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2.4 MW of fan power keeps Dutch Skydivers airborne

A new Indoor Skydive Centre in Holland is flying high in the opinion of its enthusiastic users thanks to precise air control provided by twelve huge 200 kW fans at the base of the tower.

This maximum of 2.4 MW of fan power is controlled by twelve freestanding 200kW Unidrive SP cubicle drives with an additional four 110kW Unidrive SP drives providing ventilation to control air temperature in the tower. All drives are fitted with plug-in SM-applications modules and communicate with the touch-screen controller via Control Techniques' high-speed network CTNet.

The Roosendaal Indoor Skydive centre was founded by a group of skydivers who had the dream of building the biggest such centre in Europe. Initial talks with ventilation company Rucon lead to talks with motor manufacturer, Kolmer who, in turn, introduced Control Techniques. The team began to develop a design that could accommodate both professional skydivers and the general public and a specification that included a soft-start of the big fans, simple speed control and maximum energy efficiency to keep running costs as economical as possible. In addition, whilst the blown air had to be returned in a loop, there had to be provision for the introduction of fresh air to keep ambient temperatures within acceptable limits.

The resulting design comprises a 23.5-metre tower of 4.27-metre diameter with two flight chambers, the lower for experienced skydivers, the upper for the general public, access in both cases being via a bridge and airlock.

A ring of twelve 200kW centrifugal fans, situated at the base of the tower and all locked together in speed by the Unidrive SP drives, blow air horizontally into the centre, where it is deflected vertically at a speed of up to 250 kph (3.5 million cu metres/hour), by an aeronautically-shaped cone. At the top of the tower, air collectors return the air to the motor feeds, the back-pressure reducing power consumption. The tower's temperature is monitored and, when the heat generated by the motors pushes the ambient beyond a comfortable level, four 110 kW ventilation fans situated at the top of the tower expel a proportion of the hot air to allow the intake of fresh air into the system.

KEY BENEFITS

- PRECISE AIR CONTROL
- MAXIMUM ENERGY EFFICIENCY
- COST EFFECTIVE OPERATION
- INSTANT FAN SPEED ADJUSTMENT PER INDIVIDUAL

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CONTROL TECHNIQUES

"The cost-effective operation of the centre depends on the Control Techniques drives," explains Technical Manager and Skydive Instructor Erwin Van Den Braak. "We need to keep power demand below set levels to prevent incurring peak charges. This means a gentle start-up of the motors. We are careful to optimise bookings together in blocks and if not possible we simply turn down the speed of the motors to about 10 Hz instead of turning them off and then having to start up the motors again which costs a lot and is not effective. Working in groups means that we need instant fan speed adjustment for each individual, depending on size and weight. Some skydive centres do this using baffles, with motors continuing to run at full speed, which is, of course very wasteful of energy.

The centre, opened this year, has set criteria for the size of its customers; maximum bodyweight of 140 kg and a minimum of 1.2 metres in height, "but we are already revising this through our experience," says Erwin Van Den Braak. "A guy of 160 kg has flown successfully and, with close supervision of course, even small children can fly – they seem to take to it naturally. We say anyone from 3 to 93 can enjoy the experience."

Professional skydiving teams and the military also endorse the centre and teams of up to ten people have practised complex manoeuvres in the tower.

Professionals and beginners can practise in complete safety, becoming very proficient before they have to do it for real by jumping from an aircraft, taking much of the risk out of the whole training programme.

The freestanding Unidrive SP design offers customers a simple AC-in AC-out solution, with a compact footprint, whilst retaining the technical flexibility and performance that has become the benchmark of the Unidrive SP range.

The standard IP20 cubicle includes rectifier, inverter drive and inductor and offers drive protection with either the customer's protected supply or optional built-in input fuses can be fitted. The twelve 200kW fan drives are all synchronised in speed to give the smoothest possible air-flow, free of turbulence and communicate directly with the HMI via CTNET, to give simple and instant speed control by the operator who sits alongside the flying chamber in a control booth.

The centre is presently operating for around 40 hours a week, but this is steadily increasing as its performance becomes more widely recognised by the professional skydiving community and as the general public become aware of this outstanding experience on their own doorstep. Those who know, rate it as one of the three best in the world for stability and users travel large distances to participate in the indoor skydiving experience.