MOTOR AGE TRAINING | TST

"What Can You Do With a Labscope?"

Presented by Motor Age & TST

Sponsored by PICO

What To Expect From This Webinar

- **Whether you're new to scope diagnostics or looking to expand your capabilities, this webinar will show you how to turn your labscope into one of the most powerful tools in your shop.**

- **Learn how to perform a wide range of high value tests that dramatically speed up your diagnostic process and improve accuracy.**

- **Battery & Starter Testing**
- **Relative Compression Testing**
- **Sensor Testing & Actuator Testing**
- **Voltage, Current, & Pressure Waveform Analysis**

- **The Recording Will Be Available at Motor Age Training Account & TSTseminars.org**

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PICO

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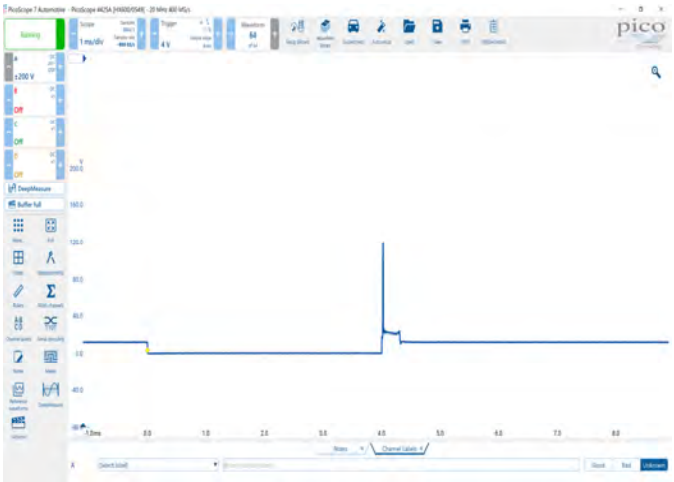
PICO Checking DC Voltage



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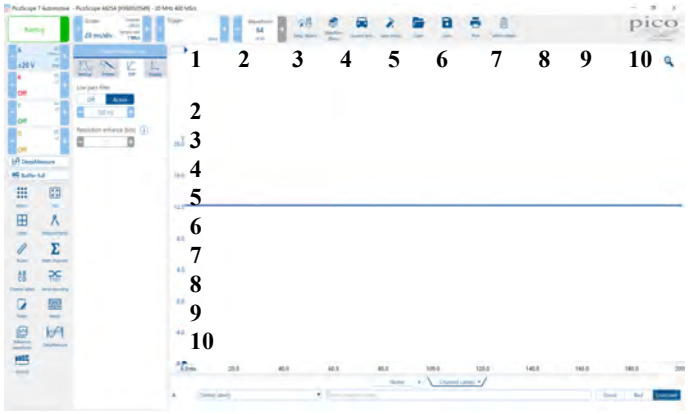
PICO Labscope



The grid is usually 10 rows high and 10 columns wide, dividing the screen into 100 blocks, called major divisions. Older labscopes were 8 rows high and 10 columns wide, dividing the screen into 80 blocks, called major divisions.

In digital scopes where the grid is made of light segments or dots instead of paint on the glass screen, you may have the option of turning the graticule off or changing the spacing or number of lines or dots that make up the grid.

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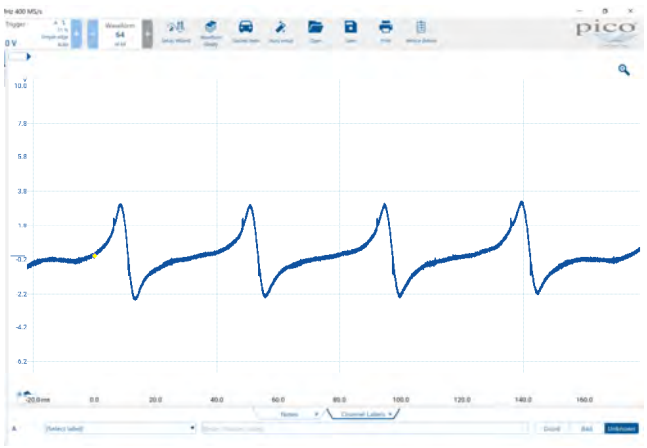
PICO Time & Voltage On The Scope Screen

