

Industry: Health & Leisure

Products Used: Drives

# Mitsubishi Inverters keep on running

When Suffolk Punch's engineers decided to build a new jogging machine, they needed a method of speed control that would be highly reliable, smooth and capable of handling sudden increases in load. They looked at several possibilities, but only Mitsubishi Electric's Z300 inverter could cope.



Most Jogging machines use a DC motor and drive system to control the speed of the treadmill. However, DC motors on Jogging machines require their brushes to be replaced as often as every two weeks, forcing the machine to be out of use for significant periods. Suffolk Punch's engineers decided the most reliable solution would be an A.C. motor, controlled by a variable speed inverter driving the treadmill via a belt. They tested several manufacturers' inverters with an eighteen stone person, however, nearly all tripped the motor on overcurrent.

This stalling is due to the sudden increases in load caused by joggers' feet hitting the treadmill. As load increases, motor slip (difference between motor shaft speed and theoretical motor speed produced by the drive's output frequency) increases, raising the current of the motor. When the motor current reaches a certain level the motor trips. Most inverters use software to compensate for this slippage. However, with such sudden increases in load, software cannot respond fast enough to prevent current rise tripping the motor.

To solve this problem Suffolk Punch use a 4 KW Mitsubishi Electric Z300 inverter. The Z300 has a stall prevention function that is based on hardware in the inverter, rather than software. Its output devices monitor the current and respond instantaneously to any increases. They are not dependent on a lengthy calculation as they use intelligent Insulated Gate Bipolar Transistors (IGBTs) to monitor and respond to changes directly.

The end result is an inverter that is virtually tripless and a Jogging machine that requires very little maintenance. Proving its reliability the new jogging machine has also been tested with a 750 cc motorbike running at 45 miles per hour and the Mitsubishi Electric Z300 inverter drive still did not trip.

*Application story first released February 1995 by Mitsubishi Electric UK*