
Datasheet

Magnetic Bearing Control Unit MBC5000

BG13500-xxN



Key Features

- 5000 VA magnetic bearing control unit
- 5 axis power amplifier with 17 A output current
- Multi-core controller board for advanced control including force control
- Up to 8 sensor channels
- Digital I/O, UPS I/O, CAN and Ethernet service interface
- Anybus® CompactCom™ interface for fieldbus
- Designed for high MTBF

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Properties

Power Amplifier

- Integrated output filter to reduce EMC and losses in magnetic bearings
- 17 A output current
- Short circuit protection

Controller

- Powerful multi-core controller board featuring fully digital control
- High-order MIMO position control with underlying force control
- Advanced unbalance rejection control (UFRC) and synchronous damping control (UFCC)
- Ethernet service interface allowing for real time measurements
- UPS and CAN interface
- Extension module for temperature measurement and fieldbus
- Optional: Trend and event logger

Sensor Interface

- Up to 8 sensor channels (e.g. 4 radial, 2 axial, sin/cos resolver)
- 10 kHz ... 1 MHz sinusoidal excitation
- Digital processing of the sensor signals
- Optional: Cable length up to 300 m by use of a sensor amplifier close to the machine

Approbation

- Developed according to IEC 61010-1 / UL 61010-1
- UL: Prepared for certification, please contact MECOS for further information
- Applicable CE-directives: Directive 2014/35/EU (LVD)
Directive 2014/30/EU (EMC)
Directive 2011/65/EU (RoHS)

Standards

EN 61010-1: 2010 +A1: 2019 +A1: 2019/AC: 2019	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
EN 60204-1: 2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 61000-6-2: 2015	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4: 2007 /A1: 2011	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards - Emission standard for industrial environments

Device Configurations

Standard Configuration

Extension Module ITB6 for Temperature Measurement and Fieldbus

- 6 channel thermistor input (2- or 4-wire configuration)
- Measurement range 0 ... 1.8 k Ω (PT100: -50 ... +850 °C, PT1000: -50 ... +210 °C)
- Anybus® CompactCom™ interface for Modbus TCP

Internal Options

Fieldbus Module

- Anybus® CompactCom™ interface for Ethernet/IP, EtherCAT, Profibus or Profinet

Coated Printed Circuit Boards

- Protection from condensation
- Protection in dirty environments

UL

- UL recognition on request, please contact MECOS for further information

External Options

Sensor Amplifier Box SMX8

- External sensor amplifier box for 8 channels
- Sensor cable length up to 300 m possible
- Directly mounted on the machine side (short sensor cable between SMX8 and machine)

Technical Specification

Operating Conditions

Operating temperature	0 ... +55 °C
Storage temperature	-20 ... +60 °C
Maximum installation altitude	2000 m above sea level
Relative air humidity	< 95 % (non-condensing)

General Data

Dimensions (L x W x H)	546 mm x 310 mm x 240 mm
Degree of protection	IP20
Weight	20 kg
Supply voltages	300 V _{DC} ±10 % / Earth-free, galvanically isolated
Overvoltage category connection	II
Level of contamination	2
Electrical Safety	According to the declaration of conformity
UL CCN / file number	Prepared for certification
Power consumption (depending on machine, cable length and parameterization)	Typically 1100 W
Maximum input current	12 A
Cooling	3 PWM-controlled axial fans

Power Amplifier

DC link voltage	300 V _{DC}
DC link capacity	5600 µF
Amplifier type	10 channel PWM unipolar amplifier
Maximum power output (dynamic)	10 x 5000 VA
Number of magnetic bearing axes	5 (4 radial, 1 axial)
Output current	12 A per channel
Continuous	17 A
Peak value	
PWM switching frequency	20 kHz

