



Press Report Compax3F[®]



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Automatic Control Technology

A new generation of controllers simplifies the combined operation of hydraulic and electromechanical axes

Clever box

The situation, in which hydraulic axes are very inferior to their electromechanical colleagues in demanding automation processes, has been out of date for some time now. This has been demonstrated by the latest development from the largest fluid technology group in the world - Parker Hannifin. The new Compax3F hydraulic two-axis controller uses well-known industry standards and hence simplifies the handling in a manner which can even make inveterate electrical specialists go "weak at the knees".



The new hydraulic controller is based on a hardware platform, which has been successfully used by its equivalent for electromechanics over many years. It is possible to take over almost 100% of the parameters from electromechanical to hydraulic controllers.

From January 2006 Parker Hannifin, the largest fluid technology group in the world with an annual turnover of 5.8 billion Euro, will introduce onto the market an hydraulic two-axis controller which will point the way to the future. The most distinctive feature of the so-called Compax3F is that it is based on a hardware platform which has proved itself well on the market over many years. Electro-mechanical drives can already be controlled by this Compax3 version. This includes both linear and rotating units. Actuators with power consumptions of up to 30 amps can be directly

connected by means of different sizes and an integrated output stage.

The hydraulic variant is also a stand-alone unit which can be programmed according to the widespread industrial standard conforming with IEC 61131-3. This is something in which comparable controllers on the market are currently still sadly lacking. It will be very significant for practicing electrical engineers to know that programs created with the "electrical variant" Compax3 can be taken over to an extent of nearly 100 percent into the new, hydraulic equivalent Compax3F. The controllers operate independent of the technology.

The industrial standard increases compatibility

By complying with the standard IEC 61131-3 the controller is able to operate with different programming languages. Instructions can be entered via graphical elements as well as in the form of text-based instructions. This provides a particularly simple method of dealing with products. The correct location of function blocks produces fast and simple automation solutions.

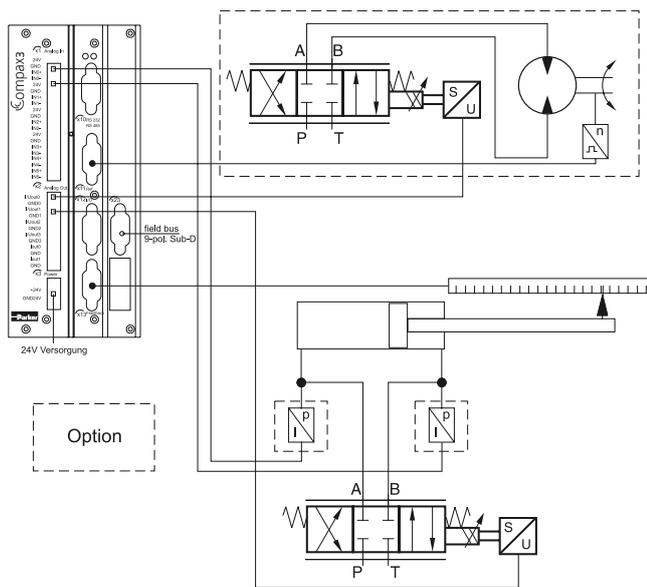
The basis for this is provided by the CoDeSys programming system from 3S. This software is used in the same way by other industrial companies which have specialised in automation technology, such as for example manufacturers of stored-program controllers or distributed I/O terminals. For the user this means that he only has to become familiar with one programming system.

The new control unit has been especially developed for so-called high-end solutions, which are often implemented by means of control valves with on-board electronics such as the DFplus from Parker. This means that the controller - in addition to the position control of two independent hydraulic axes of motion - is also able to process a combination of position and force control. This is especially necessary in demanding processes, such as those frequently found in plastics processing or joining procedures.

Position and pressure control are clearly being used more and more frequently in industrial practice because of increasing accuracy requirements. The safety of the machine is also increased through the application of modern controllers which can also support combined position and force control. With the additional option of monitoring the force relationships in a production process, the machine receives immediate feedback on faults. This prevents any possibility of damage to the machine, the system or even expensive components caused by a malfunctioning process.

The extensive tool family increases the practical benefits

A special aspect of the Compax3F is the universal tool family, the options of which are being expanded more and more. In this way not only is the commissioning of automation solutions significantly simplified but also the work of the maintenance department is supported in the future. By means of just one user interface - the so-called "C3 ServoManager" - the programmer is able to configure the controller in a simple way and to enter the parameters for the connected drive. Data exchange takes place via an RS232 interface on the unit.



