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ABB drive cuts £6,000 from clean air costs at Dyson

An ABB drive has helped vacuum cleaner manufacturer Dyson improve its dust extraction at its Wiltshire research and development centre, saving the company over £6,000 a year on energy costs.

The test facility puts new Dyson vacuum cleaner prototypes through their paces with a battery of tests that include their ability to remove dust from surfaces. The dust produced for these tests needs to eventually be extracted to maintain a safe and healthy atmosphere. It is extracted from several test points by a motor driven fan. Originally switched direct-on-line (DOL) via a star-delta arrangement, this motor drew a large starting current that was causing fuses to blow regularly.

Andrew Stokes, Integration Team Leader at the test facility, says: “Blown fuses were causing significant downtime. We also then had a failure of the dust extraction motor, which prompted us to look into soft starting as a better way of switching in the motor”

The maintenance team contacted ABB Drive Alliance member APDS for a solution, which together with ABB, investigated the application and made recommendations. APDS looked at the existing set up, monitoring its power use over a week in January. The results showed that the 55 kW dust extraction motor cost £284 per week to run at 12p per kWh.

APDS fitted a 55 kW ABB standard drive as a trial. A pressure sensor was installed in the ducting near to the drive to measure the vacuum pressure in the system, which is used to determine the flow rate needed. Test stations can either be in operation or idle, causing the demand for extraction to vary, so the drive changes the fan speed instantaneously to match this demand.

Using its internal PID function, the drive can still provide suction when the dust filters begin to clog up. As the filters become clogged the pressure feedback drops. To compensate the drive speeds up the dust extraction motor maintaining the required suction.

With the trial drive installed, monitoring showed that electricity costs per week could be reduced to £163 by running the motor at 40 Hz rather than 50Hz, giving a total annual saving of £6292.

Another major benefit was the noise reduction – running the drive at 40Hz brought ambient noise level down to 85dB from a peak of around 90dB.

Stokes added: “We got good support from James Chalmers, ABB and APDS from the beginning. The demonstration was useful in that we could see the energy savings and could satisfy ourselves that the reduced speed would not lead to degradation in air quality. They also helped us setting up the pressure sensor and finding the correct set point to give the best operation.”

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pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees. www.abb.com



Caption: An ABB drive has helped vacuum cleaner manufacturer Dyson improve its dust extraction at its Wiltshire research and development centre, saving the company over £6,000 a year on energy costs.

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