- **When the scope is connected to a circuit, voltage in the circuit is displayed vertically, (up and down).**
- **Vertical movement indicates a change in voltage.**
- **To measure voltage, count the number of divisions the trace rises and multiply times the voltage scale selected.**



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PICO Voltage & Time Per Division

Here, we've adjusted the scope so each vertical division equals 2 volts. Since there are 10 rows on the screen, we can measure a total voltage of 20 volts at one time 10 rows (x 2 volts = 20 volts).

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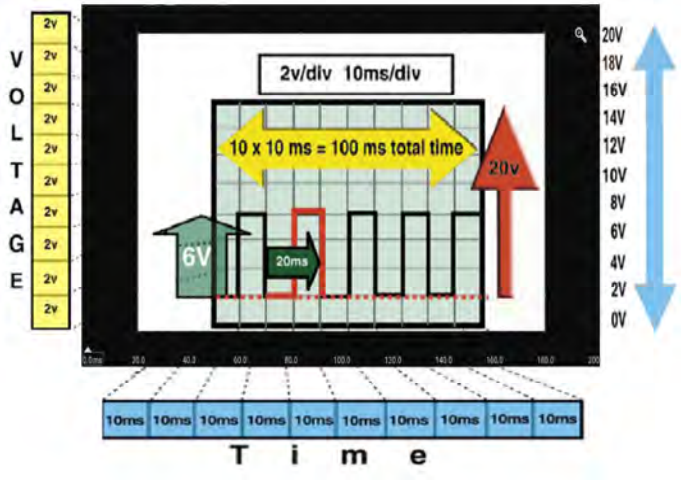
PICO Divisions



The scope is set to 2 V/Div and 10 mS/Div.
We have set the ground level (zero volts) at the horizontal grid line above the graticule bottom row (shown by the dotted line).
The waveform rises three divisions from the ground line. That's 3 x 2 volts = 6 volts. Our waveform has an amplitude of 6 volts.

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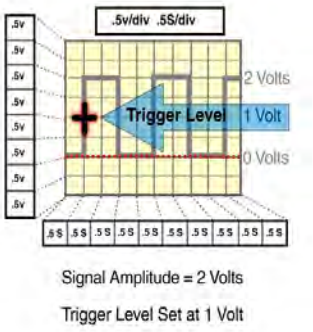
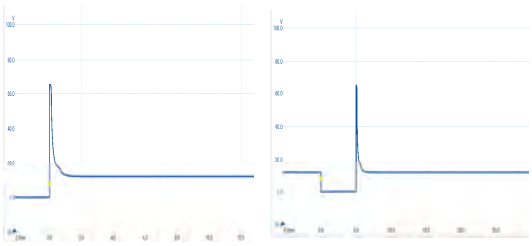
PICO Trigger & Slope

The trigger function does what its name suggests. It "triggers" the scope sweep when the signal crosses a specified voltage. But we can also set the scope to trigger on either a rising voltage or a falling voltage, and that's where slope comes in.



Positive slope triggers the sweep on a signal whose voltage is rising.



Negative slope triggers the sweep on a signal whose voltage is falling.

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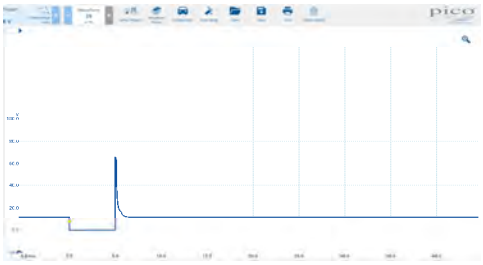
PICO Trigger Sources

Internal - The scope is triggered by the sampled voltage at one of the scope's input channels. In other words, the scope is triggered.



