



## MH200 Series (High Performance)

Processor modules of the MH200 series combine maximum processing performance with outstanding environmental robustness. Thanks to multicore technology and symmetrical multi-processing for real-time systems, the 2.3 GHz CPU is also suitable for demanding applications with very high volume requirements and short cycle times.

Specific tasks such as complex motion control, image processing or higher-level control and communication tasks benefit from the parallel processing of up to 4 tasks. Data centric applications, such as process diagnostics, machine learning or the predictive maintenance of large machine parks can be implemented easily thanks to the large working memory.

The generous thermal design and special coating processes enable fan-free use in extreme operating conditions from -30 °C to +60 °C. The integrated power supply unit, which also provides the I/O module supply, enables the installed volume to be kept very compact.

### Features

- Industrial 2.3 GHz Dual-Core-Processor
- 4 logical Cores via Hyper-Threading
- Realtime Symmetrical Multi Processing
- 2 GB DDR4 RAM
- CFast card slot for removable media
- 2x Ethernet 10/100/1000 Mbit/s with IEEE 1588
- 1x RS232, 1x RS232/RS422/RS485
- Integrated power supply for I/Os

Depending on the version (hardware revision):

- 512 kB or 1 MB remanent memory (Retain)<sup>1)</sup>
- 16 MB or 2 GB internal memory device<sup>1)</sup>
- 1x USB 2.0 or 1x USB 3.0<sup>1)</sup>
- Without Trusted Platform Module (TPM) or with TPM chip<sup>1)</sup>

Part type designation	Memorydevice	Part number
MH230 <sup>1)</sup>		00031521-00
MH230 <sup>1)</sup>	4 GB CFA	00031521-03
MH230 CC <sup>1)</sup>		00031673-00
MH230 CC <sup>1)</sup>	4 GB CFA	00031673-03
MH230		00032783-00
MH230	4 GB CFA	00032783-03
MH230 CC		00032784-00
MH230 CC	4 GB CFA	00032784-03

<sup>1)</sup> Hardware revision <KR110.000: 512 kB NVRAM, 16 MB internal memory device, USB 2.0 (incl. 500 mA supply), 30 W for I/O, no TPM-Chip, minimum version M-Base 4.30

**MH230**

Processor	
Architecture	x86/Pentium®/IntelCore®
CPU	Industrial low voltage
Clock frequency	2300 MHz
Processor cores	2
Hyper-Threading	Yes (4 logical cores)
Multitasking	Yes
Realtime-SMP / Core reservation	Yes/yes
Memory	
Main memory / partitions	2 GB DDR4 / Yes
Ramdisk	Yes
Retentive memory (Retain)	1 MB NVRAM <sup>1)</sup>
Mass storage integrated	2 GB pSLC Flash <sup>1), 2)</sup>
Mass storage removable	CFast Type I <sup>3)</sup> (via side cover)
<sup>1)</sup> Hardware revision <KR110.000: 512 kB NVRAM, 16 MB internal mass storage, USB 2.0 (incl. 500 mA supply), 30 W for I/O, no TPM chip, minimum version M-Base 4.30	
<sup>2)</sup> By default 13 MB used for system software at shipping	
<sup>3)</sup> Storage medium not included if not mentioned explicitly in order text	
Interfaces	
I/O Subsystem	Bachmann M200 Backplane Interface
	Process image controller integrated
	Cyclic process images and on-event single channel access
	Synchronisation pulse for I/O & field busses
Ethernet	2x 10/100/1000 Base-T (RJ45)
	AutoNegotiation, AutoCrossing, IEEE 1588
Serial interfaces / COM	1x RS232 (D-SUB-9 m)
	1x RS232/RS422/RS485 galvanically isolated (D-SUB-9 m)
USB	1x USB 3.0 <sup>1)</sup> (incl. 900 mA <sup>1)</sup> supply)
<sup>1)</sup> Hardware revision <KR110.000: 512 kB NVRAM, 16 MB internal mass storage, USB 2.0 (incl. 500 mA supply), 30 W for I/O, no TPM chip, minimum version M-Base 4.30	
Indications & Operation	
Status indications	3x LED for CPU status (RUN/INIT/ ERR)
	2x LED for status and speed per ETH socket
Operating elements	2x 16-position rotary switch (Hex-switch)
	For operation mode, programming, boot mode, address setting etc.
Programming	
Generic build target	Yes, across all model families
Languages	IEC 61131-3, C/C++, MATLAB®/Simulink® <sup>1)</sup>
Function modules	Yes (MotionControl, Camming, CNC, adaptive temperature controller...) <sup>1)</sup>
<sup>1)</sup> May include additional costs	
Monitoring	
Processor temperature	Yes
Processor load	Yes
Runtime behaviour	Yes, cycle monitoring & watchdog
Network load	Yes
Memory protection	Yes, per partition

