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BAUMÜLLER



b maXX

b maXX 5000, b maXX 5500, b maXX 4400, b maXX 3300, b maXX 1000, Safety, ProSafePara, ProDrive

The converter series of the b maXX family cover a power range of up to 400 kW and not only include devices that can be stacked or mounted side by side but also powerful mono units.


BAUMULLER



Added value for our customers

Our goal is to enable more flexibility in your machine design and ensuring your machine users the necessary productivity and efficiency in production, thereby giving your machines a competitive edge. That is why the focus of our development is not just the entire system of a machine, but also the added value that we make available to our customers with the modularization of machines, the scalability of components and flexible technology blocks.

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b maXX 5000

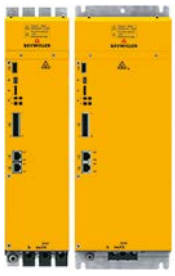
Servo controller family



b maXX 5000 Side-by-side technology



BM50XX
SUPPLY UNITS



BM51XX
REGENERATIVE UNITS



BM53XX
AXIS/DOUBLE AXIS UNITS

b maXX 5000 Mono technology



BM55XX
STANDARD UNITS



BM56XX
PEAK LOAD UNITS



BM57XX
NOMINAL LOAD UNITS

b maXX 5300

The safe, modular servo controller



Safety

Baumüller sets standards with the converter generation b maXX 5300. The further development of the successful b maXX series towards modular systems convinces with high-performance power units in air-cooled, water-cooled and cold plate cooling versions and with flexible expandability and the accessibility to an integrated communica-tion concept. Standardized as well as complex automation solutions can be implemented with Baumüller's converters and controllers within a power range between 1 and 90 kW.

The machine and installation requirements with regard to future reliability, flexible expansion possibilities and a simple adjustment to changed production processes were already considered during the preliminary development process stages of the b maXX 5300.

Individual modules easily can be removed or added over an integrated drive connect system without having to disconnect the entire drive system.

Available fieldbus options

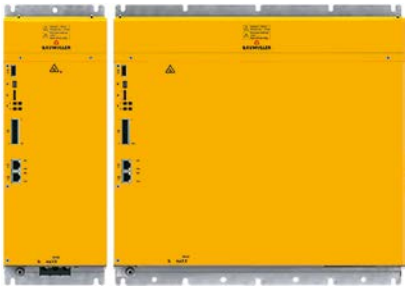
EtherCAT · PROFINET · ETHERNET POWERLINK · VARAN · CANopen · EtherNet/IP · Modbus



b maXX 5000
frame sizes 3, 4 and 7

b maXX 5000 supply units – Technical data

Type	frame size	DC link power		DC link peak power [1]		Overload factor	Dimensions WxHxD
		[kW]	[hp]	[kW]	[hp]		[mm]
BM 5030	3	5	6.7	7.5	10.1	1.5	75 x 395 x 280 / 210 [2]
BM 5031	3	10	13.4	15	20.1	1.5	75 x 395 x 280 / 210 [2]
BM 5032	3	18	24.1	27	36.2	1.5	75 x 395 x 280 / 210 [2]
BM 5043	4	36	48.2	54	72.4	1.4	100 x 395 x 280 / 210 [2]
BM 5044	4	70	93.8	70	93.8	1.0	100 x 395 x 280 / 210 [2]
BM 5074	7	150	201	300	402	2.0	175 x 395 x 280 / 250 [3]
BM 5075	7	200	268	300	402	1.5	175 x 395 x 280 / 250 [3]



b maXX 5100
frame sizes 7 and 9

b maXX 5100 regenerative units – Technical data

Type	frame size	DC link power		DC link peak power [1]		Overload factor	Dimensions WxHxD
		[kW]	[hp]	[kW]	[hp]		[mm]
BM 5173	7	36	48.3	54	72.4	1.5 1)	175 x 395 x 280 / 210 [2]
BM 5174	7	64	87	96	130.2	1.5 1)	175 x 395 x 280 / 210 [2]
BM 5192	9	150	201	300	402	2.0 4)	425 x 395 x 280 / 210 [2]
BM 5193	9	200	268	300	402	1.5 4)	425 x 395 x 210 [3]

Supply units, regenerative units:
Supply voltage: 207 – 528 V ± 0% AC
Supply frequency: 50/60 Hz
Electronics supply: external 24 V DC
Supply rated voltage: 400 V

DC link rated voltage:
540 V (supply unit),
640 V (regenerative unit)
Certification: CE, cUL

1) for 120 seconds
2) depth air cooling / depth cold plate
3) depth water cooling
4) for 10 seconds

Height and depth without mounting brackets; Depth including required bending radius of connecting cables

Subject to change



b maXX 5300
frame sizes 2, 3 and 7

b maXX 5300 axis units – Technical data

Type	frame size	I_N	I_{MAX}	typ. motor rating		Overload factor	Dimensions WxHxD
		[A]	[A]	[kW]	[hp]		[mm]
BM 5323	2	2x 3	2x 9	2x 1.6	2x 2.1	3	50 x 395 x 280 / 210 [2]
BM 5323 [1]	2	2x 4.5	2x 9	2x 2.4	2x 1.8	2	50 x 395 x 280 / 210 [2]
BM 5325	2	2x 6	2x 18	2x 3.2	2x 4.2	3	50 x 395 x 280 / 210 [2]
BM 5325 [1]	2	2x 8.5	2x 18	2x 4.6	2x 3.5	2.1	50 x 395 x 280 / 210 [2]
BM 5326	2	12	24	6.5	8.7	2	50 x 395 x 280 / 210 [2]
BM 5327	2	20	40	10.8	14.5	2	50 x 395 x 280 / 210 [2]
BM 5328	2	30	60	16.2	21.7	2	50 x 395 x 280 / 210 [2]
BM 5331	3	2x 12	2x 24	2x 6.5	2x 8.7	2	75 x 395 x 280 / 210 [2]
BM 5332	3	2x 20	2x 40	2x 10.8	2x 14.5	2	75 x 395 x 280 / 210 [2]
BM 5333	3	2x 30	2x 60	2x 16.2	2x 21.7	2	75 x 395 x 280 / 210 [2]
BM 5334	3	40	60	21.6	29.0	1.5	75 x 395 x 280 / 210 [2]
BM 5335	3	60	90	32.4	43.4	1.5	75 x 395 x 280 / 210 [2]
BM 5372	7	90	180	48.6	65.1	2	175 x 395 x 280 [3]
BM 5373	7	120	240	64.8	86.8	2	175 x 395 x 280 [3]
BM 5374	7	150	300	81	108.5	2	175 x 395 x 280 [3]
BM 5375	7	180	360	97.2	130.2	2	175 x 395 x 250 [3]
BM 5376 air-cooled	7	150	420	81	105.5	2.8	175 x 395 x 280
BM 5376 water-cooled	7	180	420	92.2	130.2	2.3	175 x 395 x 250 [3]

Axis units:
Supply voltage: 207 – 528 V ± 0% AC
Supply frequency: 50/60 Hz
Electronics supply: external 24 V DC

