Automotive Oscilloscope ATO Series

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PRODUCT OVERVIEW

ATO series oscilloscope is an oscilloscope dedicated to automotive maintenance and diagnostics. Equipped with professional automotive diagnostic functions, it comes with 2 and 4 channels, max. 300MHz bandwidth, up to 2GSa/s sampling rate and 220Mpts memory depth, delivers most powerful signal capture and analysis capability.

With 10.1-inch high-resolution full touch screen, large built-in battery, and Micsig's dedicated SigtestUI ™ multi-tasking system, the ATO automotive oscilloscope making modern automotive diagnostics much easier than ever before.

- Professional automotive diagnostic tests
- Compact portable design, best for field work
- Large battery support continual field work
- Android-based OS, 32GB internal storage
- Switchable 1MΩ/50Ω input impedance
- Deep memory to display all signal details
- Comprehensive serial bus trigger & decoding
- Support WIFI, USB, PC and SCPI control
- Hardware-based filter to eliminates interferences
- Support segmented storage acquisition

Key Specifications

Model	ATO3004	ATO2004	ATO2002	ATO1004
Bandwidth	300MHz	200MHz	200MHz	100MHz
Analog Channels	4	4	2	4
Rise Time	≤ 1.16ns	≤ 1.75ns	≤ 1.75ns	≤ 3.5ns
Sampling Rate (Max.)	2GSa/s	2GSa/s	1GSa/s	1GSa/s
Memory Depth	220Mpts		110Mpts	
Input Impedance	1MΩ/50Ω		1MΩ	
Waveform Capture Rate (Max.)	300,000 wfms/s		78,000 wfms/s	
Interfaces	USB 3.0/2.0 Host, USB Type-C, Grounding, HDMI, Trigger out			
Bandwidth Filter	Full bandwidth, Low pass			
Display	Industrial 10.1" TFT-LCD (1280*800)			
Dimension / Net Weight	265*192*50mm / 1.9kg (with battery)			
Battery	7.4V, 7500mAh, Li-ion battery			

CHARACTERISTICS & FEATURES

Portable Design

ABS+TPU protector, pre-installed handstrap, only 1.9kg, one hand to hold.

Friendly UI

Fast Android OS experience, updated UI design, easy to use

Robust Hardware

Upgraded core hardware, fast CPU, 32G internal storage, support video recording.

Protocol Decoding

RS-232/422/485/UART、CAN、CAN FD、LIN、SPI、I^2C

Smooth Touch

10.1" integrated seamless touch screen, ultra-high 1280*800 resolution.

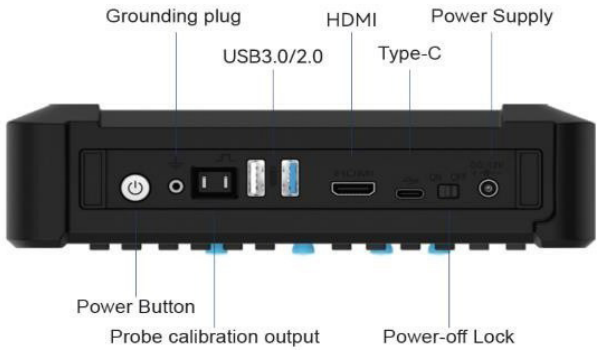
Auto-diagnostic Presets

Dedicated software for auto repair engineers, covering most of the auto repair tests.

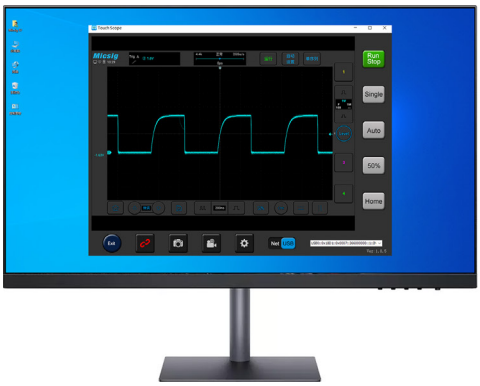
Auto-diagnostic Presets:

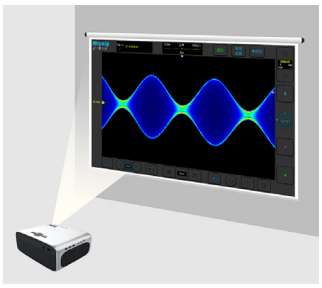
Charging/Start Circuit: 12V&24V charging, Alternator AC Ripple, Ford smart Alternator, 12V&24V Start, Cranking Current
Sensor: ABS, Accelerator Pedal, Air Flow Meter, Camshaft, Coolant Temperature, Crankshaft, Distributor, Fuel pressure, Knock, Lamda, MAP, Road Speed, Throttle Position
Actuators: Carbon Canister Solenoid Valve, Diesel Glow Plugs, EGR Solenoid Valve, Fuel Pump, Idle Speed Control Valve (IAC), Injector (Petrol), Injector (Diesel), Pressure Regulator, Quantity Control Valve, Throttle Servomotor, Variable-speed cooling fan, Variable Valve Timing
Ignition: Primary, Secondary, Primary + Secondary
Networks: CAN High & CAN Low, CAN FD, FlexRay, K line
Combination Tests: Crankshaft + Camshaft, Camshaft + Primary Ignition, Primary ignition + Injector Vol, Crankshaft + Camshaft + Injector Vol.+ Secondary Ignition
Pressure Tests: Intake Manifold, Exhaust Tailpipe, In-Cylinder, In-Crankcase

▸ Built-in large Li-ion battery, work where you work



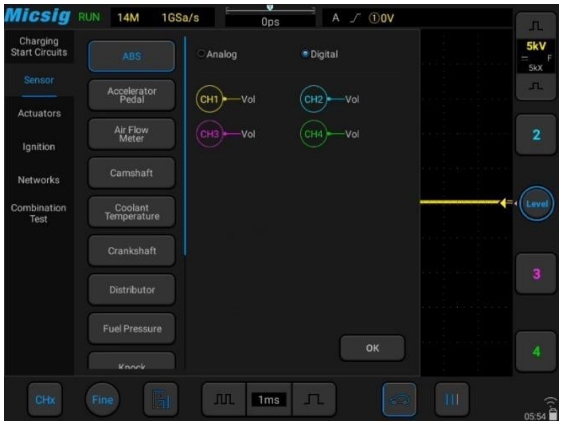
▸ Complete connectivity (*switch Power-off lock to ON for first-time use)



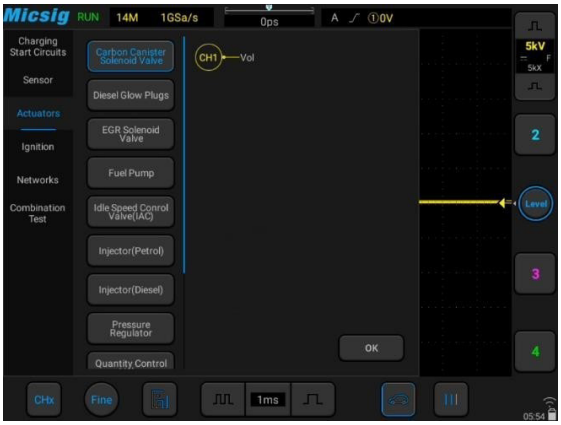


▸ The ATO series supports PC software + Mobile App (Android / iOS) remote control via Wi-Fi, USB to access internet for online upgrade, it also can be projected through HDMI port for demonstrations for training and education purpose.

▲ Support 12/24V Charging & Start circuit, AC Ripple, Cranking Current tests



▲ Directly measure the waveform of various Sensors,by comparing with standard waveform, helps user easily find out possible problem.