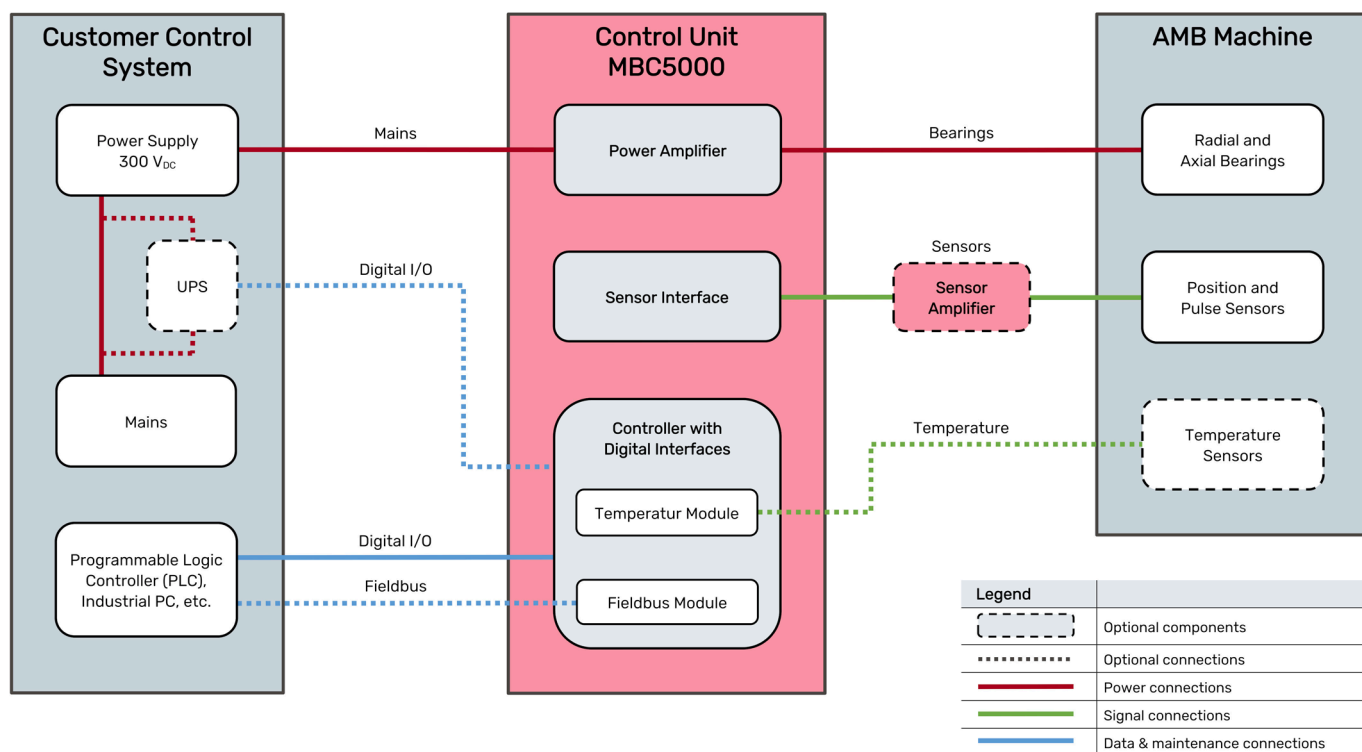
Interfaces	
Digital inputs	6 isolated inputs with common ground, max. 30 V
Digital outputs	6 isolated outputs with common supply, max. 30 V
UPS interface	Isolated: 4 digital inputs, 1 digital output, max. 30 V Recommended UPS: GE Digital Energy VH 1000
Isolated supply	24 V isolated supply for digital I/O, short-circuit-proof
CAN interface	Serial interface including 12 V supply, max. 1 A
Ethernet service interface	MECOS toolbox based on MATLAB®
Additional I/O	2 outputs for relays (12 V, 1 A, 490 mJ), 2 NTC inputs (10 kΩ)
Status indicators	LED for power, error, warning, levitating, rotating, boot and Ethernet connection

Connections

Standard Configuration

X1 Digital I/O	16-pin WAGO plug, type 713-1428/116-000
X2 UPS	12-pin WAGO plug, type 713-1426/116-000
X3 CAN	9-pin D-Sub plug
X4 MECOS Service	RJ45 socket
X5 Amp. I/O	8-pin Weidmüller plug, type SL3.50/08/90F 3.2SN OR BX
X7 Sensors A	12-pin Hummel M23 signal connector, socket, code X
X8 Sensors B	12-pin Hummel M23 signal connector, socket, code N
X9 Mains	6-pin Phoenix Contact plug, type DFK-PC 4/ 6-GF-7,62 (1840599)
X10 Bearings Z	7-pin WAGO plug, type 769-607/006-000
X11 Bearings B	7-pin WAGO plug, type 769-607/006-000
X12 Bearings A	7-pin WAGO plug, type 769-607/006-000
X13	Anybus® CompactCom™ interface, connector depends on module
X14 Temp.	26-pin Weidmüller plug, type S2L-SMT 3.50/26/90LF 3.2SN BK BX

System Overview



Dimensions

All dimensions in mm