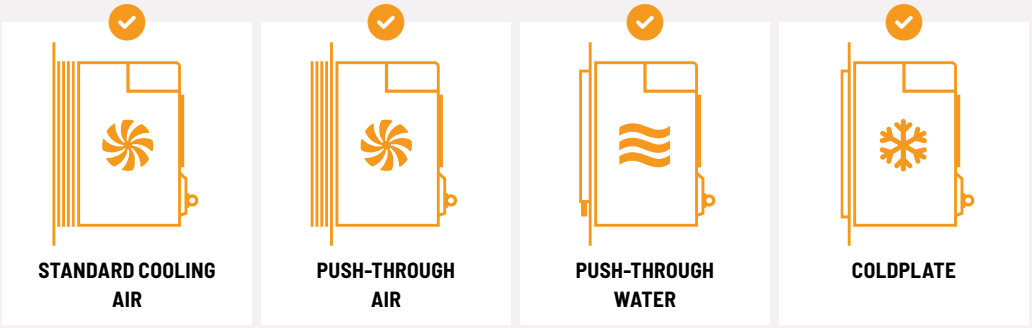
Chopping frequency: 4/8 kHz
Certification: CE, cUL

1) Load cycles as per EN 61800
2) depth air cooling / depth cold plate
3) depth water cooling

Height and depth without mounting brackets; Depth including required bending radius of connecting cables

Subject to change

Cooling types



b maXX 5500

Servo drive for higher output ratings

The modular converters 5000 have been extended to mono units in the range 5500. This covers power ratings of 10 to 315 kW and higher safety functions such as SLS (safely limted speed) and SLP (safely limited position) can be integrated up to high power ratings.

b maXX 5500 offers a performance range from 1.1 kW to 315 kW. All devices have integrated rectifiers, DC link capacitors and inverters.



Safety functions according to IEC 61800-5-2

Available fieldbus options

EtherCAT · PROFINET · ETHERNET POWERLINK · VARAN · CANopen · EtherNet/IP · Modbus

- Mono units in seven sizes for large outputs up to 315 kW
- Pluggable Safety module with higher safety functions
- Cooling types: Standard cooling air/water, push-through air/water, Coldplate



b maXX 5500 mono units – Technical data

Type	Frame size	I_N	I_{MAX}	typ. motor rating		Overload factor	Dimensions WxHxD [1]
		[A]	[A]	[kW]	[hp]		[mm]
BM 5512	1	2.5	5	1.1	1.5	2	106 x 310 x 263 [4]
BM 5513	1	4.5	9	2	2.7	2	106 x 310 x 263 [4]
BM 5522	2	7.5	15	3.4	4.6	2	106 x 428 x 340 / 320
BM 5523	2	11	22	5	6.7	2	106 x 428 x 340 / 320
BM 5524	2	15	30	6.8	9.1	2	106 x 428 x 340 / 320
BM 5525	2	15	40 [2]	6.8	9.1	2.6	106 x 428 x 340 / 320
BM 5526 einphasig	2	22.5	45 [2]	6	8.0	2	106 x 428 x 340 / 320
BM 5526	2	22.5	45 [2]	10	13.4	2	106 x 428 x 340 / 320
BM 5532	3	22.5	45	10	13.4	2	155 x 510 x 340 / 325
BM 5533	3	30	60	13	17.4	2	155 x 510 x 340 / 325
BM 5534	3	45	90	20	26.8	2	155 x 510 x 340 / 325
BM 5535	3	60	90	28	37.5	1.5	155 x 510 x 340 / 325
BM 5543	4	80	120	36	48	1.5	190 x 624 x 374 / 327
BM 5544	4	100	130	45	60	1.3	190 x 624 x 374 / 327
BM 5545	4	130	170	58	78	1.3	190 x 624 x 374 / 327
BM 5546	4	150	200	75	100	1.3	190 x 624 x 374 / 327
BM 5553	5	150	195	75	100	1.3	307 x 656 x 374 / 321
BM 5554	5	210	260	110	147	1.3	307 x 656 x 374 / 321
BM 5562	6	250	325	132	177	1.3	437 x 815 x 378 / 316
BM 5563	6	300	390	160	215	1.3	437 x 815 x 378 / 316
BM 5566	6	350	450	175	234	1.3	437 x 815 x 378 / 316
BM 5572	7	450	585	225	302	1.3	520 x 600 x 388 / 340
BM 5573	7	615	800	315	422	1.3	520 x 600 x 388 / 340

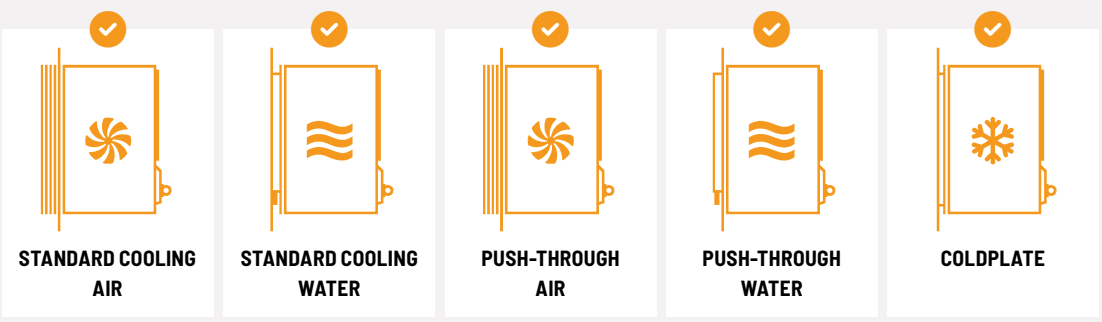
Supply voltage: 207–528 V ± 0% AC
Supply frequency: 50/60 Hz
Supply rated voltage: 400 V
DC link voltage: 540 V rated voltage
Chopping frequency: 2/4/8 kHz

Output voltage: 0–95 % of supply voltage
Electronics supply: external 24 V DC (diagnostic capability)
Fan connection: frame size 1–3: 24 V DC electronics supply, frame size 4–7: 230 V AC ± 10 %
Certification: CE, CSA, UL

1) Depth air cooling / depth water cooling
2) for 1 second 3) single phase 4) air cooling only
Height and depth w/o mounting brackets; depth incl. required bending radius of connecting cables

Subject to change

Cooling types



b maXX 5600/

The application specific servo drive

The established automation and drive solution b maXX was expanded with the new peak load and nominal load devices of the 5600 and 5700 series. The units complete the b maXX series and are available in five sizes. Therewith, Baumüller meets the requirements of industry-specific applications such as in the field of injection moulding or extrusion processes, because here either short-term peak power or permanent maximum power in constant operation are in demand. The drive can optimally be matched to the power demands of the respective application. Even though the series is equipped with greater power rating it is available in smaller sizes and minimizes the required space in the control cabinet – hence the user benefits twice.



