



Specifications

NOMINAL CHARACTERISTICS

Nominal characteristics describe parameters and attributes that have are guaranteed by design, but do not have associated tolerances.

| | | |
|-------------------------------|---|----------------------------------|
| Input Configuration: | True Differential (+ and – Inputs); with shield Ground connector. | |
| Effective Gain ¹ : | X10, X1, ÷10, ÷100 ² | |
| Input coupling: | DC. AC Coupling obtained by installing AC Coupling Adapter. | |
| Differential Mode Range | | |
| (with 10X Gain): | ±40 mV | (÷1 Attenuation) |
| | ±400 mV | (÷10 Attenuation) |
| | ±4 V | (÷100 Attenuation ²) |
| (with 1X Gain): | ±400mV | (÷1 Attenuation) |
| | ±4 V | (÷10 Attenuation) |
| | ±40 V | (÷100 Attenuation ²) |
| Common Mode Range: | ±4.2 V | (÷1 Attenuation) |
| | ±42 V | (÷10 Attenuation) |
| | ±42 V | (÷100 Attenuation ²) |
| Maximum Input Voltage: | ±42 V either input from ground. | |

Notes: ¹ From combinations of gain, internal and external attenuation.

² Use external plug-on ÷10 attenuator for ÷100.



WARRANTED ELECTRICAL CHARACTERISTICS

Warranted characteristics are parameters with guaranteed performance. Unless otherwise noted, tests are provided in the Performance Verification Procedure for all warranted specifications.

LF Gain Accuracy: 2% into 50.0 Ω load³,
measured at 1 kHz with 0 volt
offset

Common Mode Rejection Ratio⁴: (Probe head grounded, DC
Coupled, ± 1 Attenuation,
without external attenuator)

| | | |
|---------|---------------|---------|
| 70 Hz | $\geq 3160:1$ | (70 dB) |
| 1 MHz | $\geq 1000:1$ | (60 dB) |
| 250 MHz | $\geq 5:1$ | (14 dB) |

Notes: ³ Output impedance is 50 Ω , intended to drive 50 Ω . Add uncertainty of termination impedance to accuracy.

⁴ LeCroy measures CMRR with a fixture that connects the probe tip ground to the signal source ground. This method is necessary to obtain a reproducible CMRR measurement.

Often, users leave the probe tip ungrounded when measuring high frequency signals. Not grounding the probe tip can actually improve CMRR by allowing some of the common mode signal to be impressed across the entire length of the probe cable instead of from probe tip to probe ground. The CMRR improvement obtained without grounding the probe tip depends on proximity to probe cable ground, and is therefore nonreproducible.

LeCroy has chosen to use a reproducible method of measurement, rather than obtain a more optimistic measurement.

TYPICAL ELECTRICAL CHARACTERISTICS

Typical characteristics are parameters with no guaranteed performance. Tests for typical characteristics are not provided in the Performance Verification Procedure.

Bandwidth, probe only

(-3 dB): DC to ≥ 500 MHz

Risetime, probe only: ≤ 700 ps ($\div 10$ Attenuation)
 ≤ 875 ps ($\div 1$ Attenuation)

Residual Autobalance

Offset (Ref. to input) : ≤ 100 μ V ($\div 1$ Attenuation)
 ≤ 1.5 mV ($\div 10$ Attenuation)

Differential Offset

Range: ± 400 mV ($\div 1$ Attenuation)
 ± 4 V ($\div 10$ Attenuation)
 ± 40 V ($\div 100$ Attenuation⁴)

Input Resistance

(each side to ground): $1\text{ M}\Omega$

Input Capacitance

(between inputs): ≤ 1.6 pF ($\div 10$ Attenuation)
 ≤ 3.1 pF ($\div 1$ Attenuation)

Input Capacitance

(each side to ground): ≤ 3 pF ($\div 10$ Attenuation)
 ≤ 6 pF ($\div 1$ Attenuation)

Noise

(Referred to input,

5 to 1000 MHz): $6\text{ nV}/\sqrt{\text{Hz}}$ ($\div 1$ Attenuation, 10X Gain)
 $10\text{ nV}/\sqrt{\text{Hz}}$ ($\div 1$ Attenuation, 1X Gain)
 $60\text{ nV}/\sqrt{\text{Hz}}$ ($\div 10$ Attenuation, 10X Gain)
 $115\text{ nV}/\sqrt{\text{Hz}}$ ($\div 10$ Attenuation, 1X Gain)



