



Pressure switches give quadriplegic sailor complete control

Melvin Kinnear using the Sip and Puff system to fine tune his servo assisted Hansa Liberty sailing dinghy

A customised ‘Puff-and-Sip’ pressure switch system is giving quadriplegic World Champion sailor Melvin Kinnear increased control of his servo-assisted Hansa Liberty sailing dinghy.

Developed by Paul Bennett – a volunteer for the charity Tideway Sailability* - the single-crew dinghy features servomotor driven winches for its main and jib sails, which are normally reeled out and fine-tuned by a combination of joystick

control and separate hand operated switches.

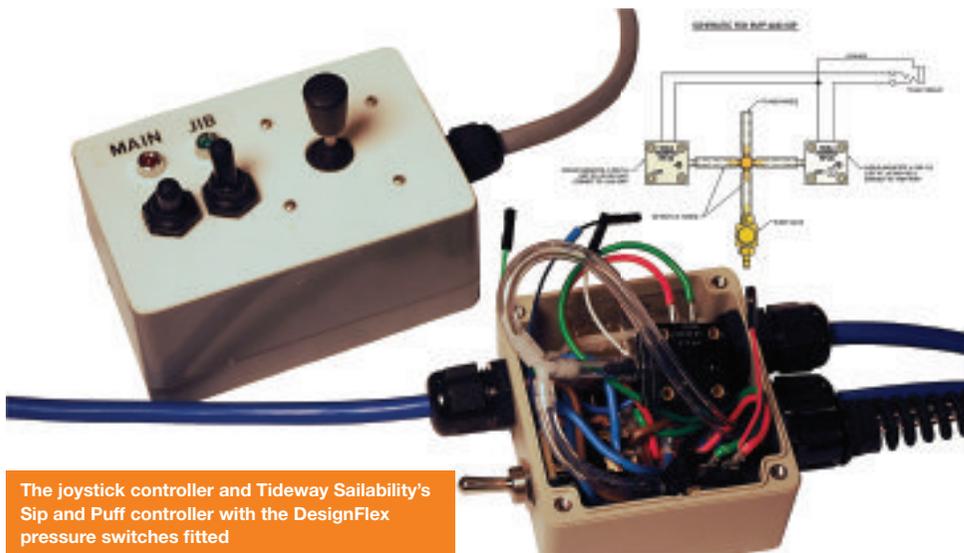
As a high-level quadriplegic with limited touch sensation, Melvin finds it tricky to operate both sails together as he needs

to keep switching between the two sails for race-performance fine tuning. And as he cannot feel the switches, he has to look away from the sails when operating them, which is far from ideal.

Melvin injured his spine in a fall from height in 1974 aged 17. Before the accident he'd been keen on athletics, and archery formed part of his rehabilitation activities at the spinal unit. After discharge from hospital he was on the lookout for another exciting sport or activity but at that time there was nothing available.

For decades there seemed very limited sport opportunities for people like himself but with the coming of the Internet, things slowly started to change. There had been some pioneering individuals getting involved in more active sports such as sailing, skiing and scuba diving and things started to open up, aided by initiatives like the Backup Trust.

In 2004 Melvin joined Tideway Sailability at Surrey Docks in London and learned



The joystick controller and Tideway Sailability's Sip and Puff controller with the DesignFlex pressure switches fitted

to sail the Liberty dinghy that was fitted with the servo controls.

The Puff-and-Sip system completely overrides the jib circuit allowing Melvin to have simultaneous control of the sails via the two different systems. By using the joystick to control the mainsail, he blows through the Puff-and-Sip to move the jib out and sucks if he wants the sail to come in.

The new control system has been extensively trialled at Tideway Sailability who sail at Surrey Docks in London - and the great news is that it has turned out to be really intuitive and made a real difference to Melvin's sailing performance. He was the 2010 Liberty World Champion (Full Servo Class) and, at the time of writing, was lining up to sail in the European Championships at Rutland Water last month.

The World Magnetics DesignFlex PSF102 pressure switches were supplied by Variohm Eurosens, whose technical support team helped the volunteers at Tideway Sailability with the simple circuit required to interface the switches with the existing joystick system. The compact components are packaged in a small weatherproof housing that includes an integral membrane to allow for atmospheric pressure changes.

Crop spraying

The USA based crop-dusting innovator Earls' Flying Service is another user of World Magnetics DesignFlex pressure switches. For nearly forty years this small company has pioneered improvements in aerial spraying that have become industry standards, such as advanced gate controllers for fertiliser economy and GPS guided spraying for improved farmland productivity. Its latest development was to find a better way of determining when the aircraft runs out of fertilizer.

World Magnetics was called on to help specify a suitable pressure switch for the hopper-empty notification system. What was needed was a pressure switch that could accurately work down to a few millibars but be durable enough to perform in the hostile con-

ditions experienced on an agricultural crop duster.

DesignFlex specified the high current PSF103 series and thanks to the flexibility of this range, Earls' was able to choose the exact pressure port arrangement, diaphragm material, adjustment range and set point to meet its specific needs. With a working life in excess of 10 million cycles, this snap-action switch is mounted in a tough moulded polycarbonate housing and has a proven success across thousands of applications in industry, agriculture, aerospace and defence.

With a wide range of standard mounting and porting options, modular Designflex pressure switches are widely used for mobility applications. Other areas for ultra-sensitive pressure, vacuum and differential pressure switching include medical and dental equipment, commercial appliances and HVAC; as well as use in demanding construction, agriculture, automotive, defence and eco-friendly equipment.

The range covers pressure from 0.25 to 4,137mbar, offering long working life and high reliability with a choice of polyurethane and Teflon diaphragms. Application specific options include field adjustable set point, controllable hysteresis for precise deadband setting, and factory calibrated versions for tamperproof use, as well as full military spec' versions.

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**Tideway Sailability is a sailing club based in central London where people with disabilities participate on equal terms to those without a disability. It is wholly run by volunteers, and all money raised goes on the activities, premises and boats. Tideway have a large fleet of specialist and standard dinghies and dayboats available to members and groups of participants. Membership is a community of people of all ages from eight years old upwards with or without disabilities who sail together. To sail with them, offer support as a volunteer or donate, visit www.tidewaysailability.org.uk*



The high current PSF103 series pressure switch was chosen for Earls' hopper-empty notification system