Safety functions according to IEC 61800-5-2

Available fieldbus options

EtherCAT. PROFINET ETHERNET POWERLINK VARAN CANopen EtherNet/IP Modbus

- Peak load and nominal load units in five sizes
- Optimized for the respective industry requirement
- Low overall volume due to use of water cooling system

5700

Your benefits at a glance

- Optimized drive solution for specific industry requirements
- Different sizes available for compatible drive dimensions
- Less space required in the control cabinet due to smaller devices and the use of water cooling, control cabinet therefore less expensive to manufacture
- Water cooling in the control cabinet provides a cost-effective solution
- Compatible with other devices in the b maXX series



b maXX 5600 peak load units – Technical data

Type	Frame size	I_N	I_{MAX}	Overload factor [1]	Dimensions WxHxD
		[A]	[A]		[mm]
BM 5632-F	3	60	120	2	208 x 556.5 x 325
BM 5641-F	4	85	170	2	242 x 681 x 327
BM 5642-F	4	100	200	2	242 x 681 x 327
BM 5650-F [2]	5	130	260	2	360 x 550 x 285
BM 5651-F [2]	5	165	330	2	360 x 550 x 285
BM 5652-F [2]	5	200	400	2	360 x 550 x 285
BM 5661-F [2]	6	250	500	2	490 x 710 x 285
BM 5662-F [2]	6	300	600	2	490 x 710 x 285

b maXX 5700 nominal load units – Technical data

Type	Frame size	I_N	I_{MAX}	Overload factor [1]	Dimensions WxHxD
		[A]	[A]		[mm]
BM 5755-F [2]	5	260	260	1	360 x 550 x 285
BM 5766-F [2]	6	450	450	1	490 x 710 x 285
BM 5773-F	7	720	800	1.1	580 x 660 x 340

1) for 1 second with a cycle of 5 seconds
2) compact design, water-cooled

Subject to change

Servo controllers b maXX 5000

b maXX 5000 offers side-by-side technology and mono units in a power range from 1.1 to 315 kW.



Braking energy

Brake resistor activation is integrated in the form of a brake chopper. A regenerative resistor is connected externally. This paves the way for optimal dimensioning and also reduces the volume of the control cabinet.

Line filter

To optimize configuration from a cost perspective, line filters are always connected in series outside the device. Several power modules can thus be grouped for each line filter resulting in reduced costs for the system as a whole.

Temperature-dependent fan control

The fan is controlled relative to the temperature inside the device. This leads to a reduction in energy consumption and therefore lowers the overall costs of a system.

DC link coupling

DC link coupling can be achieved for a number of power modules for the purpose of energy compensation. Surplus energy is not “burned”. It is made available to other drive units without taking additional energy from the supply network.

Safety module

With the optional safety module, the option “safety stop” in accordance with EN ISO 13849 safety category 4 can easily be realized without the integration of additional contactors in the motor line. This ensures that the structure of the safety circuit remains simple and transparent. The danger potential of the machine is reduced – the machine works reliably.

Safety

Safety functions according to IEC 61800-5-2

Encoder systems

- Resolver
- Incremental encoder
- SinCos-Hyperface
- EnDAT 2.1
- EnDAT 2.2
- Hiperface DSL
- SSI
- Digital I/Os (8 In / 4 Out)
- Analog I/Os (1 In / 2 Out)

Optional modules

It is also possible to expand with add-on modules for the b maXX 5000 series. There are add-on modules for encoder emulation, expansion of the fieldbus variance as well as expansion of the number of analog inputs and outputs as well as the digital inputs and outputs.

Optional modules	Description
IEE-002-001	Rectangle incremental encoder emulation with external 24V power supply. The signal generated can either be used to synchronize a following axis or to detect the position of the axis via a superordinated control.
SIE-001-001	SSI encoder emulation with external 24V power supply. The signal generated can be used to detect the position of the axis via a superordinated control.
EIP-001-001	Fieldbus optional module Ethernet/IP with rectangle incremental encoder emulation
MOD-001-001	Fieldbus optional module Modbus/TCP with rectangle incremental encoder emulation

Optional modules	Analog inputs	Analog outputs	Analoge inputs	Digital inputs	Digital outputs
	-10 V	**±10 V**	**4...20 mA**		
SVP-001-001	4	4	-	4	4
SVP-001-002	2	4	2	4	4
SVP-001-003	-	4	4	4	4

Controller functionalities

Encoder angle via fieldbus

The encoder cable is operated without splitting for motors with multiple windings.

Cogging torque compensation

The cogging torque of the synchronous motors influences the concentricity precision of the motors. An automated measurement is used to identify cogging torques and pre-control angle-dependent current. This compensates for the cogging torque.

✓ Advantage: Improved concentricity of the motors, especially at low speeds
› cost savings

Error response “Return motion in event of power supply failure”

In the event of a power supply failure, the drive carries out a positioning to a parameterizable position, provided there is enough energy in the DC link.

✓ Advantage: Protection of the machine from uncontrolled coasting down and therefore damage protection

Master-slave coupling for load compensation

This function can be used to split the load of two drives, which are moving a load together, in a defined ratio.

✓ Advantage: more compact controller technology
› cost savings

Accessories for b maXX 5000 and b maXX 3000

Electronic type plate

The b maXX 3300 and 5000 series can read or describe a memory area in the encoder system.
This so-called electronic type plate is generally divided into two areas:

Baumüller-specific memory area:
Among other things, this is where Baumüller stores motor-specific data that the converters can automatically read out during commissioning.

Customer-specific memory area:
The customer can save his or her own data here using the b maXX converter. This begins with the customer-specific item numbers and ends with machine or model numbers.

Service control panel



The control panel offers a device for the display, parameterization, commissioning and service of b maXX drives of the 3000, 5000 and 5500 series. It is an ideal tool for service technicians on site at the machine or system. This device can be used to display, change and store controller parameters.

Available languages: English and German

- Access to all parameters
- Menu structure
- Upload/download data set
- Hot plug capable (can be dis-/connected during operation)
- Voltage supply internally via controller

Configuration

- Normalization
- predefined list for parameter display
- predefined list for display of the controller status
- management of up to 8 parameter sets

DC link coupling module

A DC link coupling connects several power modules, thus enabling energy equalization between the individual devices. The surplus energy is thus not “burned up”, but is available to other drive units without additional energy being drawn from the power supply.

The DC link coupling module enables the connection of different Baumüller b maXX servo drives in machines and systems. In this way, cable-guided devices can be connected to devices on a copper rail in accordance with standards.



Signal bus coupling module

The signal bus coupling module has been developed to combine servo drives with different signals and voltages in machines and plants.

In addition, the signal bus coupling module can also be used to lift the maximum limit of 12 devices with connected signal bus in the machine. This means that the number of devices connected to the signal bus is unlimited. The module can also be useful to extend and accordingly distribute the signal from one control cabinet to the next.





DC link filter

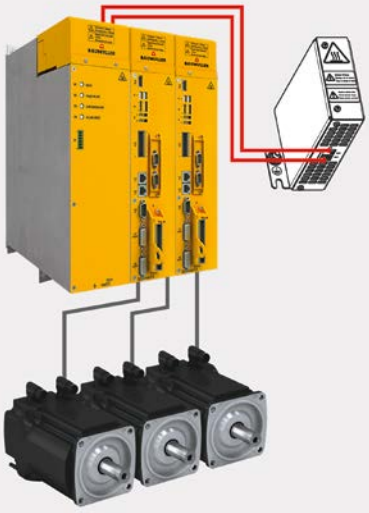
If the motor cables are too long, voltage peaks that are dangerous for the motor can occur. If these are frequently or continuously above the limit value, motor damage can occur, and in the worst case, total failure of the motor. This can be prevented if link filters are installed at the converters or link involved, because these filters prevent or remove the harmful overvoltages before they reach the motor.

