

RF WAVEGUIDE VACUUM VALVE

This device enables maintenance to be carried out on a Radio Frequency (RF) waveguide system while keeping, at the same time, part of it under vacuum.

In order to maintain one part of a RF system evacuated while doing installation and maintenance on the other part, dielectric windows are normally used. However, high-power RF can often breakdown this window, leading to loss of vacuum and increased maintenance costs overall.

The technology disclosed here is a valve which can create a vacuum on one side and atmospheric pressure on the other. When the valve is in the open position, RF transmission can take place across the gap with only minimal loss of power. When the valve is in the closed position, maintenance work can be carried out on the atmospheric pressure side, whilst retaining the vacuum on the other. This enables a flexible and reliable maintenance system – without significant loss of waveguide performance.

The RF waveguide vacuum valve was developed for CERN's Compact Linear Collider test facility.

[Applications & Features »](#)

AREA OF EXPERTISE

- Mechanics

IP STATUS

- Patented

TECHNOLOGY READINESS LEVEL

- This technology is available under CERN Easy Access IP.

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Find out more at:
kt.cern

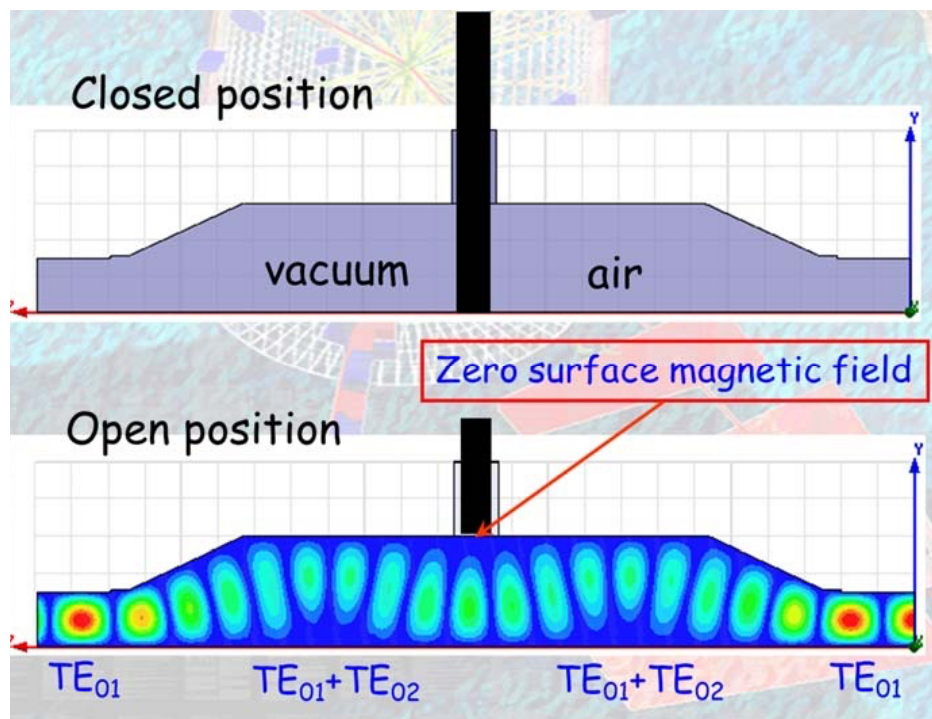


FEATURES

- No surface electric field in the waveguide section because of TE_{0n} mode conversion, which increases the potential of high-power RF transmission.

APPLICATIONS

- Waveguide systems - Medical and Industrial field and Scientific accelerators.
- Satellite & Space Research - The technology may be used to evacuate RF satellite systems using vacuums in space.



RF waveguide vacuum valve shown in closed and open positions.

- In closed position, a vacuum is maintained on one side and atmospheric pressure on the other.
- In open position, it provides low-loss transmission of RF power.

Instantaneous electric field distribution is shown in this case.