

### Plastic industry and carbon fiber: Harmonic elimination and temperature control

Plastic  
industry  
Carbon Fiber

#### Keywords

- Carbon fiber
- Harmonics
- Plastic
- Energy savings
- Power controllers
- Electric furnace
- Harmonic filter



#### Performance, quality, and environment: challenges in plastic industry

The emission of harmonic currents is a major issue for manufacturing companies in various sectors, such as the plastic and food industries. Harmonics disrupt the quality of the power supply, causing malfunctions in production processes. Thus, European institutions defined a set of standards in 2019 that must be followed. To comply with EN61000-3-2 regulations, manufacturers must control and limit these currents.

Beyond the imposed standards, manufacturers also have a vested interest in controlling harmonics due to their effects on the rest of the production process. According to data from the International Electrotechnical Commission (IEC), harmonics can reduce energy efficiency by 5% to 20%, thereby increasing production costs and the company's carbon footprint. Moreover, industrial equipment can suffer from overheating and premature failures, leading to higher maintenance costs and shorter equipment lifespans.

To address this problem, companies typically invest in harmonic filters. However, these filters are expensive, and their installation can be time-consuming, delaying operations. Consequently, a leading plastic industry player opted for Fuji Electric's power controller to eliminate these currents while optimizing efficiency.

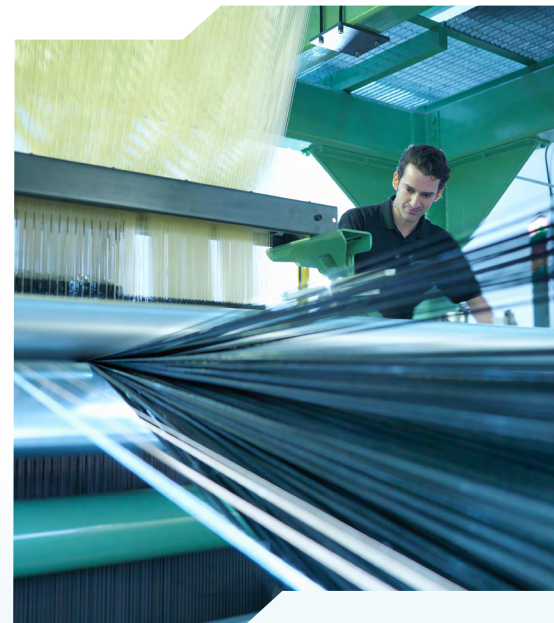
#### **This collaboration reduced energy consumption, optimized manufacturing processes, and improved plastic quality.**

The journey began when this leading plastic manufacturer faced several major challenges: excessive energy consumption, harmonics damaging equipment, and sometimes insufficient precision in temperature regulation.

These challenges affected not only production costs but also the ability to meet increasing customer demands for quality and sustainability. Harmonic currents posed a real risk to this company as they impacted other equipment in the production process and the quality of their products. Consequently, the manufacturer saw increased maintenance operations and associated costs to counteract the negative impact of harmonics.

Regarding energy consumption, this manufacturer needed to minimize it as much as possible to align their production with sustainability goals. More broadly, rising energy prices also push companies to become more aware of their consumption. Finally, very precise power regulation is necessary in plastic manufacturing to ensure optimal product quality.

**Fortunately, advanced technologies such as Fuji Electric's power controllers exist, enabling compliance with legal, energy, and operational requirements.**



## In response to these challenges, Fuji Electric's power controllers were integrated into the production processes of plastics and carbon fibres, offering precise control of heating power and optimal temperature control.



This performance is crucial, particularly during plastic extrusion or injection moulding, to ensure the quality of the final product and meet customer expectations. Better power management helps limit significant temperature fluctuations, which could damage the manufactured plastics. Thus, the temperature remains close to the set point, improving the quality and uniformity of the produced plastics and carbon fibres.

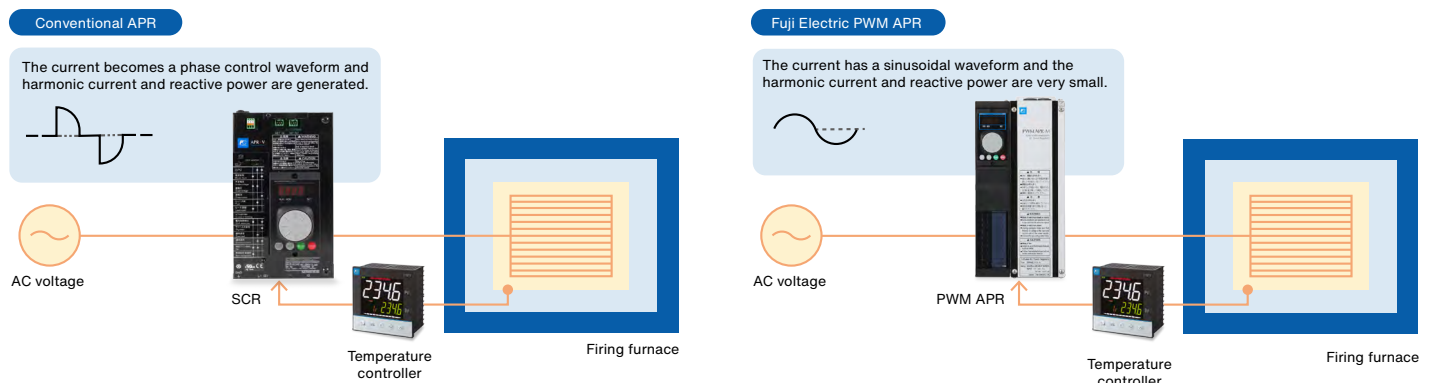
The integration of Fuji Electric's PWM-APR power controllers immediately had positive effects on the manufacturer's production processes. The power controller first eliminated harmonic emissions, reducing negative impacts on other equipment. This elimination of harmonics extended the lifespan of the manufacturer's equipment and reduced maintenance operations and associated costs. This not only minimizes downtime and maintenance costs but also enhances overall productivity.

The elimination of harmonics is possible thanks to the sinusoidal wave provided by Fuji Electric's power controller. The plastic and carbon fibre manufacturer reduced purchase costs and simplified installation by using the PWM-APR, which does not emit harmonics, thus eliminating the need for active filters. This allowed the manufacturer to cut costs since harmonic filters are often very expensive.

The PWM-APR power controller also significantly reduced reactive power, saving energy and optimizing production efficiency. This optimization led to substantial reductions in energy costs, making production more profitable.

**Integrating this power controller aligns with the manufacturer's eco-design approach to reduce its carbon footprint.**

Lastly, our power controllers stand out for their ability to adapt to any type of load and their advanced features. This allows them to adapt to numerous applications while ensuring optimal temperature regulation. For example, the soft-start feature protected the manufacturer's components by gradually increasing power. Additionally, the output short-circuit protection function allows the PWM-APR controller to safeguard all other equipment, extending their lifespan. This further reduces maintenance operations, downtime, and associated costs.



### A production manager at this leading plastic manufacturer commented on the integration of this power controller:

We have seen a significant reduction in our energy consumption and fewer production interruptions due to power supply quality issues. More precise temperature control has allowed us to improve the quality of our finished products, more effectively meeting our customers' requirements.



## Your Benefits

- + Elimination of harmonic currents
- + Reduction in energy consumption
- + Improved temperature regulation precision
- + Simplified maintenance
- + Lower installation costs



## Energy Performance and Equipment Protection

### PWM-APR

- Protection against overloads and short circuits
- Extended equipment lifespan
- Preservation of power factor
- Stability of output voltage



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