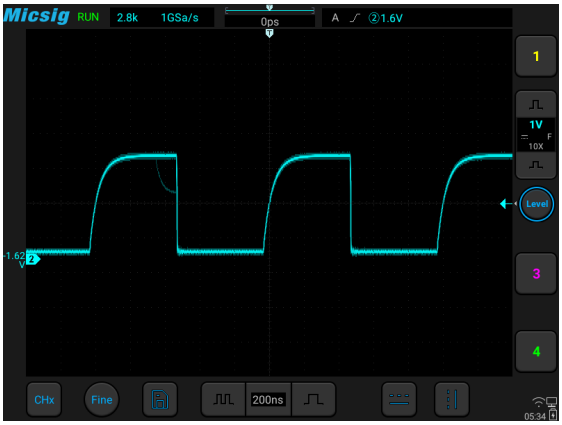


▲ Support multiple Actuator tests, including Carbon Canister & EGR solenoid valve, Fuel PumpInjectors, Cooling fan, Pressure Regulator, etc.

▲ The ignition system of a car is usually composed of primary and secondary coils and spark plugs. Can test both Primary and Secondary ignition signals, to find out possible malfunction.

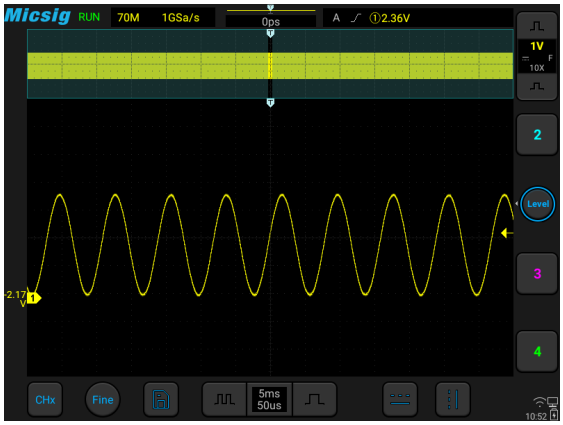
▲ ATO is capable of acquiring and decoding CAN High /CAN Low, CAN FD, LIN, FlexRay, and K line signals,delivers professional Network communication tests on vehicles.

▲ The electronic faults can be complicated, by comparing the collected various waveforms, users judgefaults by analyzing the timing and quantitative relationships between waveforms.



High Waveform Update Rate

With a waveform update rate of up to 300,000 wfm/s,the ATO can easily capture unusual or low probability events.

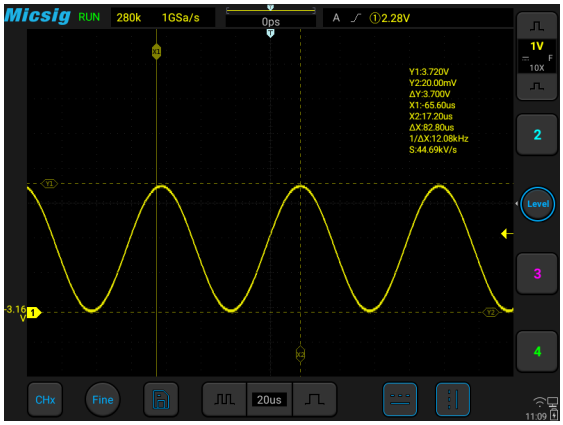


Ultra-deep Memory

Using hardware-based Zoom technique and memorydepth of up to 220Mpts, users to move and browse waveforms much easier and quickly zoom in to focuson the area of interest.

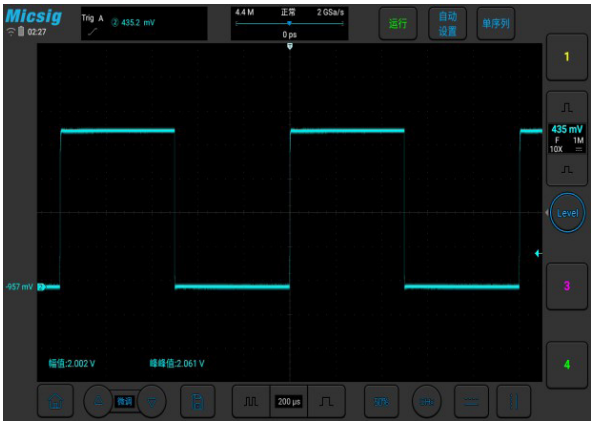
Powerful Trigger Functions

Support Edge, Pulse, Logic, N Edge, Runt, Slope, Timeout, Video and Serial trigger, most intuitive trigger settings.



