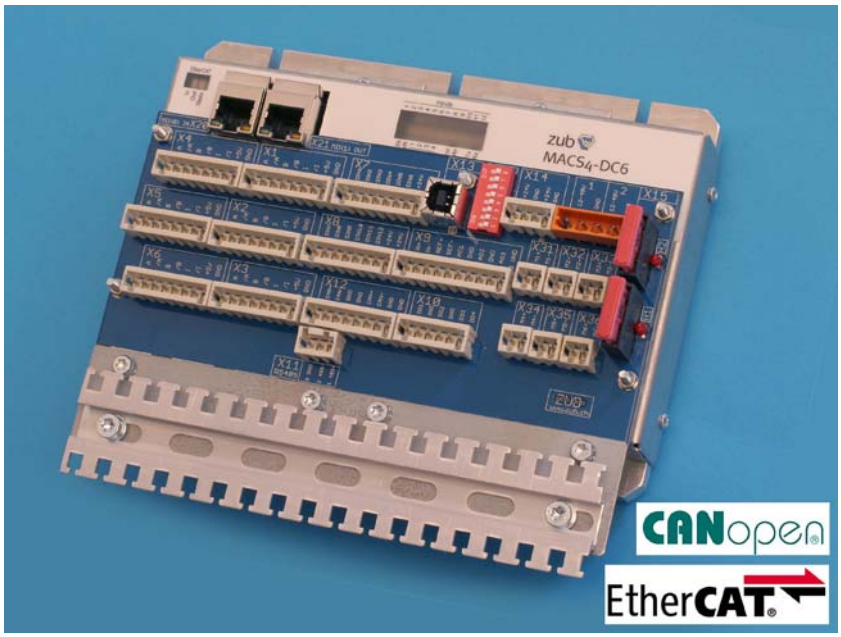
MACS4-DC6
6-Axis Compact Control Unit incl. Servo-Amplifiers

Low cost Control for Positioning Tasks of small DC drives

The **MACS4-DC6** is the first compact 6-axis control unit offering you a low cost solution for simple positioning tasks. Typical applications are found in machines and factory equipment of the paper, printing, wood-working and analytic industry. The **MACS4-DC6** controls the accurate and fast adjustment of mechanical stops as well as the multi-axis positioning of small robots in material or probe handling.

The **MACS4-DC6** integrates a freely programmable logic and position control unit with six encoder inputs and six DC servo amplifiers. The state-of-the-art integrated development environment is free of charge. There are no expensive add-on libraries necessary to gain full motion-control functionality. Modern interfaces like EtherCAT, CAN, and USB are your link to PLCs and PCs.



Your Chances / Your Benefit

- Low-cost multi-axis control without any PLC load
- Compact and complete solution, including servos and encoder inputs
- Usable for retrofit of old machines with manual stop adjustments
- No hidden costs for …
  … motion control libraries
  … external encoder inputs
  … bus converters

The benefit of your Costumer

- Flexible utilizable machines
- Position adjustment on a keypress
- Easy handling of multi-axis tasks in cost-sensitive small robots

Application area

- Position controlled, motor-driven adjustment of mechanical stops in all kind of machines
- Multi-axis positioning of small robots and handling devices
- Speed and flow control of small pump systems

Closed loop Control

- Position control
- Speed control
- Current control & limitation

Positioning Functions

- Configurable homing
- Absolute & relative positioning
- Configurable velocity profiles

I/O-Functions

- Set / reset of outputs
- Read & interrupt control of inputs
- Support of CANopen-I/O modules

Bus & Control Functions

- CANopen master-/slave functionality
- EtherCAT® slave functionality
- Interrupts reacting on inputs, position data, bus bits, timer, etc.
- Arithmetic and bit handling
- Conditional branches and loops

Debugging & Optimization

Performance optimization and testing is assisted by the development tool including a smart oscilloscope.

Conclusion

MACS4-DC6 =
Control and power for up to 6 drives in its most compact version.

P.S.

The **MACS4-DC6** can also be used standalone; there is no must for a PLC system. We also offer your specific OEM solution for series quantities.

