Control Modules for Hydraulic Drives.
Your competent partner for control technology.

Global presence, local competence.

With more than 6,000 employees world-wide, HYDAC is one of the leading companies in fluid technology, hydraulics and electronics. With more than 45 foreign companies and over 500 sales and service partners, HYDAC is on-site with customers around the world.

We know hydraulics.

For more than five decades, we have been gathering experience which enables us to offer you optimum solutions for hydraulic applications and, in close cooperation with our customers, to pursue the further development of our products continuously and with specific objectives in mind. At the same time we are also the competent development partner for our customers in the area of control technology from the very start. Customer satisfaction and a long-term partnership cooperation are of primary importance for us in this connection. The drive solutions from HYDAC are represented in practically all technology fields world-wide:

- Automotive industry
- Construction machines
- Agricultural machinery
- Lifting and material handling technology
- Machine tools
- Plastics machines
- Presses
- Iron and steel industry
- Power plant technology
- Wind power
- Process technology
- Mining machinery
- Shipbuilding
- Paper industry
- and in many other areas.

Profit from our applications experience, our development methods and from our high-quality products and systems. With HYDAC as your internationally present development partner, new paths will open up to give you a technological head start.

World-wide specifications and approvals.

The quality and environmental certifications ISO 9001/2000 and ISO 14001 document first-class quality and responsible handling of our common resources.
### Power amplifiers.

#### Analog power amplifiers

For continuous valves with one or two magnets.

The voltage supply range is between 10...30 V.

0...10 V, ±10 V, 0...20 mA and 4...20 mA can be processed as input signals.

The settings of MIN, MAX, RAMP and DITHER are made per potentiometer.

The inner workings of these amplifiers are completely digital.

An output current range from 1.0 A to 2.6 A can be implemented.

Internal monitors report such typical errors as cable breakage with the input signal (4...20 mA) as well as cable breakage to the magnets via the LED.

#### Digital power amplifiers

For continuous directional control valves or for two continuous pressure or continuous throttle valves.

The voltage supply range is between 10...30 V.

0...10 V, ±10 V, 0...20 mA and 4...20 mA can be processed as input signals.

An output current range from 1.0 A to 2.6 A can be implemented.

One PWM input can be integrated as an option.

All settings are carried out flexibly via the serial port, which means that 100% reproducibility is ensured.

This is an advantage, particularly for serial utilisation and for adjustment to various continuous valves.

A characteristic curve linearisation via freely definable XY points for adjusting flow rates and/or pressure curves, respectively, remains available.

Just as with the analog variant, the error messages here are reported additionally through a switching output.

#### Plug-in power amplifiers

This completely digital version is parameterised on-site at the plug by means of two buttons. The parameterisation is supported by an LED display. Parameterisation is equally possible through a serial port.

The small and compact design is achieved at low cost through digital electronic construction and a standard Hirschmann housing (GDM 2011).

The plug-in power amplifier is available with an M12 threaded coupling connector (DESINA standard) or optionally for custom cabling.
Control modules in individual design for hydraulic drivers.

**General function modules**

These are eminently suitable for simple applications.

**Nominal value modules**

We offer you not only analogue modules which can be set per potentiometer, but also completely digital nominal value modules for the actuation of continuous directional control valves.

Four nominal values can be set per potentiometer for the analog variants. These can then be called up via digital actuation. The polarity of the output (0...10 V) can be reversed.

The digital variant is equipped with 16 retrievable nominal digital values and the associated ramp times. An analog nominal value input is available in addition. This can be linked through a programmable function with the digital nominal value which has been retrieved. The ramp generation is implemented with a jolt limitation in order to ensure particularly gentle behavior. The output stage supports the accommodation to the continuous valves through overlap compensation as a jump function to the characteristic curve linearisation. A monitoring range of the input signal can be programmed and reported via the status output.

Typical applications include rapid feed/creep feed control, retrievable nominal velocity or pressure values, characteristic curve adjustments and signal range monitorings, in addition to ramp generation for transmissions with critical accelerations.