The DC link filter must be placed as near as possible to the supply infeed.

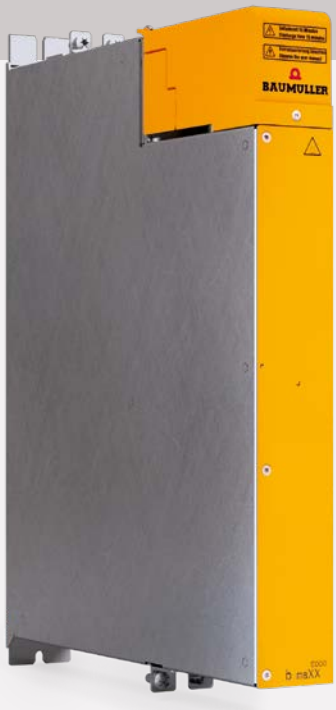
Mono devices



Modular devices



DC link capacitance unit for the b maXX 5000 series



Energy and cost savings in dynamic applications
With the DC link capacitance unit, the braking energy can be temporarily stored for dynamic applications and used for subsequent acceleration. Can be used in devices of the converter generation b maXX 5000.

Customer benefits

- Temporary storage of the brake energy: Low energy use
- Peak load leveling: Lowering the contractually-agreed consumption peaks with the energy supply company
- Lower thermal radiation: Smaller dimensioning of the cooling units possible
- Smaller dimensioning of the control cabinet and power supply unit: Less space required and cost savings possible
- Temporarily stored energy allows for controlled system shutdown in the event of errors and power failure: Cost reduction by not needing an independent power supply (UPS)

SAFETY

Plug-in safety in the drive



The machine manufacturer as well as the operator must comply with the safety requirements of the standard EN ISO 13849. In order to ensure this, Baumüller starts where all machine processes are coordinated: in the automation system. Baumüller prefers a holistic solution contrary to conventional concepts, which require for example, additional emergency stop devices. Precondition for a holistic solution are hardware components which are scalable and configured with high-class safety functions. Baumüller provides pluggable safety modules for this purpose.

This is an essential component of the comprehensive drive-integrated safety concept. In this way Baumüller complies with the requirements of the new Machinery Directive.

- ✓ Four modules for the b maXX 5000, designed as plug-in modules
- ✓ Safety modules provide the necessary machine and future safety according to the latest standards
- ✓ Safe functions via I/Os or EtherCAT-FSoE

Plug-in safety for the b maXX 5000

Four modules with plug-in board design for the b maXX 5000 provide the perfect solution for drive-based safety. Machine manufacturers can quickly and flexibly adapt the converter to meet the relevant application requirements.

SAF-000



- Safety function: none
- Parameter memory: yes

SAF-001



- Safety function: STO
- Safely controlled via: I/O
- Parameter memory: yes

SAF-002



- Safety function: STO, SS1, SS2, SOS, SDI, SLS, SBC
- Safely controlled via: I/O and field bus
- Parameter memory: yes

SAF-003

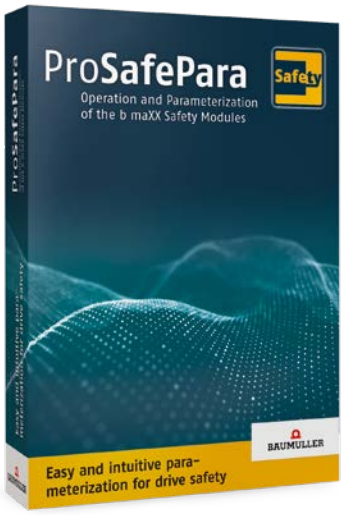


- Safety function: STO, SS1, SS2, SOS, SLA, SLS, SLP, SLI, SDI, SBC, SSM, SCA
- Safely controlled via: I/O and field bus
- Parameter memory: yes

Three safety options with the safety modules

The SAF-001, 002 and 003 safety modules guarantee the required machine safety and future compatibility in line with the latest standards. The b maXX 5000 fulfils the guidelines in standard EN ISO 13849 up to SIL 3 with its scalable range of functions and EN 62061 up to PLe.

The plug-in SAF modules allow the user to respond to new requirements with maximum speed and flexibility. All modules are equipped with an integral parameter memory that stores all the safe and unsafe parameters preset on the b maXX drive controller. The safe functions are selected via safe local I/Os or EtherCAT-FSoE, which are integrated on the safety module.



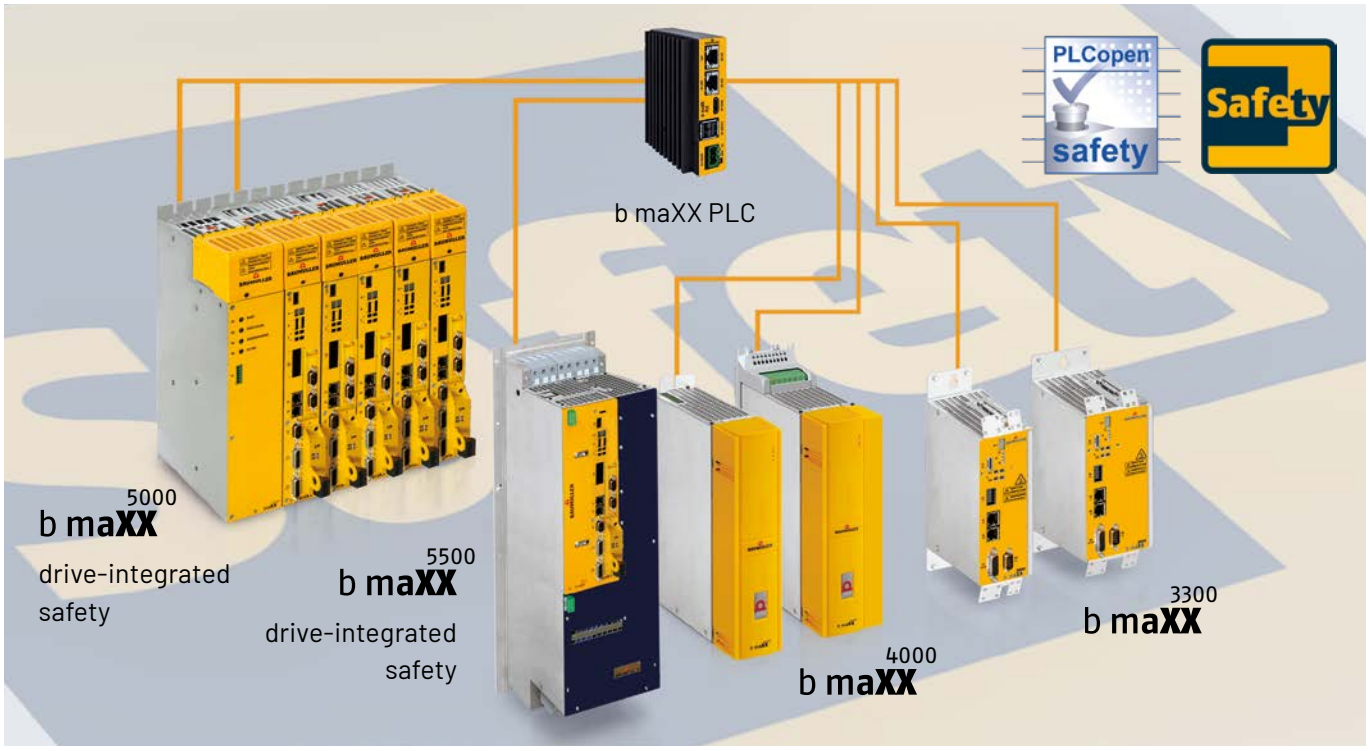
Easy, intuitive parameterization of drive safety with ProSafePara

