Abstract
The theoretical and practical properties of directional coupler PD sensors are discussed and a new special design of a directional coupler is presented which combines the advantages of directional coupler PD sensors and inductive sensors, like very high sensitivity also on-site under noisy conditions, high reliability in the differentiation of internal PD and external noise as well as the possibility of the exact location (within cm) of the PD fault.

2 Directional coupler properties
Directional couplers are used in many RF applications. They couple energy to different output ports depending on the incident pulse travelling direction. The ability of distinguishing signals by their travelling direction is determined by the directivity of the directional coupler. The amount of energy which is coupled to the output ports is described by the coupling attenuation.