

DRIVE FOR PERFECT AQUA MASSAGE

American company Aqua Massage International (AMI) developed a unique series of machines to provide dry water massage therapy, but ran into technical problems when the drive and controller proved inadequate to the task. The company faced a crisis as development costs were soaring. Following discussions with Control Techniques' engineers at the Providence, RI Application Center, a control scheme was developed around the Unidrive SP AC drive equipped with a powerful on-board SM-Applications co-processor module.



AMI had originally developed their unique machine, using a proprietary microprocessor mounted on a printed circuit board with an AC drive for pump control and two others for position and pulse control. The controller was very costly to develop and proved to have limited functionality without the option to add additional capabilities demanded by customers, without going back to the drawing board. The time requirement and development costs began to look they could not be met for their new Aqua Spa model introduction.



Customers were asking for simple on-the-fly control so that a client within the machine could make instant adjustments to provide a totally customized experience, with varied pulsation, pressure and 12 zones of massage. The target was to provide all of these adjustments from a hand controller, including extra water pressure to the lower back or more time spent on massaging of the legs. On top of this, the machine had to meet international safety and technical standards if worldwide sales were to be achieved.

AMI submitted a flowchart to a number of drives companies, including the Control Techniques team and set a demanding schedule of three weeks for completion of the initial

KEY BENEFITS

- CUSTOMIZED MASSAGE EXPERIENCE
- ELIMINATED CONTROLLER REQUIREMENT
- ONBOARD PLC FUNCTIONALITY
- INTELLECTUAL PROPERTY PROTECTION
- COMPACT SIZE



evaluation project. All of Control Techniques' competitors were unable to provide either a cost-effective or working solution that integrated all of the features specified by AMI. However, Control Techniques' Providence Application Center determined that a 5 horsepower Unidrive SP AC drive equipped with a programmable SM-Applications module and two additional I/O modules would be able to economically achieve all of AMI's requirements for the new Aqua Spa system. What's more, future refinements could easily be incorporated. Not surprisingly, AMI chose the Control Techniques' solution.

The drive with its application module is used to control all of the machine logic including pump control and two small (non intelligent) DC microdrives – eliminating the need for any additional controller. AMI's deadline was met comfortably by the Providence Application Center.

All of required functions of the Aqua Spa system were programmed into the SM Applications module using the Control Techniques' SyPT program and, in this case, the code has been secured to provide intellectual property protection for AMI. About 2,500 lines of Drive Program Language code was written to provide all of the features required by AMI.

The new features include a body profiler that divides the body into 12 zones from the feet to the neck, independently programmed water pressure and pulsation frequency for each zone and water temperature control. The system stores 'recipes' of all adjustable parameters and there is an interface with a user HMI for recipe selection and profile set-up. A hand-held unit allows the user to adjust water pressure, control

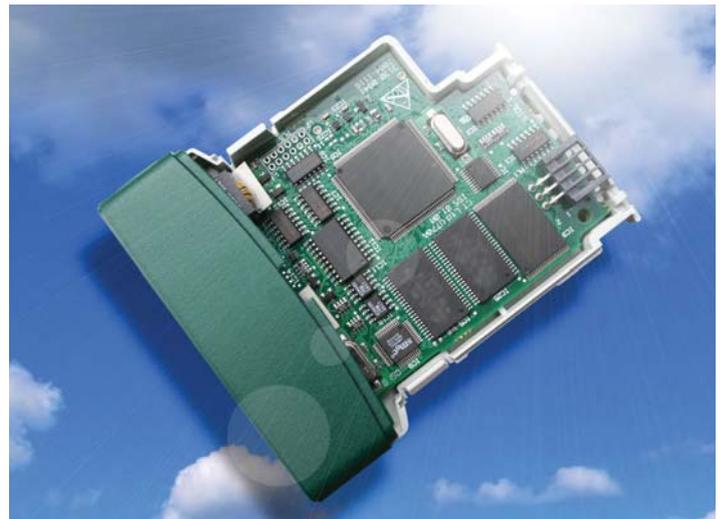
direction of the pulsation frequency and hold the current position while receiving a massage.

The system provides a gentle start and run down of the water pressure and pulsation and automated powered opening and closing of the canopy at the start and end of the treatment is programmed in as well. A usage log is stored for each customer or patient.

The system is calibrated in both english and metric units and is fully protected by a ground fault interrupter (GFI). Other drives suppliers could not function on a power supply protected by a GFI since VFD leakage current would trip the device. The Unidrive SP was capable of being set-up to avoid this.

The Unidrive SP AC variable speed drive range spans 1hp right up to 2,900hp. The Unidrive SP is the world's most advanced 'solutions platform' AC drive, configurable into five operating modes – open and closed loop, vector, servo and regenerative modes with connectivity to most industry standard networks and accepts most position feedback protocols. The drive has 3 universal option slots to accept a range of plug-in module options from specialized feedback and communication modules and as in this case, its on-board PLC can be supplemented with a programmable module and additional I/O capacity.

The Unidrive is used in AMI's most popular models, accounting for some 80% of sales. AMI machines are installed in more than 75 countries and are used in Medical Practices, Spas, Salons, Fitness and Wellness Centers and retail service locations (Malls, Airports) worldwide.



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