Baumüller is one of the few drive and automation manufacturers that consistently offers integral safety solutions for central, local modular and hybrid automation structures in line with the standards stipulated in the Machinery Directive, EN ISO 13849-1 and EN IEC 62061 up to Performance Level e and Safety Integrity Level 3. The ProMaster engineering tool supports configuration of the parameters of the b maXX safety modules SAF-002 and SAF-003. ProMaster enables the scalable integration of b maXX 5000 safety modules in standard automation technology using the integral safe parameterization environment ProSafePara.

Safety technology is fully integrated in the ProMaster engineering tool in the ProSafePara environment and accesses the same project database. The environment was developed according to the requirements of standard IEC 61508 and covers all safety requirements up to SIL 3, thereby guaranteeing the safe parameterisation of safety modules SAF-002 and SAF-003.

The safe application

EN 13849-1 builds on the qualitative aspect of EN 954-1 by including a quantitative calculation of safety functions. For many systems, this will mean that a safety control will need to be used. As a member of the PLCopen Safety organization, Baumüller has addressed the new automation sector requirements, enabling it to offer you safety solutions in conformance with PLCopen Safety and which can be integrated into the machine's automation system as a whole.



The concept encompasses centralized, modular decentralized, and hybrid automation structures and is reflected in every area of the application. In this way, Baumüller integrates its safety concept into all automation components – including communication – as well as into the ProMaster Engineering Framework.



b maXX PLC mc – compact and powerful

The control platform b maXX PLC combines Industry PC and classic PLC control on a common hardware. The b maXX PLC mc controls motion-control applications and can be rapidly deployed for high-performance automation tasks thanks to the comprehensive Baumüller technology libraries. This makes it the ideal solution for networking machines and machine modules right down to individual automation components.

EtherCAT. MQTT Node-RED OPC Unified Architecture

SINGLE CABLE

Single cable solution for power and feedback systems

b maXX 5000
b maXX 3000



The new single cable technology, with which the Baumüller motors are equipped, saves the user from having to use a feedback cable or an expensive inflexible hybrid cable that is otherwise required in addition to the obligatory motor cable.

Unlike with sensorless control, single cable technology allows for highly accurate positioning. The encoder data, rotor position, multi-turn information as well as the status of the thermal conditions in the motor are reliably transmitted interference-free via a purely digital interface. This results in significant cost savings, since both motor and controller side connectors and cables are omitted. Costly, analog evaluation modules in the drive amplifier can be dispensed with.

The diagnostic capability is also a given. The wiring is significantly simplified, which eliminates possible sources of error and also has a positive effect on the peripheral equipment, since now mobile cable handlers, cable glands and reserved areas for the cables in machines and control cabinets are significantly smaller.

The new technology supports an "electronic type plate." This results in greater degrees of freedom on the motor side: The elimination of a plug connection makes it possible to use the new technology in the smallest of installation sizes too.

Customer benefits

- Quick and easy commissioning. Wiring and commissioning are simplified due to fewer cables and plugs
- Reduced wiring costs
- Thanks to the change to just one cable now, costs are eliminated for additional plugs and cables
- Efficient feedback control
- Increased performance thanks to digital feedback
- Reliable system
- Data transmission not susceptible to errors
- Supports electronic type plate

b maXX-softdrivePLC

Technology functions directly in the drive



Drive-based solutions without separate control hardware

With the b maXX-softdrivePLC Baumüller makes separate control hardware unnecessary for some applications. Due to the combination of motion control and PLC functions in the controller, Baumüller has created a decentralized control architecture for programming according to IEC 161131 which enables the simple structuring of distributed intelligence in the machine. Using the parameterization tool ProDrive, tasks such as the simple evaluation of digital inputs up to sophisticated control algorithms can be easily completed, without the need for complex control programming tools.

Benefits

- Cost savings due to elimination of PLC hardware
- Fieldbus communication between two axes is eliminated by using double axes
- Easy implementation of master-slave functionality
- Multi-axis access to parameters is possible

b maXX – Intelligent drives

b maXX-softdrivePLC runs as part of the firmware in the Baumüller drive concepts b maXX 6000, b maXX 5000 as well as b maXX 3300 and works with single axis applications as well as with double axis applications. With b maXX-softdrivePLC programs run in the drive and are highly synchronized with the controller clock at cycle times of up to 125 µs.

Programming via ProDrive for basic version

By using the b maXX-softdrivePLC, simple control tasks can easily be implemented decentrally in the drive via the ProDrive parameterization tool – from simple calculation to control algorithms. With the help of the b maXX-softdrivePLC, programs can run highly synchronously to the drive clock (≥ 62.5 µs).

Integrated into ProMaster and programmable with ProPROG 5 as the extended version

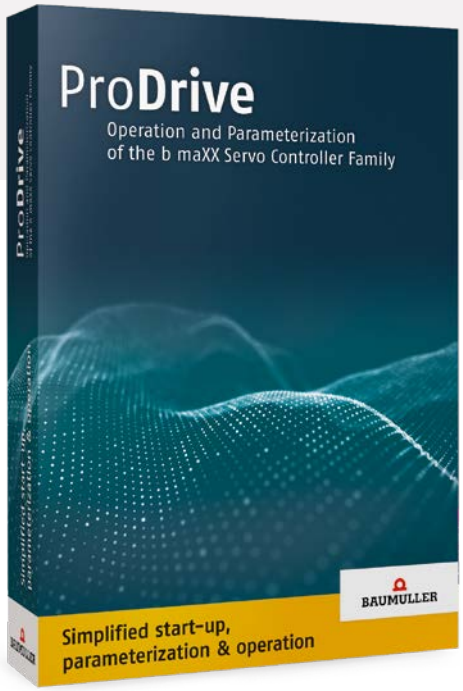
The extended version of b maXX-softdrivePLC is fully integrated into the ProMaster Engineering Framework. Here you will find all the applications for creating machine and system topology, fieldbus and I/O configurators, as well as applications like the PROPROG 5 programming environment, the ProCAM cam editor, and many more.

Numerous preconfigured software modules are available for the extended version, which can be used for motion control or analysis functions directly in the drive.

