Build Time is affected by the solenoid and pintle movement. Shorter Build Time can be caused by a solenoid winding short or an injector that is stuck. Longer build time could be from a bad driver or wire connection. Build Time is read on the upper scale.
3. Drive Time is the time the injector is actively driven. Use momentary wide open throttle to see the Min and Max readings. Drive Time is read on the lower scale.

**Analysis of Test Results**

In general, a difference of 1 amp between injector banks on resistance regulated injectors indicates that one or more injectors is faulty in the bank with the higher amperage draw. In a current regulated system, look for build time to be longer on the bank with an open or high resistance injector. Build will be shorter on the bank with a shorted injector.

**Using the Fuel Injector Probe with a Labscope**

The 71 sends a signal that is scaled at .1 volts (or 100mV) per amp detected. A 4 amp peak will appear 0.4 volts high on the labscope. Use a BNC Cable with a BNC to Banana Adapter (like Ferret P/N W090-10) to adapt the 71 to work on most labscopes or graphing multimeters.

**Technical Support**

For additional information or technical assistance, please contact Ferret Instruments at (800) 627-5655 or [www.ferretinstruments.com](http://www.ferretinstruments.com).

**Test Fuel Injectors without piercing wires or backprobing connectors. Connect to an individual injector or a bank of injectors inductively.**

**Use a LabScope to view the fuel injector pattern.**

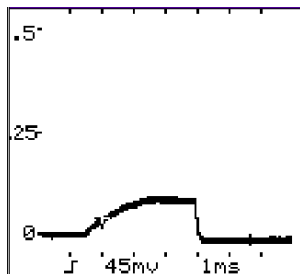
**20 segment bar graph displays Peak Amps, BuildTime or Drive Time at the press of a button.**

**Easily locate open or shorted injectors by using current ramping measurements.**

**Powered by a 9 Volt battery.**

**3 Year Limited Warranty**

**[www.ferretinstruments.com](http://www.ferretinstruments.com)**



## **SAFETY PRECAUTIONS**

- Always wear safety glasses, or other eye protection when testing vehicles. Be extra careful near batteries and moving parts.
  - Battery gas is highly explosive.
    - a. If a battery explodes, flush the acid away from person's skin with generous amounts of water. Follow up with a neutralizing solution of baking soda and then more water. Medical treatment for acid burns may be necessary. Treat clothing, vehicle parts, and equipment similarly. Any acid traces inside equipment must be removed by generous rinsing. Dry off equipment afterwards and place in a warm 50° C (120° F) oven until thoroughly dry.
    - b. Never use a wrench on the ungrounded battery terminal until the grounded one has been disconnected. Contact between the vehicle body metal and the "hot" terminal can cause sparks to ignite gas or even weld tools into a battery short circuit.
    - c. Keep the space around a battery well ventilated.
    - d. Do not make sparks or allow flames near batteries.
  - Before working on a vehicle, set the brakes and block the wheels. Beware of automatic parking brake releases.
  - Keep your work area well ventilated and free of exhaust. Engine exhaust contains deadly poisons.
  - Avoid electrical shocks caused by getting too close to live ignition wires or touching the coil TACH terminal. A person's reaction near a running engine can be more damaging than the shock.
  - Keep spark producing devices at least 0.5m (18") above the floor to reduce the hazard of igniting gasoline vapor.
  - Do not let test leads wind up in a fan or pulley. Route leads away.
  - Remove finger rings and metal wristbands. They can short terminals and become very hot from electric current.
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### **FERRET INSTRUMENTS LIMITED PRODUCT WARRANTY**

FERRET INSTRUMENTS, INC. of Cheboygan Michigan, warrants to the original purchaser that any products manufactured or supplied by Ferret Instruments, Inc. are free from defects in materials and workmanship for a period of three years from date of purchase. Our sole obligation for a product within the above warranties will be to repair or replace, at our option, any defective parts and return the product to the sender within the U.S.A., shipping prepaid, if it is sent to our Repair Department shipping prepaid and accompanied by proof of purchase. The above warranty is extended for the flashtubes in timing lights which are within five years of the date of manufacture.

### **EXTENDED SERVICE POLICY**

A Ferret product less than five years old according to the date of manufacture, and which is returned with transportation charges prepaid to: Ferret Instruments, Inc., Repair Department, 1310 Higgins Drive, Cheboygan, MI 49721, will be repaired or replaced, at factory option, for a service charge not to exceed 40% of the latest factory suggested user price; plus return transportation charges and insurance. If the product has been discontinued, the nearest equivalent product may be substituted.

This Warranty and Extended Service Policy do not apply to products which have been altered outside the factory; or repaired by anyone other than the factory or its authorized service centers; or which have been damaged from accidents, negligence, or abuse; or have been used differently than described in the printed instructions. Please note that wear and tear on leads and replacement of consumable (paper, oxygen sensors, Nox Sensors, etc.) items, is not covered by warranty.

Ferret Instruments, Inc.'s sole liability and buyer's exclusive remedy is limited to repair or replacement of the product as stated in the Limited Product Warranty and the Extended Service Policy. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND FERRET INSTRUMENTS, INC. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE SALE OR USE OF THE PRODUCT.

Some states do not allow limitations on the length of implied warranties nor exclusion or limitations of incidental or consequential damages, so that the above limitations and/or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.