

## Case Study

# Automotive Manufacturing: How the Right Power Quality Solution Reduces Demand Charges and Increases Savings



A large industrial plant in the automotive manufacturing sector was experiencing significant power quality challenges. This plant was specializing in the production of truck chassis long members and heavy frame assemblies in India. Operating heavy machinery, the facility faced frequent swings in reactive power demand that resulted in unstable power factor levels and excess kVA demand. These issues increased operational costs and compromised electrical system reliability. Seeking a more effective and stable solution than the fixed capacitor bank they had, the plant approached Elspec team in India for support.

### Customer Context

**Industry:** Automotive manufacturing

**Network:** 1MVA transformer @415V (33kV incoming)

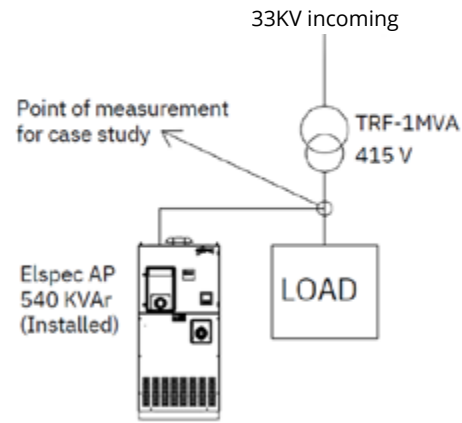
**Load profile:** Changing, inrush equipment:

- Heavy punching machines
- Roll-forming lines
- Robotic plasma cutting systems
- Paint shop automation
- Chassis forming machinery



## Solution: Real-Time Reactive Power Compensation

Following a detailed power quality audit, our team installed Elspec's 540kVAR transient free, real time reactive power compensation solution designed to handle industrial loads. The solution mitigates voltage drops, reduces fluctuations and corrects reactive power - all in less than 1 network cycle, allowing the system to maintain a stable, near unity power factor and reduce current peaks.

