

## General processing

# Testing, testing – from 10 to 300 kW

Creating a single test rig for drive motors in the range of a few kilowatts (kW) to over 300 kW can seem like a daunting task, but through the application of accurate, variable speed control and customisable software, the feat has been achieved. Even better, operators can set parameters at the push of a button.

**T**asked with designing and supplying the control system for a complex pump test rig, System Control Solutions, a specialist in automation and variable speed drive applications, faced an interesting challenge. The rig had to be suitable for use with pumps having to drive motors ranging from just a few kW up to more than 300 kW, and it had to be capable of testing all sizes over a wide range of operating speeds. A Vacon NXP variable speed drive was chosen as the solution.

The customer, Amarith, is a UK manufacturer of standard and custom-designed centrifugal process pumps for use in demanding applications. In order to ensure that its products always meet the highest standards of performance and reliability, it carries out extensive in-house testing of its products before despatch. Recently, the company decided to upgrade its test facilities with a new test rig capable of providing detailed performance information for electrically driven pumps of all sizes.

To achieve this, it was necessary for the rig to control accurately the speed of the pump under test, and to make provision for this speed to be varied over a wide range. This would, for example, allow acquisition of the data needed for plotting flow/speed curves, and for calculating the pump's energy efficiency under various operating conditions.

To supply the control system for the test rig, Amarith approached System Control



Figure 1. The Vacon software allows drives to store multiple parameter sets, with the parameter set required in any particular instance selectable via the drive's digital inputs.



Figure 2. A Vacon NXP series drive rated at 315 kW was selected for the Amarith pump test rig.

Solutions, which designs variable speed drive systems for specialised applications. On looking at the requirements for this project, the engineers at System Control Solutions saw that designing a system that would achieve the required performance with a single size of motor, or with a small range of motor sizes, would be straightforward. Designing a system to work with motors anywhere between a few kW and 300 kW was a considerably greater challenge.

The versatility of Vacon became the solution as, instead of trying to cram every function that might possibly be required into the standard software supplied with every drive, Vacon offers an application software library of special functions that can be installed as required to supplement standard software. It offers a wide range of functions for special applications without making its standard firmware so complex that the drives become difficult to set up and use.

### Meeting needs

After discussing the specific requirements of the Amarith application with Vacon, the engineers from System Control Solutions found that the Vacon Multi Motor would meet their needs. The software allows drives to store multiple parameter sets, with the parameter set required in any particular instance selectable via the drive's digital inputs.

A Vacon NXP series drive rated at 315 kW was selected for the Amarith pump test rig. After installation of the Multi Motor software, this was programmed with eight different parameter sets, enabling this



Figure 3. The rig had to be suitable for use with pumps having to drive motors ranging from just a few kW up to more than 300 kW.

one drive to 'impersonate' drives rated at 10 kW, 50 kW, and 100 kW, and any one of another five ratings up to the maximum of 315 kW. The operator of the test rig selects the parameter set required to test a particular pump simply by pressing a button.

"With the Vacon Multi Motor software, this arrangement was very easy to implement," says Bob Halls, UK technical sales manager at System Control Solutions, "and it worked exactly as expected right from the word go. The drive system does precisely what Amarith wants, it does it reliably and it

does it without unnecessary complexity. This was an ideal solution to an interesting problem!" Vacon NXP drives of the type used in the Amarith test rig provide good dynamic performance and speed holding, coupled with wide compatibility with different types of motor, all characteristics that were of particular importance in this application. The drives also have good EMC performance, and combine the use of premium grade components with advanced thermal handling to ensure long reliable working lives.

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