Convenient Cursor Measurement

One touch to open horizontal and vertical cursors, eachcursor can be moved separately or simultaneously.



Vertical scale fining

By pinching two fingers apart on the screen, you can adjust the vertical scale as you like, no longer limited by the 1/2/5 step limit.

Serial Bus Decoding and Analysis

Support RS-232/422/485/UART, LIN, CAN, CAN FD, I²C, SPI serial bus decoding and triggering options, display waveform and data at the same time.

Specifications

Vertical System	
Bandwidth Filter	ATO3004 / ATO2004: Full bandwidth, Low pass (to 30Hz) ATO2002 / ATO1004: Full bandwidth, Low pass (to 30KHz)
Input Coupling	DC、AC、GND
Input Impedance	ATO3004 / ATO3002 / TO2004：1MΩ±1% ‖ 50Ω±1% ATO2002 / ATO1004：1MΩ±1%
Vertical Resolution	8 bits
Vertical Divisions	10div
Input Sensitivity Range	ATO3004 / ATO3002 / ATO2004：1mV/div~10V/div（1MΩ） 1mV/div~1V/div（50Ω） ATO2002 / ATO1004：1mV/div~10V/div（1MΩ）
DC Gain Accuracy	5mV/div ~10V/div：≤ ±2.0%; ≤ 2mV/div：≤ ±3.0%
Offset Range（1MΩ, 50Ω）	±2.5V (Probe @ X1, <500mV/div), ±120V (Probe @ X1, ≥ 500mV/div)
Noise	≤ 1.2mVpp（1mV/div，1MΩ）
Maximum Input Voltage	CAT I 300Vrms 400Vpk（1MΩ），5Vrms（50Ω）
Ch-to-Ch Isolation DC to Max. Bandwidth	＞ 40dB（≤ 100MHz），＞ 35dB（＞ 100MHz）

Horizontal System	
Time Base	1ns/div~1ks/div（ATO2002 / ATO1004：2ns/div-1ks/div）
Time Base Accuracy	20ppm
Vertical Divisions	11div
Clock Drift	≤ ±5ppm / year

Trigger System	
Trigger Mode	Auto, Normal, Single
Trigger level range (analog)	±5div from the center of the screen, analog channel
Trigger Holdoff Range	200ns~10s
Trigger Coupling (frequency)	DC, AC (70Hz), high frequency (40KHz), low frequency (40KHz), noise (10MHz)
Trigger Types	Edge, Pulse Width, Logic, N Edge, Runt Pulse (Runt), Slope, Time Out, Video
Bus decoding	RS-232/422/485/UART、CAN、CAN FD、LIN、SPI、I2C

Sampling System	ATO3004 / ATO2004 / ATO3002	ATO2002 / ATO1004
Real-Time Sampling Rate	2G Sa/s (One CH), 1G Sa/s (All CH)	1G Sa/s (One CH), 250M Sa/s (All CH)
Max. Memory depth	220Mpts	110Mpts
Segmented Storage	Support	Not Support
Average	2,4,8,16,32,64,128,256	2,4,8,16,32,64,128,256
Envelope	2,4,8,16,32,64,128,256, ∞	2,4,8,16,32,64,128,256, ∞

Waveform Measurements	
Automated Measurements	Period, Frequency, Rise Time, Fall Time, Delay, Positive Duty Cycle, Negative Duty Cycle, Positive Pulse Width, Negative Pulse Width, Burst Width, Positive Overshoot, Negative Overshoot, Phase, Peak-to-Peak, Amplitude, High, Low, Maximum, Minimum,RMS, Cycle RMS, Mean, Cycle Mean
Hardware Frequency Meter & Resolution	6 digits, 2Hz~Max bandwidth，PK-PK ＞ 0.8div
Cursors	Horizontal, Vertical, Cross
Waveform Math	
Dual Waveform	+、-、*、/，analog channel
FFT	Points: max. 275kpts Rectangular, Hamming, Blackman, Hanning
AX+B	A: ±1k, Min. Resolution 1p or 4it B: ±1k, Resolution 1p or 5bit X: Analog channel
Advance math	Advanced input, including +、-、*、/、<、>、≤、≥、==、!=、&&、‖、（、）、!(、sqrt、abs、deg、rad、exp、diff、ln、sin、cos、tan、intg、lg、asin、acos、atan