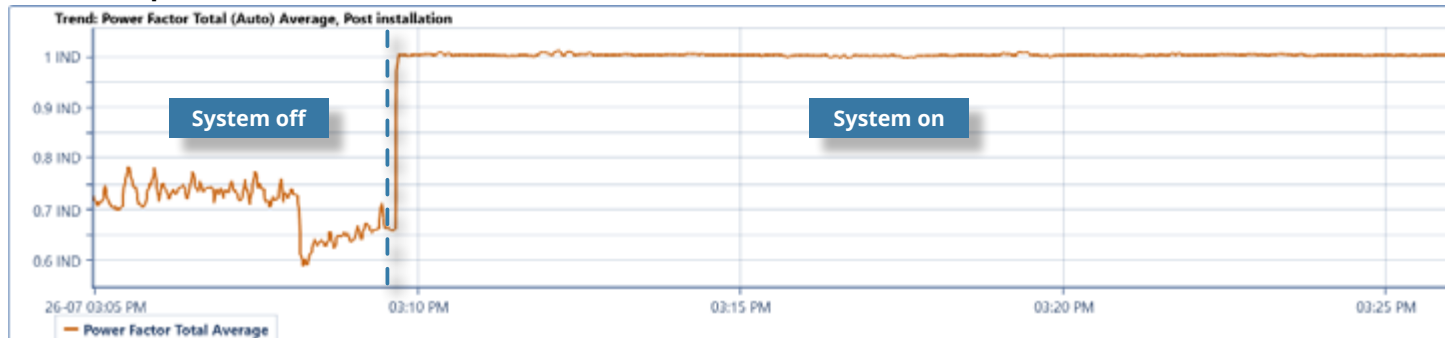


## Performance Comparison: Former System Vs. Elspec Technology

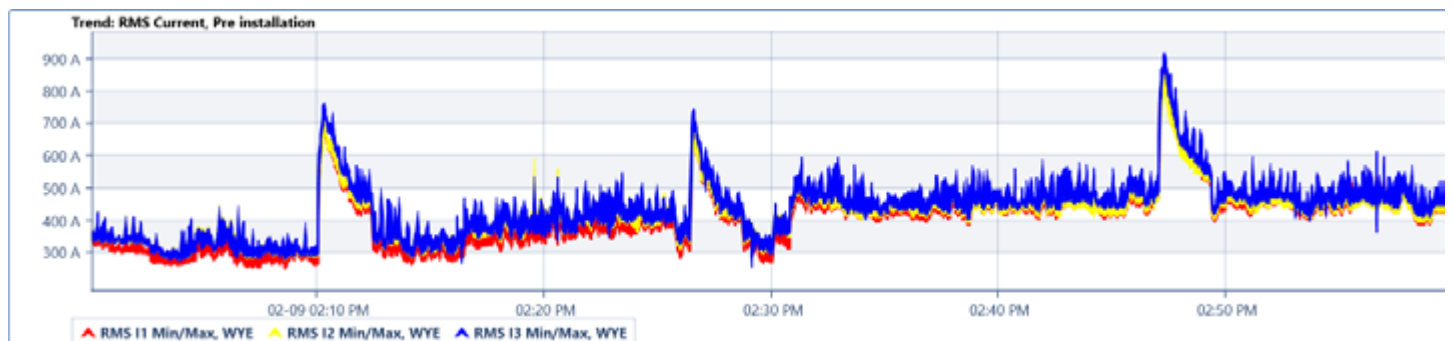
### PF with former solution



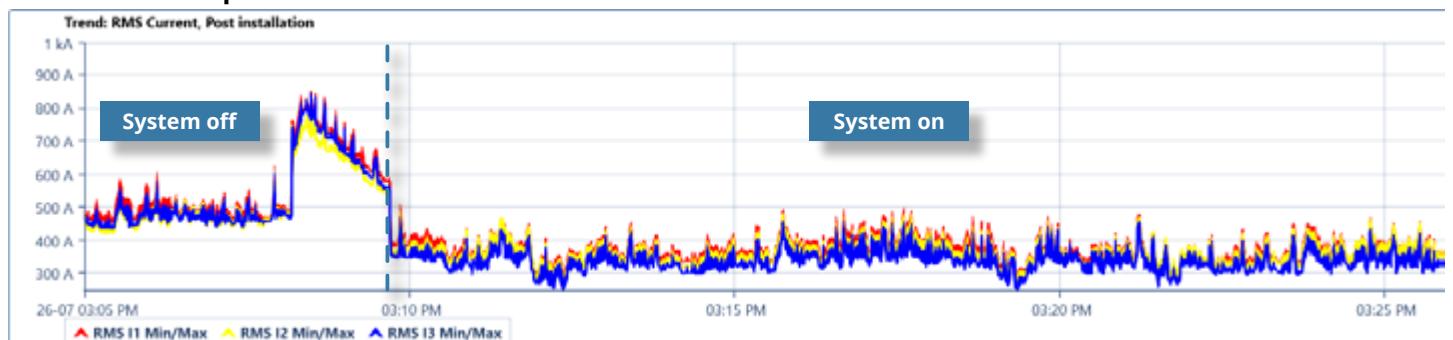
### PF with Elspec's solution



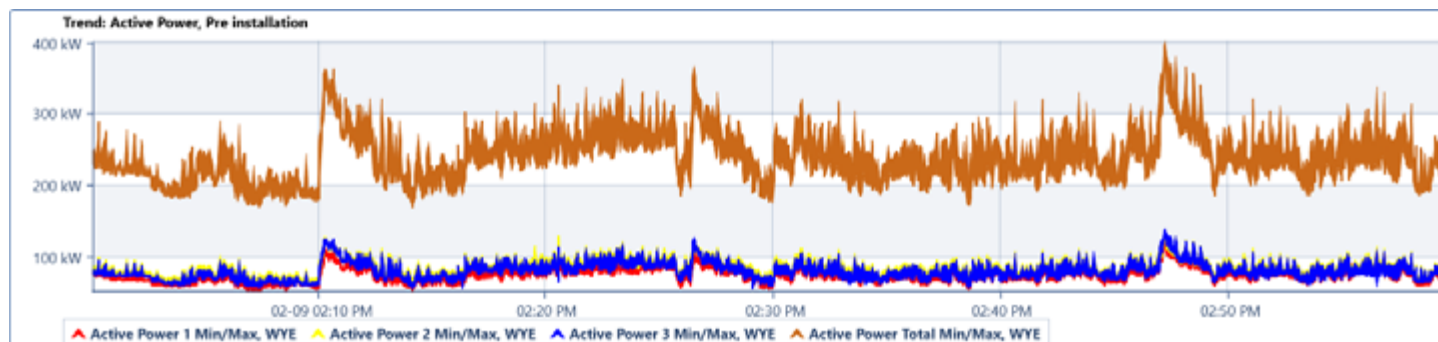
### Current with former solution



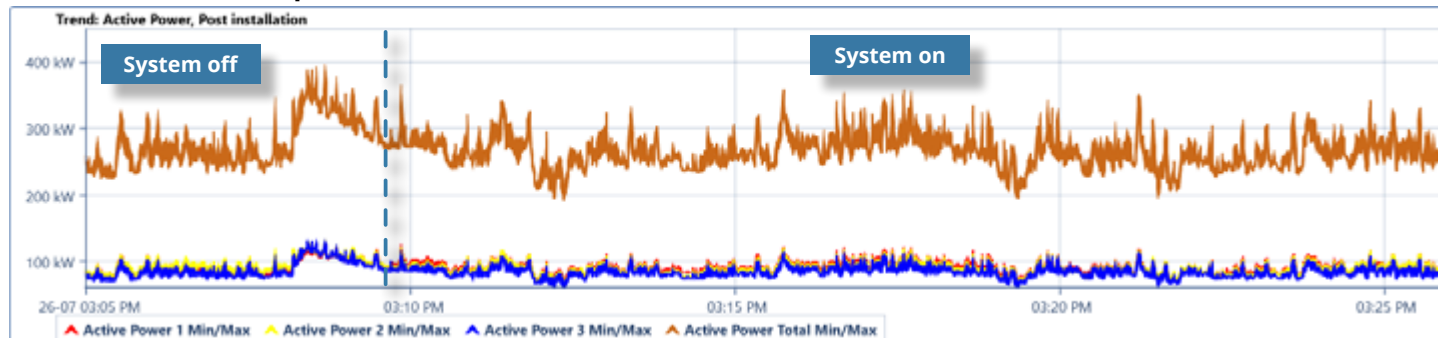
### Current with Elspec's solution



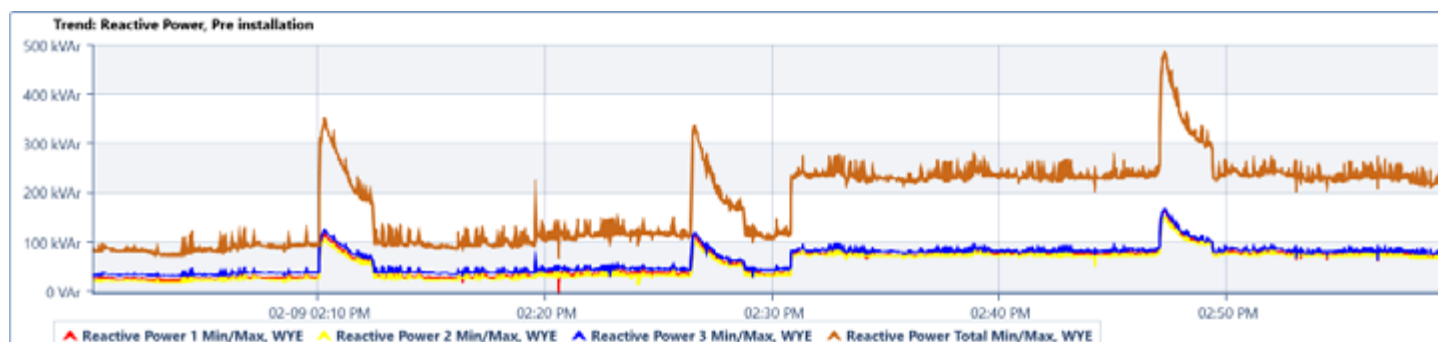
## Active Power with former solution



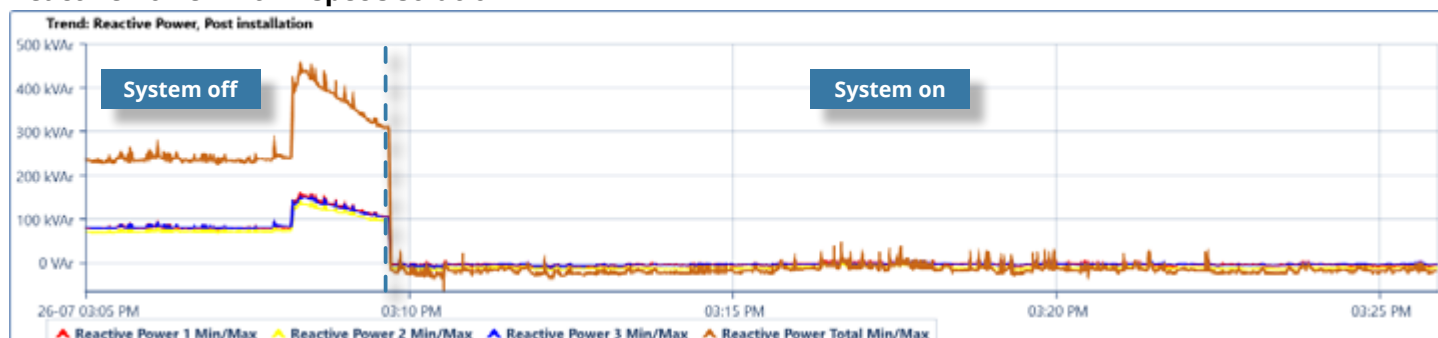
## Active Power with Elspec's solution



## Reactive Power with former solution



## Reactive Power with Elspec's solution



Metric	Former System	Without Any Compensation	Espec PQ Solution	Benefit with Elspec
Average Power Factor	0.92	0.84	0.99	Higher, more stable PF
Recorded Billing Demand (kVA)	419	472	381	↓ 38 kVA
Excess kVA Demand Surcharge	₹98,003	₹128,093	₹17,226	↓ ₹80,777
PF Surcharges / Incentives	₹0	₹66,444	-₹23,487 (incentive)	Incentive unlocked
Excess Net Payable Amount	₹98,003	₹194,537	-₹6,261	Major reduction
Monthly Benefit vs. No Compensation	₹96,534	₹0	₹200,798	Net uplift ₹104,264 (~\$1,155) vs. former system