Monitoring		
Power supply	Yes, with interrupt signal	
Subsystems		
Real-time clock	Yes (battery-backed RTC for time/date), sync capability over IEEE 1588, SNTP	
Trusted platform module	Yes (TPM 2.0) <sup>1)</sup>	
<sup>1)</sup> Hardware revision <KR110.000: 512 kB NVRAM, 16 MB internal mass storage, USB 2.0 (incl. 500 mA supply), 30 W for I/O, no TPM chip, minimum version M-Base 4.30		
Energy supply		
Supply voltage	24 V DC (18 V to 34 V)	
Terminal block for socket	KZ 51/03 RM 5.08; 3-pol.	
Reverse polarity protection	Yes	
Galvanic isolation supply	Yes	
Voltage interruptions immunity (IEC 61131-2)	PS2	
Nominal power consumption without I/O	22 W <sup>1)</sup> (no supply via NT255 possible)	
Nominal power consumption with I/O	63 W <sup>1)</sup>	
Nominal power output for I/O	36 W <sup>1)</sup>	
Maximum currents for I/O	+5 V / 4200 mA <sup>1)</sup> ; +15 V / 500 mA; -15V / 500 mA	
<sup>1)</sup> Hardware revision <KR110.000: power consumption total: 55 W, without I/O: 20 W, output to I/O: 30 W (+5 V / 3000 mA; +15 V / 500 mA; -15 V / 500 mA)		
Electrical Safety		
Protection class (DIN EN 61140)	III	
Degree of protection (IEC 60529)	IP20	
Environmental conditions		
	Standard	ColdClimate (❄)
Operating temperature	-30 °C to +60 °C without fan	
Relative humidity, operation	5 % to 95 % noncondensing	5 % to 95 % with condensation
Storage temperature	-40 °C to +85 °C	
Relative humidity, storage	5 % to 95 % noncondensing	5 % to 95 % with condensation
Installation altitude	2000 m above sea level (with derating up to 4500 m)	
Pollution degree acc. IEC 60664-1	2 (noncondensing)	2
Approvals/Certificates		
Product safety	CE, UKCA, cULus	
Maritime	ABS, BV, DNV, KR, LR, NK, RINA	
Dimensions		
Number of slots / module units	4	
Width × Height × Depth	220 mm × 119 mm × 96 mm	
Weight/Mass	Approx. 1835 g	
System requirements		
Backplane	BS2xx, BS2xx/S, BS2xx/E	
Software	MHOS (VxWorks 7) from M-Base 4.39 <sup>1)</sup> or higher (pre installed on internal mass storage), for application development ToolChain from V4.31 or higher is recommended (to utilize MultiCore/SMP)	
<sup>1)</sup> Hardware revision <KR110.000: 512 kB NVRAM, 16 MB internal mass storage, USB 2.0 (incl. 500 mA supply), 30 W for I/O, no TPM chip, minimum version M-Base 4.30		

For details on shock and vibration robustness, EMC robustness and interference emission see **user manual M-Base**.

**Order data**

Part type designation	Part number	Description
MH230	00031521-00	CPU module MH230 (2.3 GHz) DualCore HT; 2 GB DDR4; 512 kB nvRAM; 16 MB File-Flash; 2x Eth100/1000; 1x RS232; 1x RS232/422/485 isolated; 1x USB 2.0; I/O supply 30 W; CFast-Slot
MH230 4GB CFA	00031521-03	CPU module MH230 (2.3 GHz) DualCore HT; 2 GB DDR4; 512 kB nvRAM; 16 MB File-Flash; 2x Eth100/1000; 1x RS232; 1x RS232/422/485 isolated; 1x USB 2.0; I/O supply 30 W; CFast-Slot; 4 GB CFast-Card
MH230 CC	00031673-00	Like MH230 00031521-00; ColdClimate (❄)
MH230 4 GB CFA CC	00031673-03	Like MH230 4 GB CFA 00031521-03; ColdClimate (❄)
MH230	00032783-00	CPU module MH230 (2.3 GHz) DualCore HT; 2 GB DDR4; 1 MB nvRAM; 2 GB File-Flash; 2x Eth100/1000; 1x RS232; 1x RS232/422/485 isolated; 1x USB 3.0; TPM; I/O supply 36 W; CFast-Slot
MH230 4GB CFA	00032783-03	CPU module MH230 (2.3 GHz) DualCore HT; 2 GB DDR4; 1 MB nvRAM; 2 GB File-Flash; 2x Eth100/1000; 1x RS232; 1x RS232/422/485 isolated; 1x USB 3.0; TPM; I/O supply 36 W; CFast-Slot; 4 GB CFast-Card
MH230 CC	00032784-00	Like MH230 00032783-00; ColdClimate (❄)
MH230 4GB CFA CC	00032784-03	Like MH230 4 GB CFA 00032783-03; ColdClimate (❄)

**Accessories**

Part type designation	Part number	Description
KZ 51/03 B	00012052-00	Supply terminal block: terminal 03-pins pitch 5.08; cage clamp terminal with labeling strips
CFA200/4GB	00017355-00	CFast card 4 GB
CFA200/8GB	00021781-00	CFast card 8 GB
CFA200/16GB	00019082-00	CFast card 16 GB