Display System	
Display Type	10.1-inch TFT LCD capacitive, 11*10 divisions
Persistence Duration	Auto, 10ms~10s, ∞
Time Base Mode	YT、XY、Roll、Zoom
Expand Benchmark	Center, Trigger position
Waveform Display	Vectors, Line, brightness adjustable
Waveform Update Rate	ATO3004/2004/3002 is 300,000 wfms/s，ATO2002 / ATO1004 is 78,000 wfms/s

Storage	
Storage Medium	Local, USB drive
Internal Storage	32G
Waveform Storage Format	WAV、CSV、BIN
Store Waveform Quantity	Unlimited
Stored Waveform Rename	Support
Reference Waveform Display	4 internal waveforms
Quick Screenshot	Support
User Setting Storage	10 internal setups
User Settings Rename	Support
USB Flash Drive	Support industry standard flash drives
Screenshot, Video recording	Support

Input / Output Ports	
USB3.0 Port	Support one USB mass storage device, read and edit
USB2.0 Port	One, read and edit
USB Type-C	One, read and edit
DC Port	One
Probe Compensator	1kHz、2Vpk-pk
HDMI	HDMI 1.4
Wi-Fi	Support
Android/iOS remote control application	Support
SCPI	Support

Power Source	
Power Voltage Range	100~240V AC, 50/60Hz
Power Consumption	< 60W
Adapter Output	12V DC, 5A（ATO2002 / ATO1004 is 12V DC, 4A）
Battery	7.4V, 7500mAh Li-ion battery

Environment	
Temperature	
Operating	0℃ ~ 45℃
Non-operating	-40℃ ~ 60℃
Humidity	
Operating	5% ~ 85%, 25℃
Non-operating	5% ~ 90%, 25℃
Altitude	
Operating	< 3000m
Non-operating	< 12000m

Physical Characteristics	
Dimensions (W x H x D)	265*192*50mm
Weight	Net: 1.9kg (with battery), Volume Weight: 4.5kg

Standard Kit


2 x passive probe


2/4 BNC-Banana cable


power cord


1/2 x Alligator clips/pair

1/2 x soft pin probe/pair


power adapter


Battery (built-in)


screen protector

* ATO2002 are 2CH oscilloscopes, and ATO1004/2004/3004 are 4CH oscilloscopes.
The standard configuration of the 2CH oscilloscope includes 2 BNC banana cables, 1 pair of alligator clips, and 1 pair of soft pin probe.
The standard configuration of the 4CH oscilloscope includes 4 BNC banana cables, 2 pairs of alligator clips, and 2 pairs of soft pin probe.

Master Kit


2 x passive probe


2/4 BNC-Banana cable


secondary ignition probe


1/2 x Alligator clips/pair

1/2 x soft pin probe/pair


Multimeter probe


power cord


power adapter


Suitcase


Battery (built-in)


screen protector

Optional instruments

Optical-fiber Isolated Probe	
SigOFIT series	Bandwidth: up to 1GHz, Common mode voltage: 85kVpk, DC gain accuracy: 1%, CMRR: up to 180dB

High Voltage Differential Probe	
DP series	Bandwidth: up to 500MHz; Differential voltage (DC+AC PK) Max.7000V; Accuracy：±2%

Current Probes	
HF AC/DC current probe CP series	Bandwidth: up to 100MHz, Range: 5A/30A, Accuracy: ±1%
LF AC/DC current probe CP2100 series	Bandwidth: up to 2.5MHz, Range: 10A/100A
Rogowski AC current probe RCP series	Bandwidth: 2Hz - 30MHz, Range: 6000Apk, Accuracy: 2%
AC Current Probe ACP1000	Bandwidth: 10Hz -100KHz, Range: 0.1Apk-1000Apk

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