Output Impedance: 50 Ω nominal. Intended to drive 50 Ω

Harmonic Distortion

3rd order distortion: -52 dB below fundamental (200 mV_{p-p} output, at 100 MHz)

3rd order intercept: +15 dBm (at 100 MHz measured at output)

AC Coupling LF Cutoff

(-3dB): 1.6 Hz

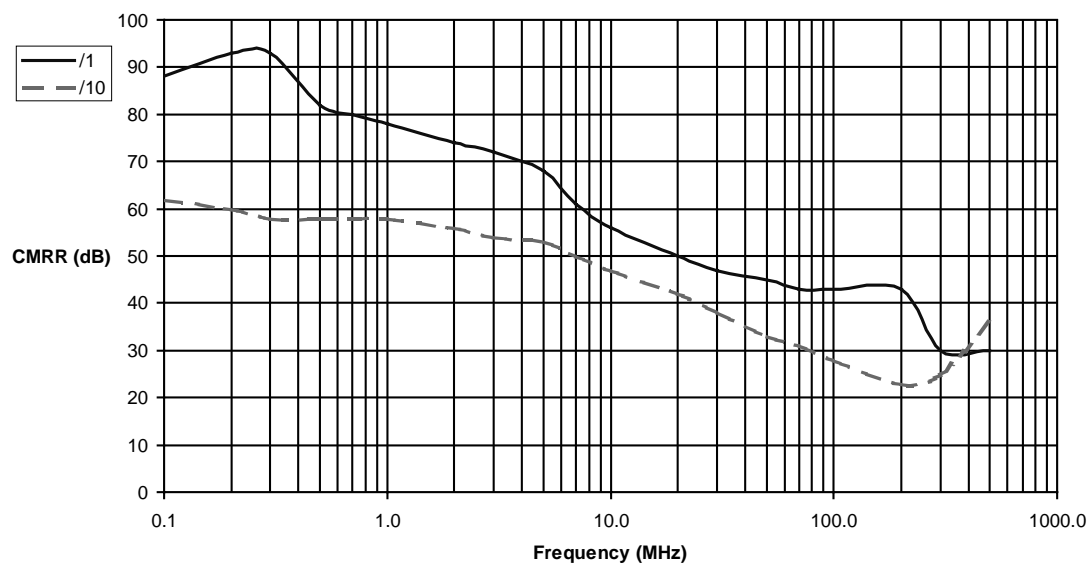


Figure 13 – Typical CMRR Graphs

GENERAL CHARACTERISTICS

Temperature: 0 to 50 °C Operating
-40 to 75 °C storage

Input Connectors: Compatible with 0.025" (0.635 mm)
square pins.
0.036" (0.91 mm) maximum diameter
(for round pins)

Power Requirements: Powered from oscilloscope through
ProBus interface or with ADPPS
power supply.

Dimensions:

| | | | |
|---------------------|-------------|---------|---------------------------------------|
| Control Housing: | Length: | 9.2 cm | (3.625") |
| | Width: | 3.8 cm | (1.50") |
| | Height: | 2.5 cm | (1.00") |
| Head | Length: | 10.1 cm | (4.0") (W/O Attenuator or AC Coupler) |
| | Width: | 2.25 cm | (2.25") |
| | Height: | 1.6 cm | (0.625") |
| Cable: | Length: | 106 cm | (42") |
| | Diameter: | 7.0 mm | (0.275") |
| Mass: | Probe only: | 0.18 kg | (6.4 oz) |
| | Shipping: | 1.15 kg | (2 lbs., 8.4 oz) |



COMPLIANCE AND CERTIFICATIONS

EC Declaration of Conformity Conforms to EMC Directive 89/336/EEC for electromagnetic emission and immunity requirements.

EN 55011:1997 The probe has been tested to verify compliance with this standard, Class B for Conducted and Radiated Emissions.

EN 50082-1:1997 The probe has been tested to verify compliance with this standard for ESD, Radiated Immunity, EFT/Burst Immunity, Fast Surge Immunity, Conducted Immunity, and Voltage Sags & Interruptions. The line related tests were performed with a model ADPPS Probe Power Supply.

Conforms to Low Voltage Directive 73/23/EEC for product safety.

The probe has been designed to comply with EN 61010-1 Installation Category I, 42.4V, Pollution Degree 1.



SAFETY INFORMATION

Operator Safety

The probe is intended to be used only with instruments that are connected to earth ground through the input BNC connector. When used with the ADPPS Power Supply Adapter, make sure that the adapter is connected to a BNC connector that is grounded by the test instrument before connecting the probe inputs to the test circuit.