External - This is a separate scope input (commonly marked ext) that triggers the scope from an external source, regardless of the channel settings or channel voltage.

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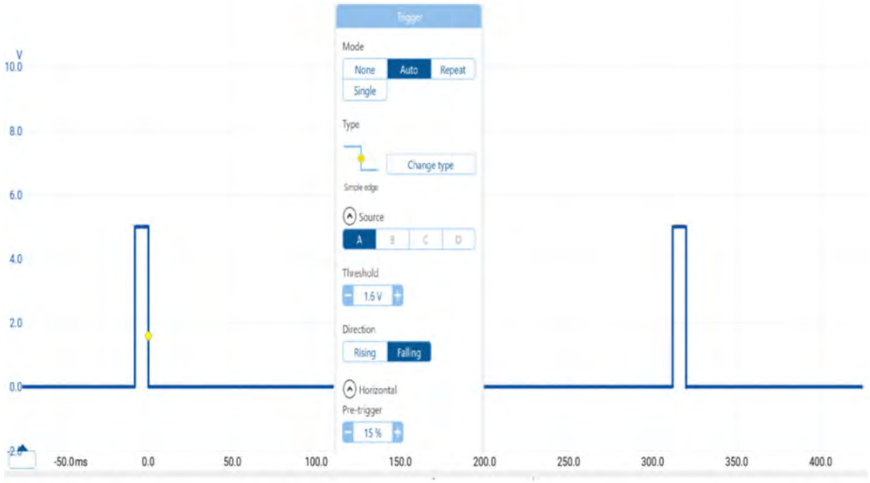
PICO Trigger Modes



Auto - Repeat - Single - Trigger

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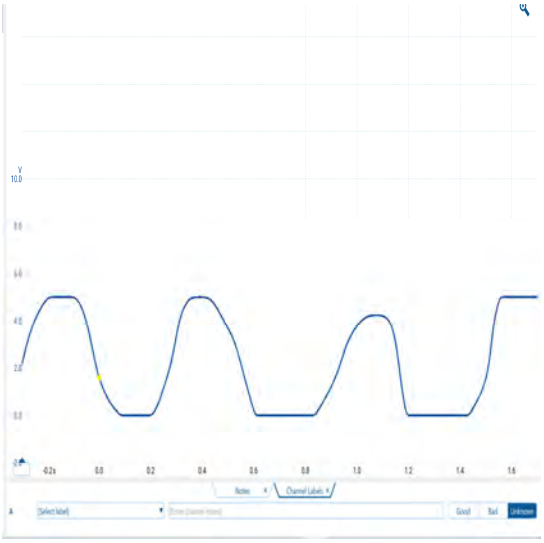
PICO Direct Current/Voltage Signals



Throttle Position Sensor (TPS) voltage corresponds to throttle opening. Voltage may increase or decrease as the throttle opens, depending on system design. This waveform is from a good sensor.

Note that the voltage increases and decreases smoothly as throttle angle changes.

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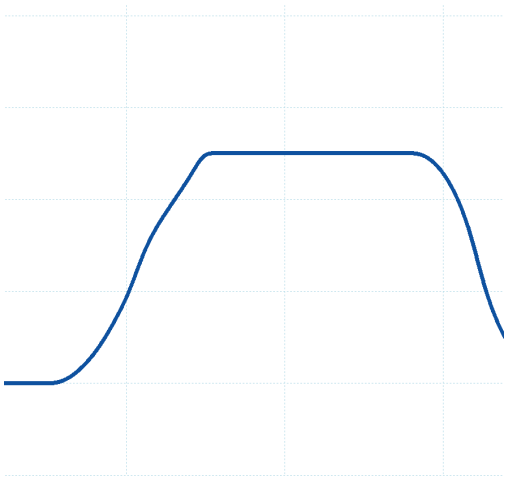
PICO Direct Current/Voltage Signals



This is a waveform from a mass airflow sensor during a snap throttle test. Signal voltage increases to indicate the increase in air mass taken into the engine as the throttle opens and then falls again as the intake plenum fills.