**PID controller**

This assembly is used for the general control of proportional controlled systems.

The control structure is designed as a classic PID control. A short cycle time of 1 ms offers sufficient reserve, even with dynamic requirements of the control. As an alternative work can be performed with various sensors (0...20 mA, 4...20 mA, 0...10 V).

The output signal is available as active differential output for the direct connection of actuators (0...10 V, optional 4...20 mA).

A REMOTE CONTROL function can be activated to simplify commissioning. In other words, remote control is possible via the RS232C interface with the parameterizing software.

Typical applications are dynamic PID controls for power, pressure and rpm.

**Ramp and linearisation module**

This module is used to adjust SPS signals (±10 V, 0...10 V, 4...20 mA) for typical proportional valves with integrated power stage.

The signal input scaling, the ramp time function (four-quadrant ramp, linear or jerk-attenuated) and the free signal linearisation are used for optimum adjustment to the various applications.

The parameterization is effected using our parameterization software.

Typical applications are rpm controls with pulse generators.

**RPM controller with power stage**

This module is used for controlling a universal control loop for controlling rpm and velocity.

One power stage for continuous valves is already integrated (output current up to 2.6 A). The nominal value is actuated via 0...10 V signal (optional 4...20 mA with cable breakage and overcurrent monitoring).

Alternately, an internal nominal value can also be permanently programmed (fixed rpm control for generators).

The ramp function and PID controller can be used everywhere.

The output stage is monitored for cable breakage and overcurrent (short circuit) and switches the respective output stage off in the event of an error.

The parameterization is effected using our parameterization software.

Typical applications are rpm controls with pulse generators.
Pressure controllers

Pressure control module for pressure valves

- This module is used for controlling a universal control loop for controlling pressure and velocity.
- One power stage up to 2.6 A is already integrated.
- The nominal value and the actual value are set up via 0...10 V signal (optional 4...20 mA with cable breakage and overcurrent monitoring).
- The ramp function and PID controller can be used anywhere.

Pressure control module with two sensor inputs

- The parameterization is effected using our parameterization software.

Synchronization controllers

Synchronous control module with analog target position specification

- The parameterization is effected using our parameterization software.
- The drive runs under control and passes over into regulated status.
- The overlapped synchronization controller influences the velocity of the axis (slave axis). Position errors during the travel cause a velocity increase or reduction, so that the synchronisation error is regulated out. Switching variants are master/slave function or median value formation with two axes.

Pressure control module with two sensor inputs

- This module was developed for controlling pressure-regulated hydraulic axes via analog or (optional) integrated Profibus-DP port.
- In the Profibus version, the regulation components can be specified directly via the Profibus and the regulation portions can be activated or deactivated individually.
- The differential output is designed for the actuation of continuous valves with integrated or external electronics (differential output).
- Possible regulations are power/pressure regulation with a sensor or differential pressure regulation with two pressure sensors.

Synchronization control module with SSI and Profibus DP (optional Ethernet)

- With this module, the nominal value specification, the control byte and the status byte are transferred through the field bus. The distance measurement can be analog or digital via SSI port in its execution.
- A distance resolution up to 1 µm (SSI) and a velocity resolution up to 0.005 mm/s are possible.
- A maximum of 30 synchronized axes can be controlled via the Profibus DB. One synchronization module is necessary for each axis and one Profibus DB coupler for every four modules.
Position controllers

We offer you a complete programme of position regulation for hydraulic axes. Starting from «simple» distance-dependent braking with analog nominal value and actual value specification and ranging to the NC axis regulator with SSI sensor interface and Profibus coupling, all typical drive tasks can be solved. Distance-dependent braking is implemented in all devices and offers a particularly simple handling and setting of the parameters by means of our parameterization software.

Simple positioning assembly

For controlling hydraulic positioning drives. The typical positioning resolution is approximately 0.01% of the sensor length. Up to eight different target positions can be retrieved through digital inputs. Continuous valves with integrated or external electronics can be actuated with the differential output (optionally with power stage up to 2.6 A).