The new Compax3F hydraulic axis controller has been specially developed for demanding controls such as those found in forming technology.

For the new controller there is a comprehensive tool family, which significantly eases the large amount of work involved from commissioning to maintenance.

The extent to which Parker Hannifin has thereby also been able to orientate itself to the practical requirements is aptly demonstrated by the integrated "hydraulics manager". This is a component database, which contains the setting values of all valves and cylinders from the Parker range. The provision of this data significantly simplifies the dimensioning of the controller since it permits automatic "pre-parameterising".

Here, too, Parker proves – just as in the selection of the industrial standard IEC 61131-3 – that the company does not pursue a "closed shop" strategy. This means that whenever machine and system builders use valves and cylinders from other suppliers, they still do not need to do without the advantages of the Parker hydraulic manager. The users simply have to enter the corresponding values for the components used and save them. During the next configuration of a controller they only have to

select these components and the automatic pre-parameterising takes place.

Simple cloning reduces service times

All the above is valid for the initial configuration of a controller for a particular automation solution. If the task is however to transfer already-existing settings to a system of the same design, the manufacturer offers its own parameterising unit for the purpose. This control module is simply plugged onto the RS232 interface, the data can then be read out and after the module has been plugged onto another controller the data can be transferred to this one. In the same way it is naturally also possible to optimise and save parameters.

Such a procedure doesn't just shorten the commissioning times but it also proves to be of great value during later operation. If for example the red LED on the unit lights up, the repairer can plug on the control module and then read off the corresponding plain text error message from the two-line display.



Fast control valves with integrated electronics such as the DFplus are indispensable for highly-dynamic processes.

Let's get back to commissioning: It is just here where it can quickly be demonstrated just how practical and convenient the axis controller actually is. The "C3 ServoManager" has an integrated optimising tool with a four-channel oscilloscope. In this way, during a commissioning session, the control engineer, even without the possibly not available or functioning controller, is able to carry out test movements. For this he only needs a standard PC or laptop.

By means of the oscilloscope he can detect undesirable following errors or the quality of the dynamic positioning of the connected actuators. The associated advantage is that optimisations can be carried out at an earlier time without having to provide additional testing equipment.

A debugger is also part of the tool family, which tests the proper function of the software, because software plays a central role in the overall performance of the Compax3F. And there is a curve designer which electronically simulates the frequently required "cam disk" function. This enables the user to accurately simulate his particular task, which he had to carry out before by means of a vertical shaft as well as mechanical cam disks, electronically and then to transfer it to the controller.

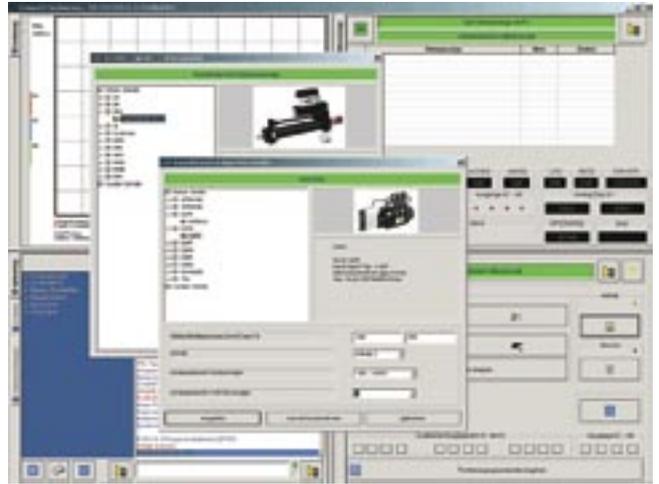


Apart from the position and force control of linear and rotary drive systems it is possible to achieve change-over control between position and force. Synchronous operation of up to 31 axes is also possible.

All of this demonstrates that hydraulic systems are now able to be adapted to and to be incorporated into all forms of technology. To drive the advantages in practice right to the top, Parker has made communication possible for synchronous movements between individual controllers via the group's own Heda-bus. Thereby it does not matter whether similar controllers are coupled together or whatever form of electromechanical and electrohydraulic technology is used.

This naturally also functions via the well established industrial bus systems of Profibus and CANopen. In preparation are DeviceNet and Powerlink (Industrial Ethernet).

Summary: The hydraulics prove how well the image of a powerful but also clever drive technology applies.



The stand-alone unit has four outputs and can thus control up to four control valves with on-board electronics. Using the C3-Servo-Manager as the user interface it is particularly easy to carry out parameterisation and commissioning.



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