Basic version

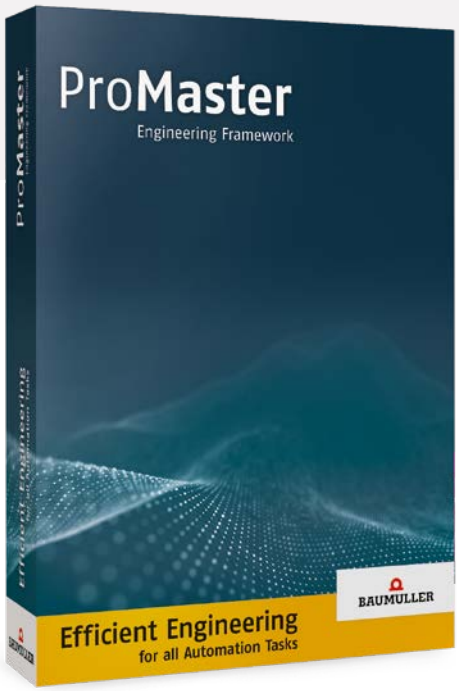
INCLUDED

- Simple functions
- Can also be used by customers, e.g. for logical links, rescaling



Extended version

- More complex functions
- Applied by Baumüller, e.g. movement of an axis, analysis of drive data



b maXX 4400

The modular servo controller

Power units with five cooling variants and seven sizes:
b maXX has up to eleven inserts for plug-in modules and can therefore be individually adapted for special automation tasks. Special plug-in modules interface b maXX, including interface adaptors for most standard bus systems.
The plug-in b maXX-drivePLC module provides integrated intelligent control.



Available fieldbus options

EtherCAT · PROFINET · ETHERNET POWERLINK · VARAN · CANopen · CANsync · EtherNet/IP · Modbus

- Mono units in seven sizes for large outputs up to 315 kW
- Modular due to up to eleven plug-in slots for modules
- Cooling types: standard cooling air/water, push-through technology air/water, Coldplate

Function and option modules for b maXX 4400

With more than 30 different function and option modules b maXX can easily be adapted in line with the individual tasks of the automation and drive solution. The individual modules are designed as plug-in boards and therefore the drive controller no longer has to be ordered as a preassembled unit. By using various plug-in boards, the machine manufacturer can secure a wide variety of functions and configure the appropriate combinations on their own. In this way, he can react quickly and flexibly to new requirements. This system also ensures that the drive can be quickly expanded at the user's facility. Production adjustments can be implemented within a short space of time and with minimal effort.

Digital I/Os



- 4 inputs, 24 V industrial logic, isolated
- 4 outputs, 24 V industrial logic, isolated, 0.5 A

Analog I/Os



- 2 inputs ±10 V, 12 Bit, 2 outputs ±10 V, 8 Bit
- 2 inputs ±10 V, 16 Bit, 2 outputs ±10 V, 16 Bit
- 2 inputs ±10 V, 12 Bit, 2 outputs ±10 V, 12 Bit
- 2 inputs 4–20 mA, 16 Bit, 2 outputs ± 10 V, 16 Bit

Encoder interfaces



- SinCos encoder, with Hiperface interface and electronic rating plate. Resolution: up to several million incr./rev.
- Resolver, resolution: 1024 incr./rev.
- 5 V-square-wave incremental encoder, res.: (stroke no. x 4) incr./rev.
- SinCos encoder with EnDat® interface, sine/cosine encoder with EnDat 2.1 and 2.2 interface for single and multiturns, length measurement systems and absolute position recognition.
- SinCos encoder with SSI interface, sine/cosine encoder with SSI standard interface, with internal and external encoder power supply.
- Incremental encoder emulation, 5 V-square-wave/ differential signal, 90° phase shift

Fieldbus modules



b maXX 4400 supports all conventional fieldbus systems. b maXX can be optimally integrated into all systems by simply replacing the corresponding option module. EtherCAT is the standard fieldbus.

Fieldbus	b maXX 4400	b maXX-drivePLC
EtherCAT	Slave	Slave, Master, Cluster
EtherNet/IP	Slave	-
CANopen	Slave	Slave, Master
CANsync	Slave	Slave, Master
Profibus	Slave	Slave
Sercos	Slave	-
Varan	Slave	-
POWERLINK	Slave	Slave
Ethernet	TCP/IP	TCP/IP

Storage module



The parameter storage module contains all the parameters that are set on the drive controller of the b maXX for all 8 parameter data records and all 16 positioning profiles.

New parameters can be loaded to the drive controller simply by plugging in the module. Given that the parameter module is pluggable, a drive can be replaced during servicing without the need for any knowledge of the operating software.

b maXX-drivePLC
Drive-integrated controller for b maXX 4400

The b maXX-drivePLC module makes the drive intelligent. This in-drive control intelligence allows very fast access to the setpoints and actual values of the drive controller. Therefore, the functionality of the drive can be enhanced with complex motion, control and technology functions. This ensures that the application can be created quickly and economically.



b maXX-drivePLC

- 32-Bit Risc CPU, 120 MHz
- 16 MB flash memory, of which 2 MB is reserved for the IEC program and 4 MB for cams
- 100 KB non-volatile RAM

EtherCAT
CANopen

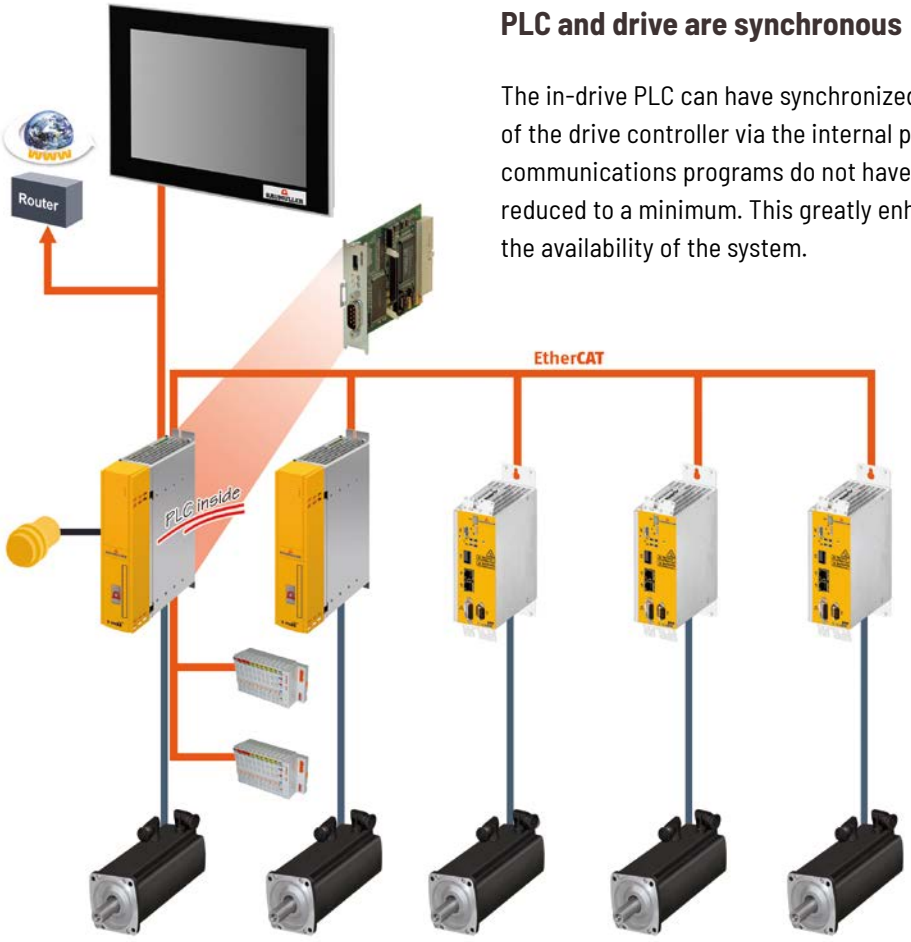
With a cycle time of 100 µs for 1,000 lines of STL, the b maXX-drivePLC is suitable for both comprehensive control and demanding motion control tasks. Through the use of our drivePLC, the PLC can be assisted, down-sized or even completely replaced. A new transparency and clarity is also created in the application via the clean decoupling of motion control applications from the machine program. The drivePLC can be integrated into the b maXX 4400 servo controller series and enables the uncomplicated creation of control technology programs with ProMaster or PROPROG.