MACS4-DC6			Note
Electrical Data			
Control Unit: Supply voltage / Current	24 V DC ±25 %	200 mA	without I/O-load
The supply circuits of the power stages are grouped. The power stage 1 - 4 have one common supply. The power stages 5 - 6 have another common supply. The supplies of both groups are completely independent and have each pluggable 4A fuses (ex factory). If the maximum potor power is required, the standard fuses have to be replaced by ones with higher current ratings.			
Power Stage 1 - 4: Supply voltage / Fuse	12 – 48 V DC	4 A (ex factory) / max. 15 A	depending on motor power
Power Stage 5 - 6: Supply voltage / Fuse	12 – 48 V DC	4 A (ex factory) / max. 7.5 A	depending on motor power
CPU & Memory			
Microprocessor	DSP TI2812	150 MHz	
Workspace & program memory	1 Mbyte SRAM	512 Kbytes Flash	Application & data
Closed loop Controls			
Number of drives and control type	6	Position, Speed, Current	Closed loop Control
Position control	0.5 kHz	2 ms cycle time	PID control plus feedforward
Speed control	1 kHz	1 ms cycle time	PI control
Current control	4 kHz	0.25 ms cycle time	PI control plus current limitation
Internal Power Stages			
Quantity	6		for brush-type DC motors
Amplifier type & chopping frequency	4Q-PWM	24 kHz	
Max. output current (configurable)	1.5 A continuous	3.8 A peak (min. 60 sec.)	per amplifier, Period of time of peak current depends on cooling
Motion-Control Functionality combined with Programmability			
Velocity and position control with configurable trapezoidal speed profile Velocity and position / angle synchronization with or without master / slave marker correction, CAM profile synchronization			
Encoder Inputs			
Encoder 1 … 6	Incremental encoder	5 V, max. 32 MHz	TTL or differential (RS422)
	or SSI encoder	max. 32 Bit, 39 kHz…5 MHz	One single SSI clock
	Enc. 1 … 6 configurable as slave (☞ positioning) or master inputs (☞ synchronization) Encoder power supply output: 5 V DC, max. 200 mA per encoder, total: max. 1A Additional supported encoder types: CANopen absolute encoder (max. 1 Mbaud)		
Digital Inputs / Outputs			
Digital Inputs	12	Low: < 4.6 V / High: > 18 V	max. 45 V, max. 200 kHz
	Inputs 1 - 8 can be configured as marker inputs for hardware encoder position latching		
Digital Outputs	4	24 V, 100 mA, 300 kHz	
Analog Inputs/Outputs ☞ Only for MACS4-DC6-…-ANA versions			
e.g. analog command output (±10 V or unipolar + direction) for external servo amplifiers or frequency converters			
Analog Inputs	1	±10 V, 12 Bit, max. 5 kHz	
Analog Outputs	3	±10 V, 12 Bit, 20 mA, 10 kHz	e.g. analog command output
Reference voltage (output)	±10 V DC	max. 20 mA	
Interfaces			
CAN interface	ISO/DIS 11898	max. 1 Mbaud	CAN master / slave functionality
Serial interface 1	USB		Development & visualization
Serial interface 2	RS485	max. 10 Mbaud	e.g. for Danfoss frequency converter
EtherCAT®	☞ Only for MACS4-DC6-EtherCAT-… versions		
Other bus interfaces	☞ Only on request (starting at 500 units), e.g. Ethernet, Profibus, Profinet, Powerlink, Modbus		
LEDs			
Inputs / Outputs / Status / USB	12 / 4 / 3 / 2		
Mechanical Data			
Type of housing / Mounting	Compact metal housing		
Full size (H x B x D) / Weight	80 x 185 x 165 mm	incl. connector and shielding	approx. 1.4 kg
Dimension of mounting base (B x D)	185 x 135 mm		
Connector type:	Pluggable tension spring clamps RM3.5 and RM5.08 (power stage supply)		
The MACS4-DC6 is delivered with all counter plugs! The connector board is pluggable and locked by six screws.			
Temperature Range			
Operation / Storage	0…+40 C / –20…+85 C	20…80 % humidity	non condensing

Product Types and Ordering Codes

Base Version	plus EtherCAT®	plus Analog-I/O	plus EtherCAT and Analog
MACS4-DC6 Order-No. 001244	MACS4-DC6-EtherCAT Order-No. 001245	MACS4-DC6-ANA Order-No. 001247	MACS4-DC6-EtherCAT-ANA Order-No. 001246

Customized connector boards, power stages and functionality on request!

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