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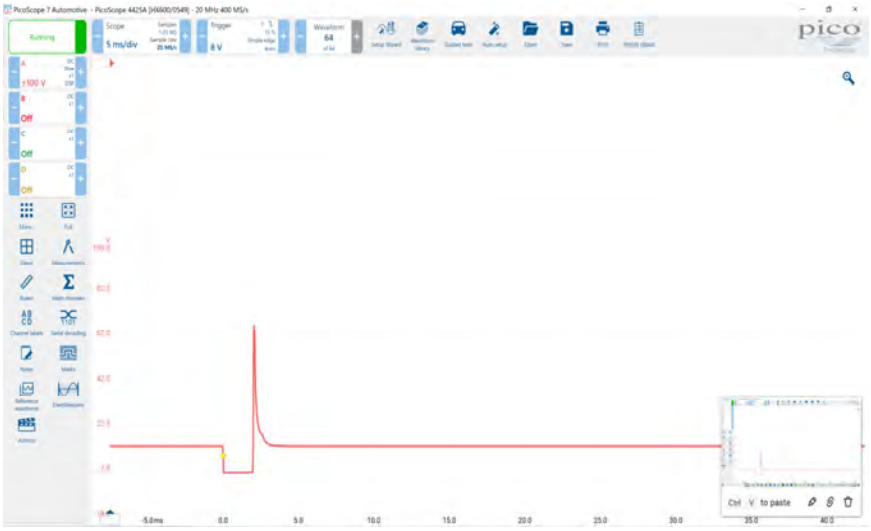
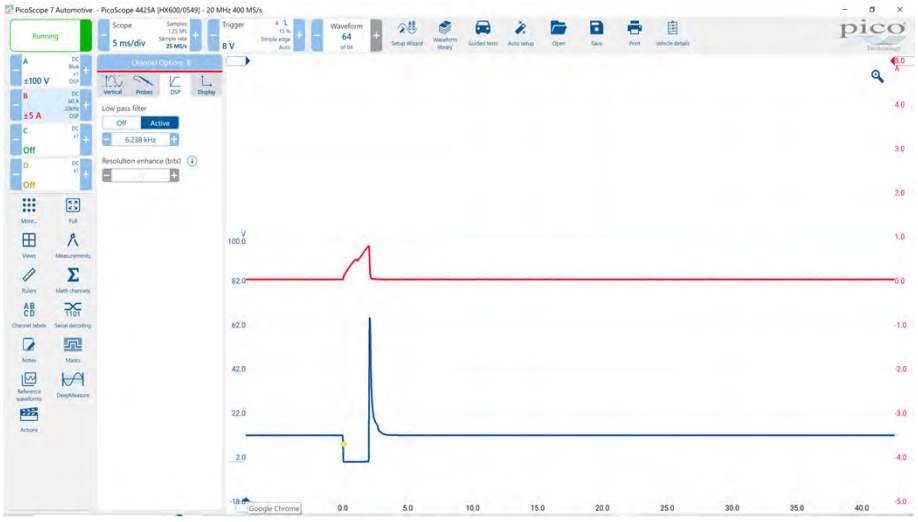
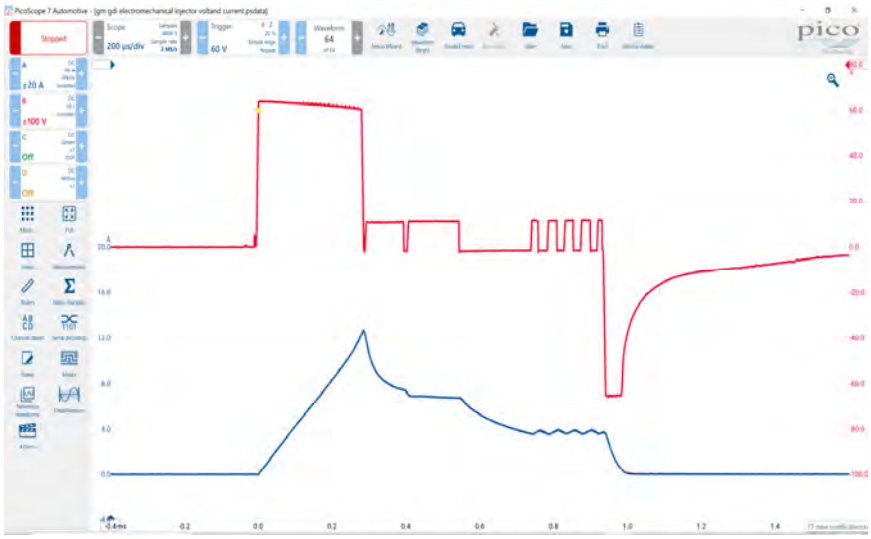
PICO Fuel Injector