A CANopen master is included with the CAN option module for b maXX-drivePLC. This enables up to 65,536 digital I/O points to be switched. With the existing EtherCAT master challenging and highly synchronized movement processes are controlled directly on the b maXX-drivePLC. The extensive product range includes decentralized analog and digital I/O modules.

The program memory of the b maXX-drivePLC is sufficient for typical 120,000 lines of IL. 2 MB of RAM are available for variables. The optional residual data memory of 100 KB is buffered battery-free with a NVRAM. This means there is enough memory available for sufficient code. Costly memory expansions can be dispensed with. The battery-free NVRAM means that data is available maintenance-free and after every time the system is switched off and on without any data loss.

Speed up your applications

- Makes drives user-programmable
- Delivers excellent real-time performance
- Increases availability
- Reduces control cabinet size
- Ensures a consistently stable system



PLC and drive are synchronous

The in-drive PLC can have synchronized access to all setpoints and actual values of the drive controller via the internal parallel bus. Therefore, time-consuming communications programs do not have to be created. The signal transit times are reduced to a minimum. This greatly enhances process security and also increases the availability of the system.

Further details on how b maXX 4400 can be extended into a complete automation system can be found in the brochure with the title “Automation”.

All the advantages at a glance

- Fast, synchronous PLC access to the drive controller:
  Sophisticated communications programs are no longer required – the burden on the system is relieved
- No wiring between the PLC and the drive:
  Fault-prone cable connections can be reduced – availability is increased
- Compact design saves control cabinet space:
  The volume of the control cabinet can be reduced
- Maximum PLC and servo controller performance due to independent processors:
  No limitations due to overlapping processes – the system remains stable and reliable
- Baumüller is the contact partner for the PLC and drive system, and therefore the automation system as a whole:
  Experience and competence for the entire automation system – direct communication with one reliable partner reduces the amount of engineering that is required
- Simple adaptation possible
- Installation package for control and development PC included

Converter family b maXX 4400

b maXX 4400 offers a performance range from 1.1 kW to 315 kW. All devices have integrated rectifiers, DC link capacitors and inverters.



Braking energy

Brake resistor activation is integrated in the form of a brake chopper. A regenerative resistor is connected externally. This paves the way for optimal dimensioning and also reduces the volume of the control cabinet.

Line filter

To optimize configuration from a cost perspective, line filters are always connected in series outside the device. Several power modules can thus be grouped for each line filter resulting in reduced costs for the system as a whole.

Temperature-dependent fan control

The fan is controlled relative to the temperature inside the device. This leads to a reduction in energy consumption and therefore lowers the overall costs of a system.

DC link coupling

DC link coupling can be achieved for a number of power modules for the purpose of energy compensation. Surplus energy is not "burned". It is made available to other drive units without taking additional energy from the supply network.

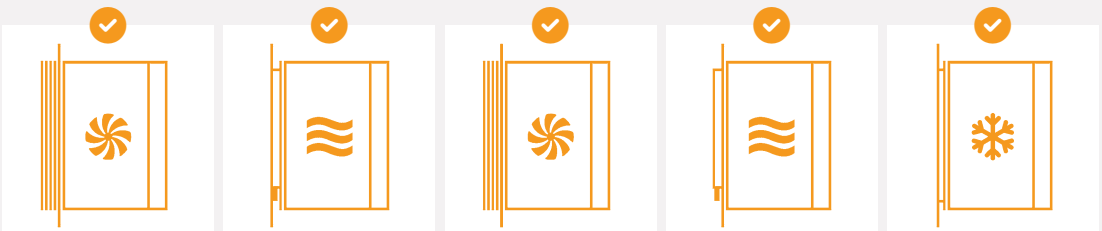
Safety module

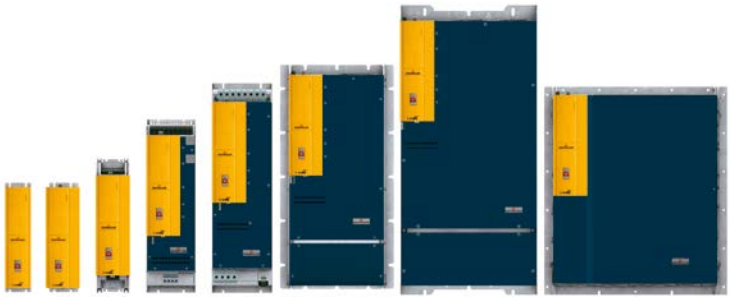
With the optional safety module, the option "safety stop" in accordance with EN ISO 13849 safety category 4 can easily be realized without the integration of additional contactors in the motor line. This ensures that the structure of the safety circuit remains simple and transparent. The danger potential of the machine is reduced – the machine works reliably.