Do not use in wet or explosive atmospheres. Remove any contamination from the probe housing before connecting the probe inputs to any circuit. Make sure that the surface of the probe head is completely dry before connecting the inputs.

The use of the probe and/or the instrument it is connected to in a manner other than specified may impair the protection mechanisms.

Do not use the probe if any part is damaged. All maintenance should be referred to qualified service personnel.

STANDARD ACCESSORIES

- Hard Case
- ÷10 Plug-on Attenuator
- Plug-on AC Coupler
- Probe Connection Accessory Kit:
 - Flex Lead Set (1)
 - Mini Clip, 0.8 mm (3)
 - Mini Clip, 0.5 mm (2)
 - Ground Lead (1)
 - Offset Pins, Round (4)
 - Square Pin Header Strip (1)
- Manual, AP033 Active Differential Probe Instruction Manual

OPTIONAL ACCESSORIES

- ADPPS Power Supply

OSCILLOSCOPE SOFTWARE COMPATIBILITY

For full control functionality of the probe, the LeCroy oscilloscope must have software version 8.1.0 or higher. You can find out the software version installed in a LeCroy oscilloscope by pushing the SHOW STATUS button on the front panel, then selecting the **System** menu choice. The probe can be used with earlier versions of software, however gain and attenuation can only be controlled through the buttons on the probe body. Probe offset is controlled through the probe only. Also, the scale factor will be displayed incorrectly in some modes.

Contact your local LeCroy representative for information on upgrading the software in your oscilloscope.

Logic in the probe decodes the effective gain of the probe based on the settings of the gain and attenuation, and it displays the results on the probe front panel. When the probe is connected to a LeCroy oscilloscope with software version 7.6.0 or higher, the displayed scale factor will be adjusted to account for the effective gain of the probe.

With software versions 7.8.0 to 8.0.x, the VOLTS/DIV control will only affect the oscilloscope sensitivity. Extending the dynamic range of the probe can be done with the buttons on the probe or



AP033 Active Probe

through the AP033 Gain menu selection located in the probe control menu. (See Figure 14.) The probe control menu is activated by pressing the COUPLING button while the channel the probe is attached to is selected.

With software versions below 8.1.0, it is important that the oscilloscope channel offset be set to zero volts when the AP033 is attached. Failure to do so will limit the dynamic range of the probe which could result in a “clipped” waveform being displayed. With versions 7.8.0 – 8.0.x, the AP033 offset can be adjusted in the “COUPLING” menu. (See Figure 14).

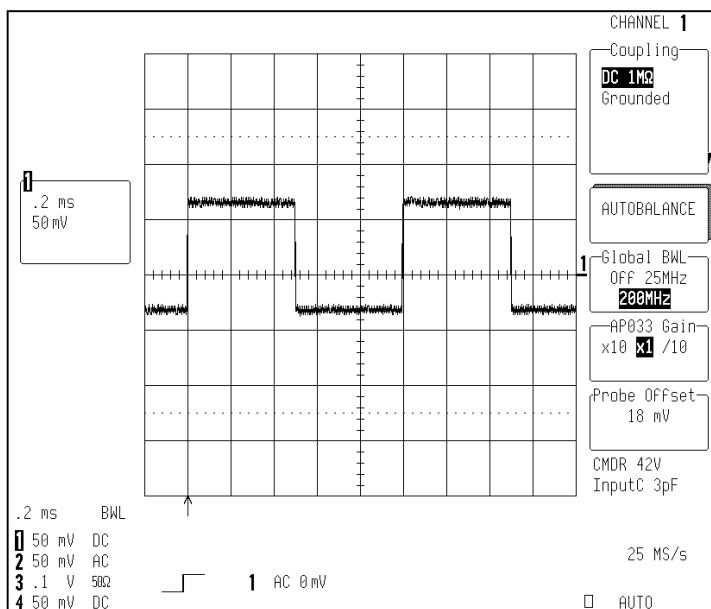


Figure 14. AP033 Probe Control Menu with software versions 7.8.0 – 8.0.x

With software versions 8.1.0 and above, the oscilloscope channel offset is automatically set to zero volts when the AP033 is attached to the oscilloscope. The channel offset knob will then control the AP033 probe offset.

With the AP033 probe attached, the Coupling Menu refers to the probe input. The common mode dynamic range (CMDR) for selected probe gain and attenuation settings are displayed in the lower right corner.

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