cosylab
CONTROL SYSTEM LABORATORY

bergoz
Instrumentation

microIOC MEM

Are we running at optimal efficiency?

Product Descriptions

what is it?

To have optimal machine efficiency and large beam lifetime it is important to know the beam current, efficiency of the transfer lines and beam losses at different parts of the machine. Machine Efficiency Monitor (MEM) is a turn-key system that provides real time measurements of all the above mentioned parameters.

The system consists of the following components:

- Bergoz BCMs[1] are used to measure beam charge at the start and end of two transfer lines.
- Bergoz NPCTs[2] measuring beam current in booster and storage ring.
- A microIOC-BLM system.
- A microIOC[3] for processing BCM and NPCT data.

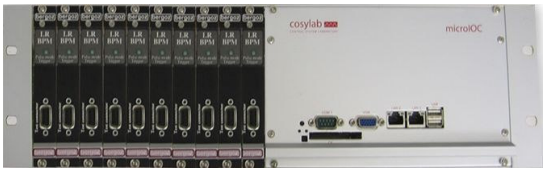
The number of detectors is not fixed, but can be customized to a particular machine.

1 – www.bergoz.com/products/BCM/BCM.html
2 – www.bergoz.com/products/NPCT/NPCT.html
3 – http://www.microioc.com/mem.htm

operation principle

- The difference in the measured total beam charge at the start and end of every transfer line gives the efficiency of the transfer line.
- From the current circulating before and after injection and the beam charge in the transfer line, injection and extraction efficiency is determined.
- Rate of current decrease in the ring is used to determine lifetime.
- BLM detectors are used to measure beam loss at different positions and machine configurations to find optimal machine parameters.

The following features are provided as standard: industrial-grade components; standard x86 architecture; dual Ethernet, 2xUSB, RS232, and VGA interfaces; complete SW support: Linux Debian or RTEMS, control system integration.



benefits

- Optimal machine performance can be achieved.
- Deviations from optimal machine performance are rapidly observed.
- Easy troubleshooting in case of increased beam loss.
- Low beam loss, thus protecting the environment and equipment from radiation damage.

key features

- A proven solution with easy installation.
- Dedicated EPICS control software.
- Open system for easy hardware and software upgrade.
- No license fees to third parties.

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Product specifications version: 1.4

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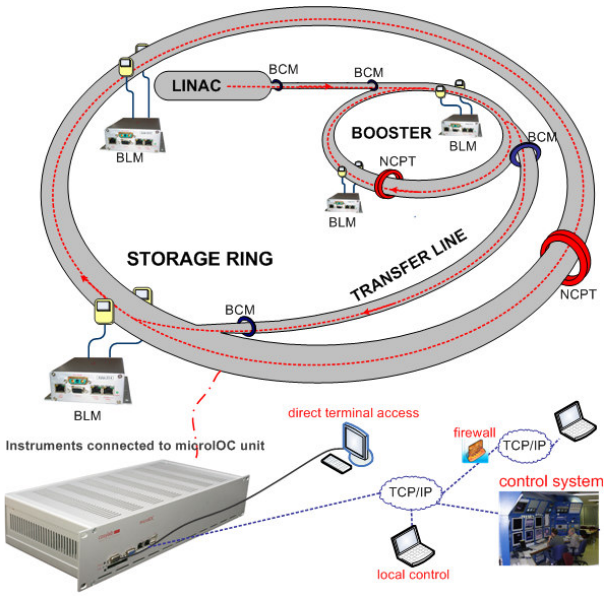
use case

- Optimizing injection and extraction scheme.
- Optimizing beam life time in the storage ring.
- Minimizing irregular uncontrolled losses to protect the environment and equipment from radiation damage.
- Monitoring machine performance.
- Locate any kind of vacuum chamber obstruction from RF-fingers down to different vacuum problems.
- Precise energy calibration of the beam is possible as Touschek loss increases at beam depolarization.
- The combination of a scraper and a BLM offers useful applications for beam lifetime studies, e.g. ground motion observation, beam diffusion measurements and tail scans.



price breakdown

Estimate for a typical MEM system	269970 EUR
Linac to Booster transfer line	**28600 EUR**
2 Bergoz ICT	2*6000 EUR
2 Bergoz BCM-IHR-E	2*8300 EUR
Booster	**50590 EUR**
Bergoz NPCT	27000 EUR
24 Bergoz BLM detectors	24*390 EUR
12 CSL BCS (BLM electronics)	12*970 EUR
microIOC-CosyIcon	2590 EUR
Booster to Storage Ring transfer line	**28600 EUR**
2 Bergoz ICT	2*6000 EUR
2 Bergoz BCM-IHR-E	2*8300 EUR
Storage Ring	**126180 EUR**
Bergoz NPCT high res.	37000 EUR
96 Bergoz BLM detectors	96*390 EUR
48 CSL BCS (BLM electronics)	48*970 EUR
2 microIOC-CosyIcon	2*2590 EUR
Control system	**8000 EUR**
microIOC-BCM	4000 EUR
microIOC-NPCT	4000 EUR
Customizations and installation	**18000 EUR**
Cabling	**10000 EUR**

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