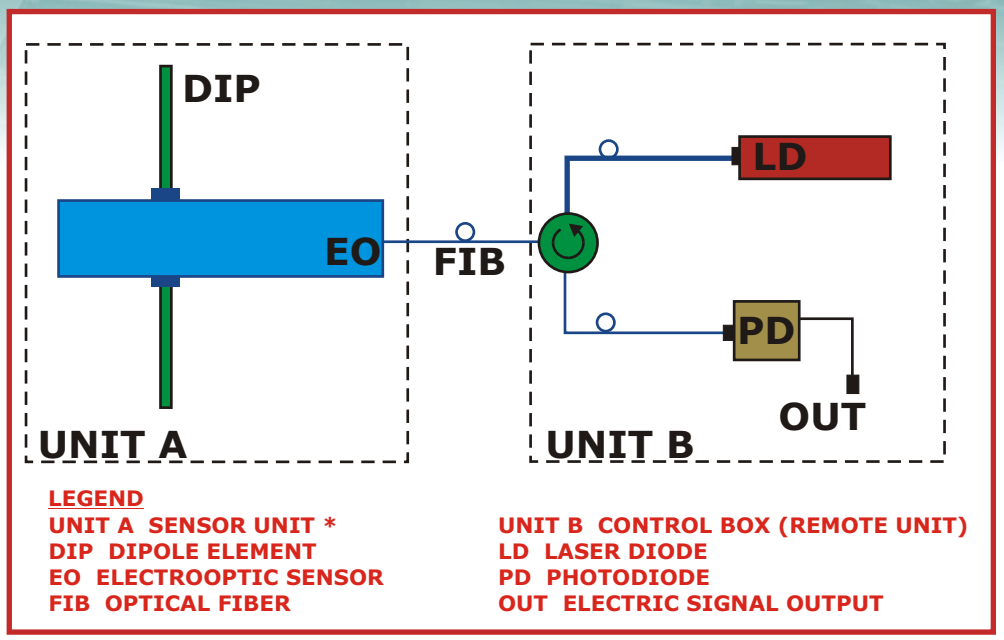
SELEX Sistemi Integrati

$LiNbO_3$ Photonic Foundry

Electro-optic field sensor



General principles

An electric field sensor has been developed in SELEX SI Photonics labs.
The core of the sensor is a dipole antenna, electro-optically coupled to an integrated optics $LiNbO_3$ Mach-Zehnder interferometer, by which the external electric field acts to modulate an optical carrier, provided by a laser diode. The modulated carrier is then transmitted to the remote unit, where, by passing through a photodiode, it is converted into an RF output signal, proportional to the electric field to be measured.

Specifications of the whole system (A+B)*

Sensitivity	0.3 mV/m
1 dB compression point**	1 V/m
Bandwidth	DC - 3 Ghz
Typical dimensions***	70mmx10mmx8mm

* Also sole sensor unit (A) is available upon request
** Sensor head for stronger fields is available
*** Further size reduction can be achieved

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Applications

- EM measurements for work safety (industrial or medical areas) and environment protection
- EM pulses measurements

Advantages

- Totally dielectric sensor unit avoids distortion of EM field to be measured
- Insulating probe enables measurements in close proximity to HV lines
- Use of optic fiber prevents from external EM interference
- Contrary to other sensing techniques (dipole element connected to an RF diode) it carries phase and frequency information to remote spectrum analyser

Keywords

- Electric field sensor, EMC, antenna measurements
- Optical modulators, optical links, electro-optical device

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