## Speaking Performance

The former system delivered limited performance under the plant's load conditions. During the evaluated billing period, it maintained an average power factor of 0.92, with drops reaching as low as 0.56, due to heavy industrial machinery. This inadequate reactive-power compensation drove the recorded billing demand up to 419kVA, exposing the system's inability to stabilize electrical parameters effectively. As a result, the plant incurred significant excess kVA demand surcharges, higher operational energy costs, and ongoing instability in voltage and current levels throughout production. Because the system could not respond quickly enough to the loads, it consistently provided inefficient reactive-power compensation, reducing overall power-quality performance.

After commissioning Elspec's [power quality solution](#), the plant achieved a stable, near unity power factor of 0.99, reduced the recorded billing demand charges to 381kVA, sharply reduced excess kVA demand surcharges to ₹17,226 and crucially unlocked PF incentives of ₹23,487 thanks to consistent compliance above the utility's PF threshold. Overall, these improvements translated into a net uplift of ₹104,264 (~\$1,155) per month versus the former solution.

## Why Elspec's Technology Outperforms Conventional Power Quality Solutions

1. **Real time response to dynamic loads:** Tracks and compensates reactive power, avoiding under/over compensation typical of fixed banks.
2. **Transient free switching:** Minimizes switching transients, supporting voltage stability and reducing current spikes.
3. **Measurable billing improvements:** Higher PF and lower recorded kVA demand reduce surcharges and unlock PF incentives, creating recurring savings.

## Conclusions

For industries such as automotive manufacturing, traditional fixed capacitor banks are inherently limited. Elspec's advanced power quality solutions demonstrate clear technological superiority by providing real time, transient free compensation. Adopting Elspec's technology is therefore not only a technical upgrade but a high-impact, financial investment for any plant seeking to unlock incentives and safeguard electrical reliability.

*"Elspec demonstrated professionalism, technical knowledge, and timely execution. The system was installed and commissioned in a structured and efficient manner, and the service provided by their technical staff was commendable."*  
[Authorized representative, automotive manufacturing plant]



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