

MiniMACS

Low-cost Controller for Positioning and Synchronization

Strong performance at a low price: CANopen, Ethernet, USB

The **MiniMACS** motion controller can control several amplifiers via the CAN bus, and is ideal for combination with DSA amplifiers from zub AG or with Danfoss/VACON frequency converters.

The control unit positions and synchronizes with accustomed precision and efficiency. The low-cost device is developed for simple applications for 1 to 3-axis solutions. In terms of precision and functionality, the MiniMACS is the equal of the MACS5 model series in every respect.

Each MiniMACS controls and regulates autarkic the complex and high dynamic positioning and synchronization of servo and asynchrony motor axis. A single module can be used for autarkic control of small devices.

In systems and mechanical engineering multiple MiniMACS modules can be linked by CAN, Ethernet, and USB to a PLC or PC network. Then the MiniMACS serve as a CANopen master of a sub-network and command servo amplifiers, frequency converters, and I/O modules.

The MiniMACS is like all zub controllers free programmable and can be adapt the functionality exactly to the machine or device requirements or enable you even to enhance the DS402 features.

Application Range

- ◆ **X/Y/Z-Positioning**
- ◆ **Storage:** Cart positioning
- ◆ **Feeding:** Synchronous feeding
- ◆ **Winding:** Position synchronization
- ◆ **Labeling:** Marker synchronization

Did we miss your application?

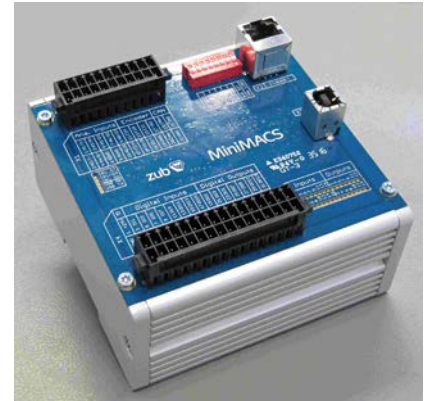
Please, call us! zub machine control AG will offer you an appropriate solution for that as well.

Multiple Bus Interfaces

- ◆ USB and Ethernet for PC, PLC or visualization
- ◆ CANopen to integrate MiniMACS modules as "intelligent" slave into any kind of PLC systems
- ◆ CANopen master functionality for drives and I/Os

zub Standards

- ◆ **Control Functions:** Interrupts reacting on inputs, position data, bus bits, timer, etc.; arithmetic and bit handling; conditional branches and loops.
- ◆ **Positioning Functions:** Configurable homing, absolute and relative positioning, programmable velocity profiles.
- ◆ **Synchronization Functions:** Velocity synchronization, position / angle synchronization, Synchronization including correction depending on slave / master marker.
- ◆ **Free programmability** by the extensive automation software APOSS®-win and license free Motion Control Library.
- ◆ **Interactive graphic editors** like CAM-, Array- and Path-Editor.
- ◆ **Debugging & Optimization:** Smart-Oscilloscope and integrated graphic CAM-Editor.
- ◆ **State-Machine Support:** APOSS® supports the automatic execution of hierarchic State Machines.
- ◆ **On-the-fly Flexibility:** The entire set of motion or regulation parameters and the mode of operation can be altered on the fly with automatic recalculation of the motion profile.



Variant MiniMACS DIN housing



Variant MiniMACS compact housing

Options

- ◆ **Analog Option 1** can be used to control up to three external servo amplifiers or frequency converters by a ± 10 V command signal.
- ◆ **Analog Option 2** can be used to read in potentiometric position scales in a more accurate way (i.e. 13 bit) than by the standard analog inputs.

Conclusion

The MiniMACS is the most competitive and high-performance link in between your process control and drive units. The integrated encoder input, a lot of inputs and outputs, and the license free, highly sophisticated motion control functions reduces the hardware and software expenses.

MiniMACS – Preliminary data sheet

Electrical Data

Supply voltage, current cons. 24 V DC $\pm 10\%$ 100 mA @24 V current consumption without I/O-load

CPU & Memory

Microprocessor ARM Cortex M4 120 MHz
 Workspace & program memory 256 Kbyte SRAM 1 Mbyte Flash firmware, application, and data

Control Characteristic

Axis control: number and type 1 – 3 PID with feed forward
 Position control frequency 1 kHz 1 ms cycle time

Motion-Control Functionality combined with Programmability

Velocity and position control with linear, S-profile, or jerk limited ramps
 Velocity and position / angle synchronization with or without master / slave marker correction, CAM profile synchronization

Encoder Terminals

Encoder Incremental encoder 5 V, max. 5 MHz
 Additional supported encoder CANopen absolute encoder (max. 1 Mbaud)

Digital Inputs / Outputs

Digital Inputs 16 Low: < 4.6 V / High: > 18 V max. 45 V, max. 1 kHz
 Digital Outputs 14 24 V, Push up 100 mA, 1 kHz

Analog Inputs / Outputs

Analog inputs 6 analog inputs 0-10 V, 10 Bit, max. 5 kHz (not available, if analog opt. module in use)
 Options Alternatively it is possible to mount internally one of 2 analog option modules (replacing the standard analog inputs using the X9 connector):
 Analog option 1 can be used to control up to three external servo amplifiers or frequency converters by a ± 10 V command signal.
 Analog option 2 can be used to read in potentiometric position scales more precisely (i.e. 13 bit) than by the standard analog inputs.
 Analog option 1 (...-IO1-...) 1 analog input ± 10 V, 12 Bit, max. 5 kHz ± 10 V reference voltage, (max. 20 mA)
 3 analog outputs ± 10 V, 12 Bit, 20 mA, 10 kHz
 Analog option 2 (...-IO2-...) 6 analog inputs 0-10 V, 13 Bit, max. 5kHz +10 V reference voltage (nominal 7 mA, max. 35 mA)

Interfaces

USB data exchange & visualization
 Ethernet Ethernet TCP/IP max. 100 Mbaud data exchange & visualization
 CAN bus ISO/DIS 11898 max. 1 Mbaud master and slave functionality (switchable bus termination)

LEDs

16 inputs / 14 outputs / 3 status / 2 Ethernet / 2 USB

Power-down Save

User-defined data can be saved automatically at power-down (e.g. in case of mains failure).

Mechanical Data

Type of housing, mounting
 Variant DIN housing Aluminum rail housing with top hat rail mounting
 Dimensions: 108 x 108 x 67 mm
 Width x height x depth till the top edge of the Ethernet plug
 Weight: 0.5 kg
 Variant compact housing Sheet housing for rear panel mounting
 Dimensions: 116 (98) x 108 x 42 mm
 Total width (only construction) x height x depth till the top edge of the Ethernet plug
 Weight: 0.3 kg
 Connector type Wago MCS MII HD

Temperature Range

Operation / storage 0...+40° C / -20°...+85° C;
 20...80 % humidity, not condensing

Typical product types

Part numbers 00xxxx: MiniMACS in DIN housing 00xxxx: MiniMACS -IO1
 00xxxx: MiniMACS in compact housing 00xxxx: MiniMACS -IO2