

Description of Data, Format, and Conventions for Main Injector BPMs and Test Stand Data Files

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The BPM test stand provides a means to determine the position sensitivity and the electrical center of a beam position monitor by energizing a wire stretched through the pick-up and recording the resulting pick-up electrode signal amplitudes. The wire position is referenced to the mechanical fiducials of the monitor and can be accurately scanned across the BPM aperture.

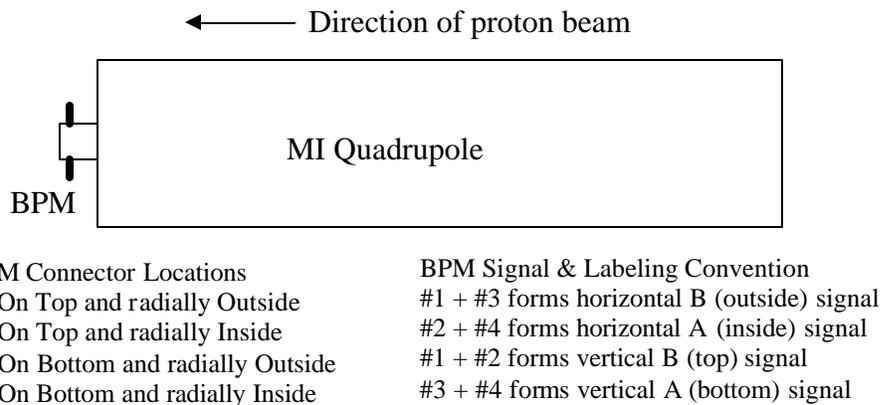
Figure 1 is a photograph of a standard Main Injector BPM. The BPM has four electrodes; each tapped with a feedthrough connector at one end and electrically shorted at the other end. The view in the photograph is from the connector end. The electrodes are numbered in the convention shown on the label on each BPM. The BPMs are installed with the connector end downstream relative to the direction of proton beam travel. Since protons travel counterclockwise in the Main Injector, electrodes 1 and 3 are on the radial outside of the orbit and electrodes 2 and 4 are radially inside. Figure 2 depicts the installation and sign convention.

The sign convention for reporting beam position is that vertical positions above center and horizontal positions to the radial outside are positive, i.e. positive is up and out. Signals from electrodes 1 and 2 are combined to produce the TOP signal, labeled vertical B, and signals from 3 and 4 are combined for the BOTTOM signal, labeled vertical A. Similarly 1 and 3 combine to form the OUTSIDE signal, labeled horizontal B, and 2 and 4 combine for the INSIDE signal, horizontal A.

Test stand measurement data files were produced for wire scans of each Main Injector BPM. These are ASCII files with one line per wire position and six columns per line. Columns 1 and 2 are the horizontal and vertical coordinates of the wire position in millimeters relative to the mechanical center of the BPM and columns 3-6 are the recorded signal amplitudes in decibels from electrodes 1, 2, 3, and 4 respectively.



Figure 1. Photograph of MI BPM Serial Number 1244 with typical label



BPM Sign Convention is that positive positions are vertically up and radially outside; therefore position is determined ~like $(B-A)/(B+A)$

Figure 2. Installation, Sign, and Labeling Conventions