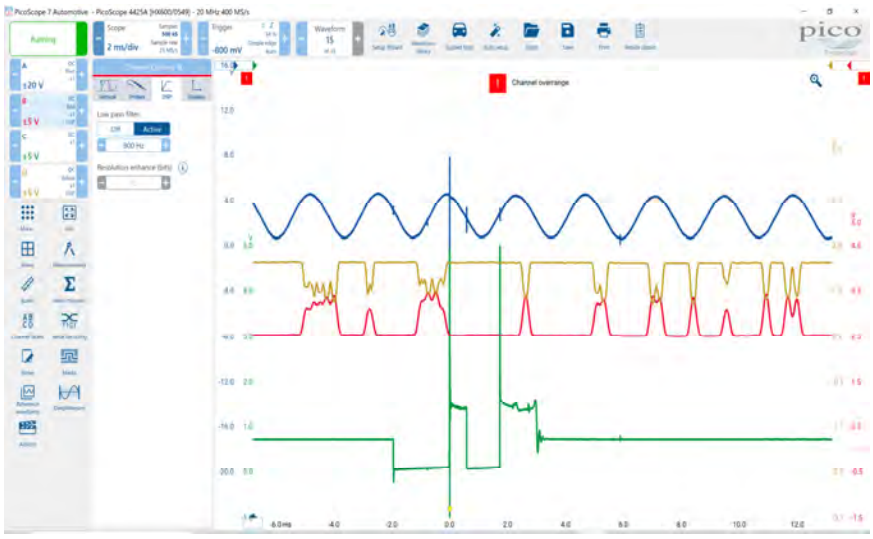
PICO Voltage & Current



PICO GDI Fuel Injector - Voltage & Amperage



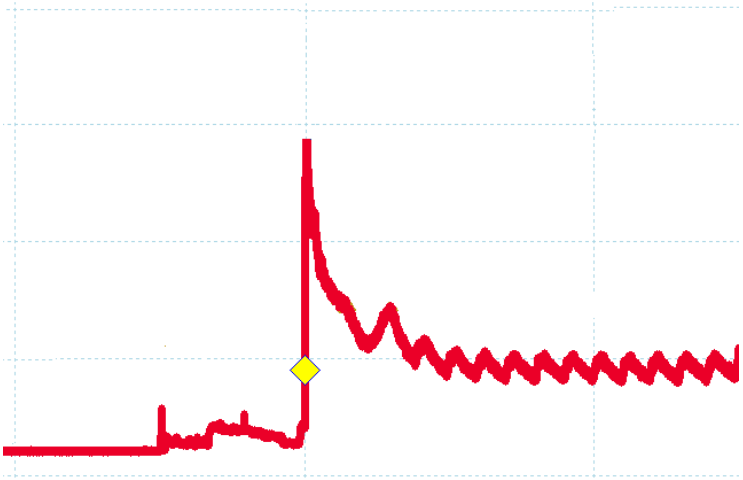
PICO AC Crank - Pin 6 & 14 CAN - Ignition



PICO Direct Current

The DC voltage signals shown is the current draw from a starter motor.

