

CASE STORY

Active Harmonic Filters strengthen power quality at Vakıfbank's new headquarters

» **LOCATION**
Istanbul, Türkiye

» **INDUSTRY**
Commercial Real Estate

» **LOCAL PARTNER**
Wömner Power Quality Solutions

» **INSTALLATION DATE**
2021

BACKGROUND

Wömner Power Quality Solutions delivered a comprehensive power quality solution for Vakıfbank's new headquarters in the Istanbul Finance Center. The site is a large, high-rise office complex supporting critical banking and financial operations, where power quality, reliability, and grid compliance are essential.

In 2021, Vakıfbank approached Wömner with a requirement for a highly efficient and compact power quality solution suitable for a modern commercial building. Due to space limitations and the nature of the loads, conventional compensation systems were not considered a viable long-term solution.

CHALLENGE

The main challenge was a highly complex commercial load profile – very different from a traditional industrial environment. The facility is dominated by single-phase loads, LED lighting, VFDs, and a high density of power electronic equipment.

Traditional stepped capacitor banks could not handle these conditions effectively. A conventional solution would have required very large compensation panels to manage both inductive and capacitive reactive power, in combination with separate harmonic filtering equipment. In addition, severe phase unbalance was common, with one phase operating inductively while another was capacitive at the same time.

As a financial center, the site was also subject to stricter harmonic distortion limits than typical industrial facilities. Class 1 compatibility requirements demanded precise and continuous mitigation to protect sensitive banking and IT infrastructure and always ensure stable power quality.

SOLUTION

To address these challenges, Wömner implemented a solution based on Comsys Active Harmonic Filters. A total of 40 ADF P100N units were installed across the facility.

The Active Harmonic Filter solution eliminated the need for bulky hybrid or stepped capacitor/reactor banks. The ADF provides continuously controlled compensation of both reactive and harmonic currents on each phase. This enables true dynamic, bi-directional compensation and phase balancing – including single-phase and two-phase correction, capabilities that are not achievable with traditional contactor-based systems.

A key engineering advantage was the use of RMS-based current vector summation, allowing harmonic and fundamental reactive current demands to be handled simultaneously within the inverter's total current capacity. This means the system is not sized additively for harmonics and reactive power.



Combined with favorable derating behavior under site conditions, this allowed Wömner to specify lower rated units that still fully met all performance and compliance requirements – resulting in a more compact, efficient, and cost-effective solution.

RESULTS

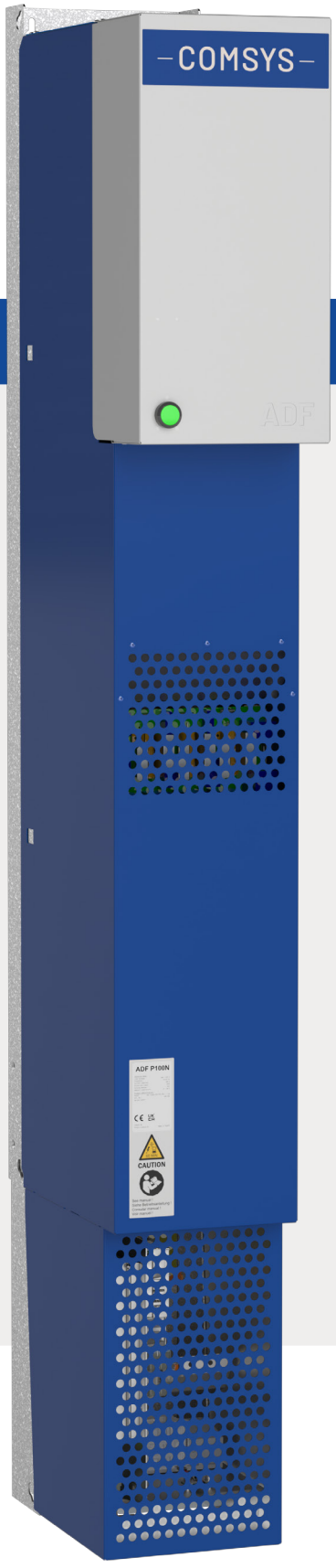
The Active Harmonic Filters successfully managed the complex and unbalanced commercial load profile of the facility. Large conventional compensation panels were avoided, significantly reducing the physical footprint of the power quality installation.

The system maintains strict Class 1 harmonic limits and a stable power factor, regardless of whether the load is inductive or capacitive. Phase unbalance caused by single-phase electronic loads is continuously corrected, improving overall system performance and protecting sensitive banking and IT equipment.

After commissioning, the customer recognized the technical capability of the solution to manage demanding commercial power quality requirements within a compact device. The ability to meet all targets using lower amperage equipment – enabled by advanced engineering and favorable derating, was a key success factor in the project.

This project confirms that for modern commercial buildings with mixed single-phase loads, Comsys ADF technology provides a technically and commercially superior approach to controlling harmonic distortion, ensuring compliance, and maintaining long-term electrical grid stability.

> “Managing the complex, unbalanced load profile of a major financial center required a solution far more sophisticated than traditional, bulky compensation panels. We have applied a compact system that seamlessly handles our dynamic inductive and capacitive requirements while maintaining strict grid compliance. Smart engineering to achieve superior power quality with a much smaller footprint and better efficiency than the competition”.
>
> *Faruk Başar, Power Quality Manager at Wömner*



PRODUCT USED IN THIS CASE

ADF P100N

- HARMONIC ELIMINATION
- LOAD BALANCING
- DYNAMIC VAR COMPENSATION
- MODULAR & SCALABLE DESIGN
- LOW RESPONSE TIME
- 208-415V NOMINAL VOLTAGE
- SEVERAL ADF P100NS CAN BE COMBINED FOR HIGHER POWER