



BEAM DIAGNOSTIC COMPONENTS

National Electrostatics Corp.

Low Current Beam Profile Monitor

NEC now offers a beam profile monitor that can detect beam current down to the Femto Amp range.

Applications

The Low Current BPM, Model BPM90-LC, is based on the NEC Model BPM90. As with all NEC BPM models, the BPM90-LC can be used with both positive and negative ions, electrons, and neutral beams. The BPM90-LC is ideal for applications requiring measurement of beams with current densities less than $1 \mu\text{A}/\text{cm}^2$.

Design

The BPM90-LC utilizes a uniquely modified design of the standard NEC BPM collection method. The design of the standard NEC BPM relies on the collection of secondary electrons from a grounded scanning wire. In contrast, the BPM90-LC utilizes a biased wire and collection area at high voltage. There are 7 gain stages to select from ranging from 0.5 kV to 7 kV. This bias allows the electrons to be focused by a shield into a SSB detector. The detector, coupled with a preamp and amplifier, magnifies the electron signal from the wire. This magnified signal can then be directly displayed on an oscilloscope.



The original NEC low current beam profile monitor, Model BPM90-LC.

Specifications

Overall Length: 6.7" (17.15cm) - 7.38" (18.73cm) dependent on flange type.

Standard Housing Flanges: 6.0" or 8.0" OD CF; 6.0" OD NEC; 4.0" O.D. Dependex. Other flange size and type available upon request

Beam aperture: 1.0" (2.54cm) dia. molybdenum

Scanning wire: 0.020" (0.5mm) dia molybdenum other wire diameters may be available upon request.

Maximum beam power: 12 μA

Minimum detectable beam current: $\leq 1 \text{ pA}$ demonstrated

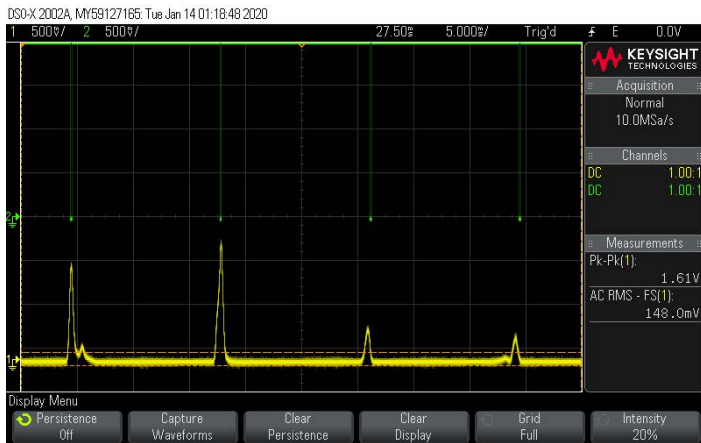
Accessories

For a complete system, an SSB detector, signal preamp, and amplifier are required.

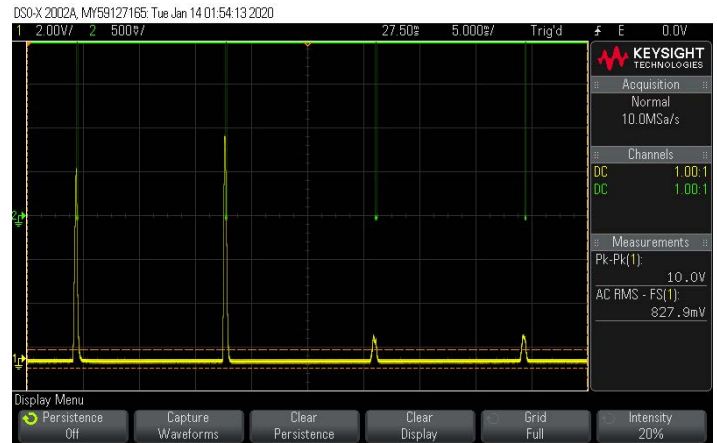
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Below are four graphs showing the BPM90-LC display for various beam currents.

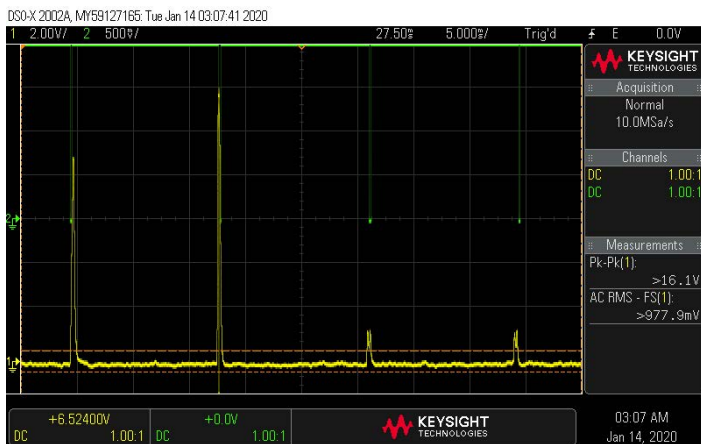
100 nA



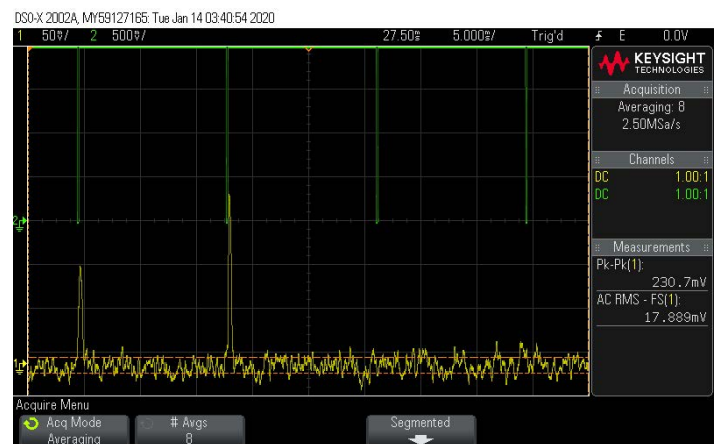
1 nA



10 pA



10 fA



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