An NC mode can be activated. In this mode, the nominal position is generated via a profile generator. The axis moves with contouring error regulation with constant velocity to the nominal position. A set-up operation in manual mode is possible with one velocity each per direction of movement.

Universal positioning assembly

(variants SSI and field bus)

For controlling hydraulic positioning drives. The typical positioning resolution is approximately 0.01% of the sensor length. The target position specification and the actual position return proceed analogously (4...20 mA, 0...10 V).

The nominal velocity is specified analogously (0...10 V). Continuous valves with integrated or external electronics can be actuated with the differential output (optionally with power stage). Here, too, an NC mode can be activated and a set-up mode can be run.

Variant SSI:
In the case of the SSI variant, the actual position response takes place through an SSI sensor. A position resolution of 0.001 mm can be achieved as a result.

Variant field bus:
This has to do with an expanded version for the Profibus or Ethernet and digital sensors (SSI).
Nominal values and control signals to the module are sent via the Profibus and status information in addition to actual values are reported back from the module. The current actual position can also be fed in through the analog input (0...10 V, 4...20 mA). A distance resolution up to 1 µm (SSI) and a velocity resolution up to 0.005 mm/s are possible.

2-axes positioning assembly / synchronization

This module is used for the control of two hydraulic positioning axes via one integrated Profibus DP interface. The two axes can be operated completely independently as position regulation or as a two-axis synchronous system.
Nominal values and control signals are transferred to the module and actual values and status signals are transferred from the module through the Profibus DP. The differential outputs (0...10 V, optional 4...20 mA) are designed for actuation of continuous valves with integrated or external electronics (differential output). The assembly is intended for the connection of analog distance sensors (0...10 V, 4...20 mA, scalable).

Axis control assembly for position and power regulation

This module was developed for controlling hydraulic axes through an integrated Profibus-DP interface. The hydraulic axes can be designed as position regulation with digital distance measurement via a universal SSI interface or via analog sensors (0...10 V, 4...20 mA). In the case of the SSI interface, a distance resolution of up to 1 µm can be achieved.
In addition, a power or differential pressure regulation, respectively, is integrated as replacement pressure limitation regulation. Optimum utilisation is achieved with zero-cut regulating valves.
Our experience.  
Your advantages.

We have every problem under control
You are looking for a solution for general and hydraulic drive tasks?
We offer you an extensive product family in the area of decentralized regulating electronics.
From the simple power amplifier through general regulating modules all the way to 30-axis synchronized regulation, we always offer you the right product for typical applications.

Less is more
Our electronic assemblies are fitted to the individual requirements of our customers. Each module fulfills a specific drive control. This way, we can offer our customers an inexpensive alternative to complex expensive competitor products.

Simple installation
Thanks to the use of snap-on housings, we provide you with a simple and rapid mounting.

Rapid commissioning
A simple and rapid commissioning our digital modules are made possible by our parameterisation software.

We are there for you
Our competency center for electrohydraulic control is happy to help you further with any questions and problems which may arise.

Parameterization software.
The parameterization software is for the simple and rapid parameterization of our digital controllers and for the calculation of hydraulic cylinder drivers. With the integrated REMOTE CONTROL function, the regulator can be controlled directly and the drive can be driven without higher-level control.

Properties:
- Table-oriented input
- Saving and loading of datasets
- Monitor for process data display
- 4-channel oscilloscope function
- REMOTE-CONTROL function
- Universal application for all digital modules

Download under: www.hydac.com

Technical description.

Product structure
Our Miniboards and our Standard Hardware form the basis for all of our modules. The various types and versions, respectively, are implemented in the software. It is thus always possible to offer you our products at inexpensive prices.

Regulation focal points:
- Analog and digital Power amplifiers
- General function modules
- Pressure controller
- Synchronisation controller
- Position controller

Product advantages
- High-performance electronics
- Cost-optimised design
- Easiest of handling
- High flexibility
- Robust in defence against application errors

Interfaces:
- RS232C for parameterization (End 2011: USB as well)
- Profibus (optional)
- CAN-Bus (optional)