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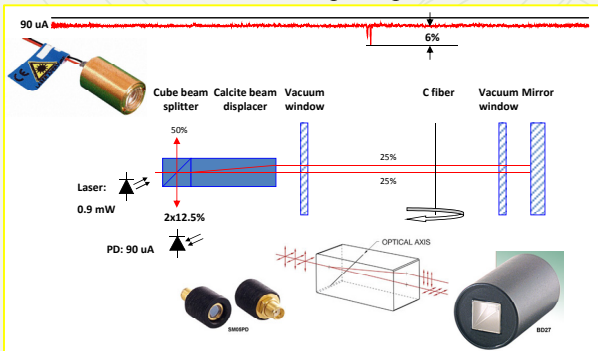
Abstract

The fast rotating wire scanners installed in the PS and the PS booster are used for the precise transversal profile measurements in horizontal and vertical planes. The scanners may show large position measurement errors if no special treatment is applied to the acquired data. The aim of the calibration is to obtain a correction algorithm for the systematic position measurement error due to mechanical and electronic offsets.

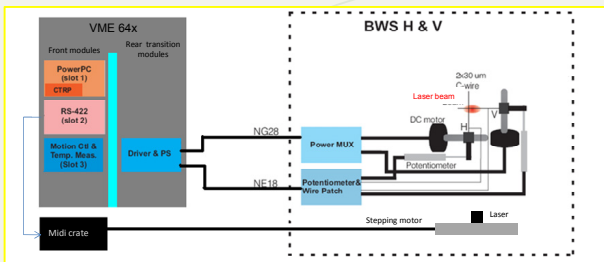
A new calibration system has been developed and introduced in CERN for the scanners implementing position feedback control. The calibration method is based on a substitution of a particle beam by a laser one where the laser beam position is well known. According to the previous experience the following crucial requirements to the system have been taking into consideration: heavy and mechanically stable design of the calibration bench to reduce mechanical oscillations of scanner parts; automation of the calibration procedure to exclude human errors in data taking, storing and analysis; high precision of the laser positioning; minimization of the total amount of scans and calibration time for each scanner.

System Overview

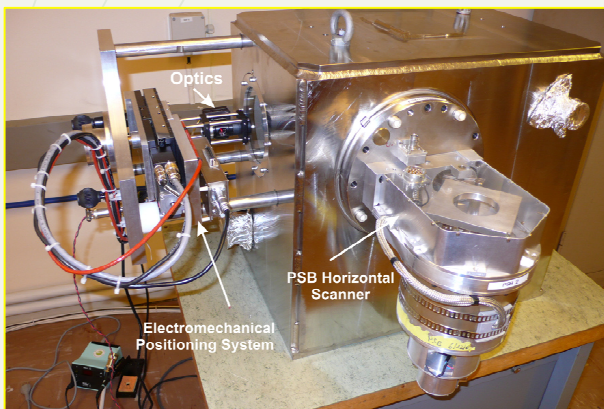
Measurement principal



Electronics schematics of the calibration bench

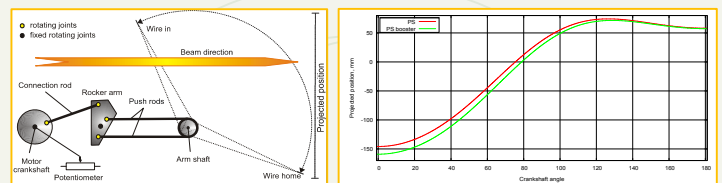


Calibration bench with a horizontal PS booster scanner



Lookup Tables

theoretical lookup tables – calculated (ideal scanner)

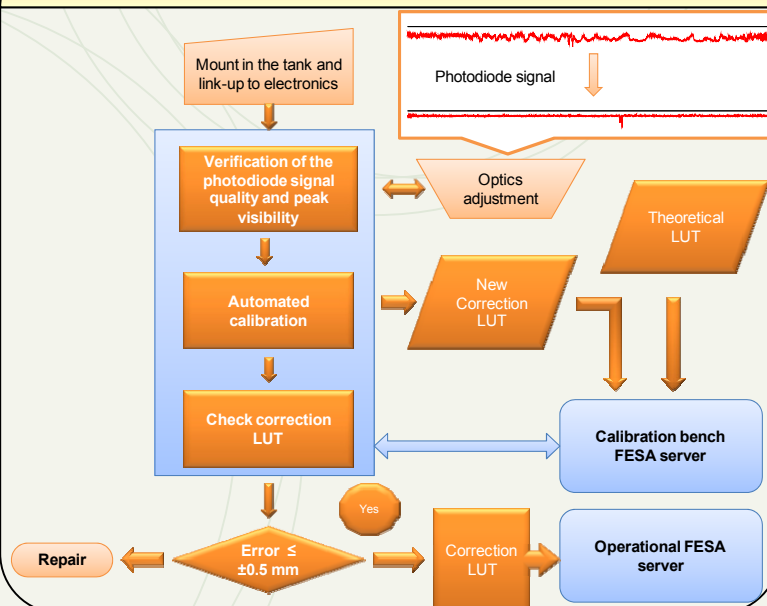


correction lookup tables – measured (real scanner)

Potentiometer Value [Bits]	Projected position [mm]

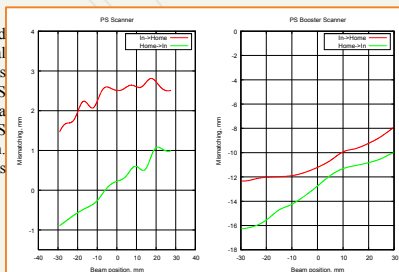
- 3 predefined speeds: 10, 15 and 20 m/s
- 2 wire movement directions: In from/to Home

Calibration procedure

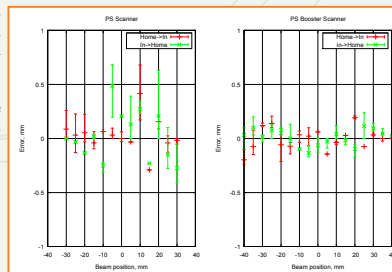


Some results of calibration

Mismatching between measured and theoretical projected positions of a scanner in PS domain and a scanner in PS booster domain. The wire speed is 15 m/s.



Check results of a scanner in PS domain and a scanner in PS booster domain. The wire speed is 15 m/s.



Horizontal profile measurement of a centred beam in the PS booster: a) beam position from a downstream pickup, b) profile, measured by a wire scanner