Anything else?



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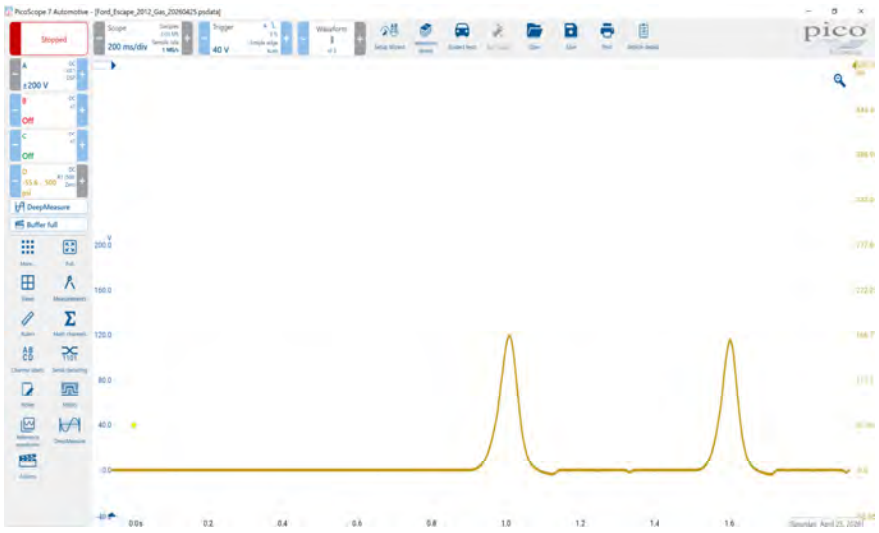
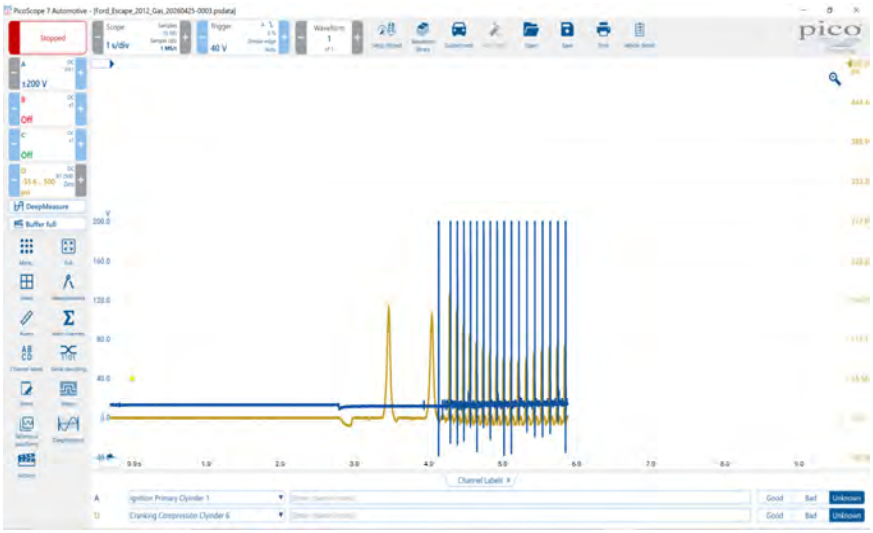
PICO Cranking Compression



PICO Relative Compression - Voltage - Amperage

PICO Ignition & Running Compression

PICO Ignition & Cranking & Running Compression



On To The Vehicle

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Thank you to our partner!

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THANK YOU

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