

# 60 A DC Current Clamp (TA018) User's Guide



The TA018 current clamp is ideal for use with the PicoScope 3223 and 3423 for measuring currents between 10 mA and 60 A. This enables the scope to display current waveforms for fuel injectors and fuel pumps (see waveforms below).

The current clamp has two calibration settings, set by a slider switch on the handle of the probe.

- 1 mV / 10 mA (100 mV = 1 A): use this for testing currents up to 20 A
- 1 mV / 100 mA (10 mV = 1 A): use this for testing current up to 60 A

In use there is no need to break into the circuit or disturb the isolation, as the jaws simply clamp around the current-carrying conductor. No electrical contact is required.



## Connecting the TA018 current clamp

The current clamp is supplied with a BNC-type connector so it can be plugged directly into the PicoScope 3223 and 3423 scopes.

Once the clamp is connected to the scope, switch the clamp on (the green LED should light) and then fit the jaws around the current-carrying conductor (as pictured).



## Using the TA018 current clamp with PicoScope

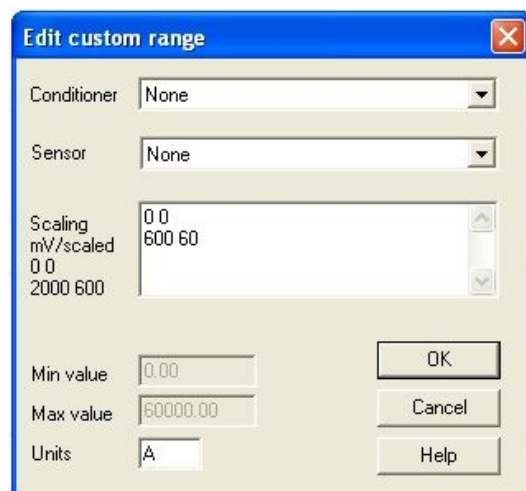
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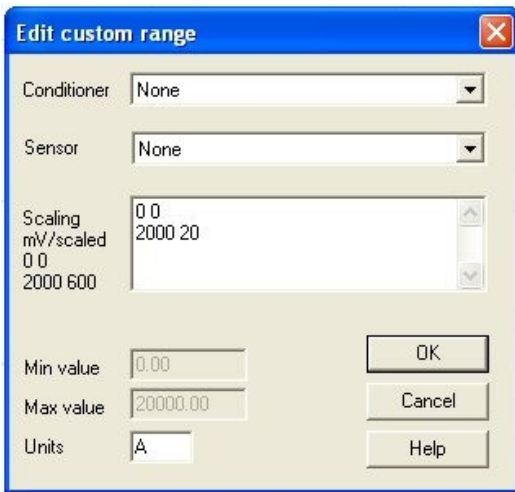
You can quickly check that the clamp is working by measuring the current drawn when a car's headlamps are switched on. To do this, start PicoScope and select the 1 mV / 10 mA range (DC coupled) on either the scope or the meter. Connect the clamp around one of the wires to the headlamps. With nothing on the car switched on, the reading on PicoScope should be near 0 mV. Now switch the headlamps on, and the reading should jump up a few mV (100 mV per ampere of current drawn). If the reading jumps down, don't worry: current clamps are directional, so just reverse the clamp on the conductor.

Using PicoScope it is easy to scale the output from the clamp from mV to amps. First select **Settings | Custom Ranges** from the drop-down menu, and then click the **Add** button.

Next, fill in the scaling information. The custom settings on the right will scale the mV output from the current clamp on the 1 mV / 100 mA setting. The output from PicoScope will be in the range 0 to 60 amps.



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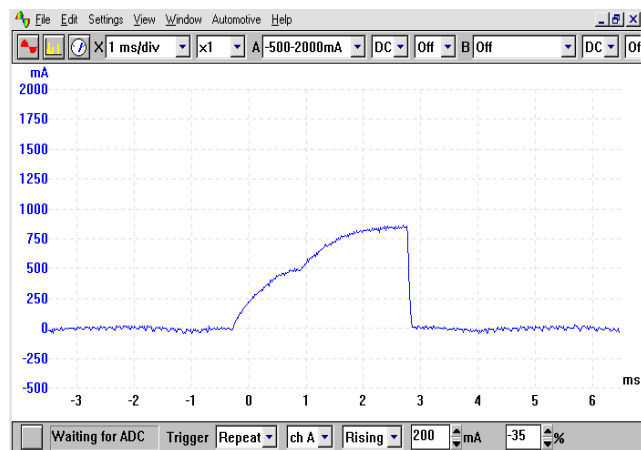
The custom range on the left scales the mV output from the current clamp on the 1 mV / 10 mA setting. PicoScope will show the output from the current clamp in the range 0 to 20 amps.

There is more information on scaling in PicoScope's online manual.

When you have entered the scaling information, click **OK** twice to return to the main menu. Now select **File | Save Settings** to save your custom range. This custom range now appears in the drop-down list of voltage ranges (see examples below).

## Injector current waveform

The waveform on the right shows the current waveform for a fuel injector. The waveform shows two stages. The first stage (0 to 1.2ms) shows a small amount of current being drawn, where the injector has been switched by the ECU but the solenoid is charging and hasn't been fired. After this small delay an increase in current can be seen. This is the solenoid actually firing and fuel being injected into the engine.



## Fuel pump current waveform

The screen shot on the right shows a captured current waveform from a fuel pump. The waveform can be seen to have an AC ripple due to the switching between different commutators in the motor. This can be seen to repeat every 8 cycles. A fault with one of the windings or brushes will be shown by the current drawn for one period of the waveform being reduced significantly.