Safety

Safety functions acc. to IEC 61800-5-2

Cooling types





b maXX 4400 Mono units – Technical data

Type	Frame size	I_N	I_{MAX}	typ. motor rating		Overload factor	Dimensions WxHxD [1]
		[A]	[A]	[kW]	[hp]		[mm]
BM 4412	1 S	2.5	5	1.1	1.5	2	80 x 310 x 263 [4]
BM 4413	1 S	4.5	9	2	2.7	2	80 x 310 x 263 [4]
BM 4412	1 B	2.5	5	1.1	1.5	2	106 x 310 x 263 [4]
BM 4413	1 B	4.5	9	2	2.7	2	106 x 310 x 263 [4]
BM 4422	2	7.5	15	3.4	4.6	2	106 x 428 x 340 / 320
BM 4423	2	11	22	5	6.7	2	106 x 428 x 340 / 320
BM 4424	2	15	30	6.8	9.1	2	106 x 428 x 340 / 320
BM 4425	2	15	40 [2]	6.8	9.1	2.6	106 x 428 x 340 / 320
BM 4426 single phase	2	22.5	45 [2]	6	8.0	2	106 x 428 x 340 / 320
BM 4426	2	22.5	45 [2]	10	13.4	2	106 x 428 x 340 / 320
BM 4432	3	22.5	45	10	13.4	2	155 x 510 x 340 / 325
BM 4433	3	30	60	13	17.4	2	155 x 510 x 340 / 325
BM 4434	3	45	90	20	26.8	2	155 x 510 x 340 / 325
BM 4435	3	60	90	28	37.5	1.5	155 x 510 x 340 / 325
BM 4443	4	80	120	36	48	1.5	190 x 624 x 374 / 327
BM 4444	4	100	130	45	60	1.3	190 x 624 x 374 / 327
BM 4445	4	130	170	58	78	1.3	190 x 624 x 374 / 327
BM 4446	4	150	200	75	100	1.3	190 x 624 x 374 / 327
BM 4453	5	150	195	75	100	1.3	307 x 656 x 374 / 321
BM 4454	5	210	260	110	147	1.3	307 x 656 x 374 / 321
BM 4462	6	250	325	132	177	1.3	437 x 815 x 378 / 316
BM 4463	6	300	390	160	215	1.3	437 x 815 x 378 / 316
BM 4466	6	350	450	175	234	1.3	437 x 815 x 378 / 316
BM 4472	7	450	585	225	302	1.3	520 x 600 x 340 [5]
BM 4473	7	615	780	315	422	1.3	520 x 600 x 340 [5]

Supply voltage: 207–528 V ± 0% AC
Supply frequency: 50/60 Hz
Supply rated voltage: 400 V
DC link voltage: 540 V rated voltage
Chopping frequency: 2/4/8 kHz

Output voltage: 0–95% of supply voltage
Electronics supply: external 24 V DC (diagnostic capability)
Fan connection: frame size 1–3: 24 V DC
electronics supply, frame size 4–7: 230 V AC ± 10%
Certification: CE, CSA, UL

1) Depth air cooling / depth water cooling
2) for 1 second 3) single phase
4) air cooling only 5) water cooling only
Height and depth w/o mounting brackets; depth incl. required bending radius of connecting cables

Subject to change

b maXX 3300

Compact servo drive up to 5 kW

The servo converter b maXX 3300 is a premium-quality servo controller with an integrated position control for the small power range. The b maXX 3300 distinguishes itself with its compact and space-saving construction. The field-oriented control provides an excellent rotational accuracy. Higher-level speed and position control ensure a precise positioning.

b maXX 3300 is compatible with servo controllers b maXX 5000 with regards to handling, communication parameter structure, main functionality and operation. b maXX 3300 is parameterized in ProDrive.



Available fieldbus options

EtherCAT · PROFINET · ETHERNET POWERLINK · VARAN · CANopen

- Compact servo controller with integrated position control for the small power range
- Excellent rotational accuracy thanks to field-oriented control
- Compatible with the b maXX 5000 converter family

The highly dynamic control of b maXX 3300 in conjunction with the highly dynamic small-sized servo motors of the series DSD increase the cycle-times of the application and increase the production output of machines and installations. The high chopping frequency (16 kHz) reduces noise emission and therefore relieves the burden on the environment.

The servo controller is specifically designed for the operation with the servo motors DSD 28–100 as well as for the Baumüller disc motor series. The consequent design focus of the controller on efficiency and compact construction form qualifies the b maXX 3300 for applications in the handling or robotics fields as well as for applications within the printing, textile and packing industry.

Safety

Safety functions according to IEC 61800-5-2

The following control types are available for synchronous machines

- Current control (sampling times 62.5 µs)
- Speed control (sampling times 125 µs)
- Position control (sampling times 125 µs)
- Jogging mode
- Referencing

b maXX-softdrivePLC

- Basic and extended version

Safety Technology

- Certified Safety Function STO according to EN ISO 13849 up to PLe

Functions

- 230 V or 400 V mains supply voltage
- Chopping frequency 4/8/16 kHz
- Integrated regenerative switching transistor
- Integrated ballast resistor
- External 24 V supply
- 1 encoder input
- Digital I/Os 24 V/; 2 In; 2 Out
- Analog I/Os ± 10 V; 1 In; 2 Out
- 7 parameter data sets
- Open loop control
- EtherCAT/CANopen on board

Encoder types

- Resolver
- Rectangle incremental encoder
- SINCOS absolute encoder (single/multiturn)
- SINCOS incremental encoder
- ENDAT 2.1 / ENDAT 2.2
- SSI-Encoder
- Hiperface DSL



b maXX 3300 – Technical data

Type	frame size	I_N	I_{MAX}	typ. motor rating		max. peak current time	Dimensions WxHxD [1]
		[A]	[A]	[kW]	[hp]	[s]	[mm]
BM 3302	0	1.5	6	0.8	1.07	60	65 x 170 x 170
BM 3303	0	2.7	11	1.4	1.9	60	65 x 170 x 170
BM 3304	0	5.0	15	2.5	3.4	30	65 x 170 x 170
BM 3312	1	6.5	20	3.3	4.4	10	85 x 170 x 170
BM 3313	1	10	20	5.0	6.7	10	85 x 170 x 170

Mains supply voltage:
frame size 0: 110 V-243 V, single-phase;
supply rated voltage: 230 V
frame size 0/1: 180 V-528 V, three-phase;
supply rated voltage: 400 V

Supply frequency: 50/60 Hz
Chopping frequency:4/8/16 kHz
Output voltage: 0–85% (single-phase),
0–95% (three-phase) of supply voltage
Electronics supply: external 24 V DC

Data is valid for 4 kHz clock frequency
Dimensions without mounting brackets

Subject to change

b maXX 1000

Frequency converter

The b maXX 1000 is a frequency converter that provides for the highly efficient vector control of standard motors in three sizes with output power ranging from 0.2 kW to 11 kW. In designing the b maXX 1000, Baumüller has placed their primary focus on providing an easy to use line of products. The b maXX 1000 offers an integrated EMC filter as standard, for compliance with the applicable EU standard (EN 55011A / Second Environment). Numerous protective and overload functions, such as phase failure detection on the line and motor side, ensure error-free operation.

A comprehensive control scheme provides a constant, precise overview of the current drive status. The b maXX 1000 is also equipped for wide-ranging applications, thanks to its 15 different preset speeds. Its adjustable pulse width modulation, from 1 kHz to 15 kHz, also means that it emits barely any noise during operation. It can achieve a rotating field frequency of between 0.1 Hz and 400 Hz, meaning that even multi-pole machines can be operated at high speeds.

The b maXX 1000 can be connected to CANopen, the premier open fieldbus system. It is also able to work as a motion control slave, due to its integrated protocols.



- Power range from 0.2 to 11 kW
- Numerous protection and overload functions
- 15 different preselection speeds
- Pulse width modulation from 1 to 15 kHz

Highly efficient, easy to operate frequency converter

- Comprehensive protective functions: overvoltage and undervoltage protection, ensuring that the device cannot be destroyed
- Ground-fault, short-circuit, overload, and no-load protection, ensuring that the motor is protected effectively; protection against overheating
- Adjustable PWM frequency, 1 kHz to 15 kHz – for extremely quiet machine operation
- Intelligent output current monitoring
- Automatic energy-saving function – reduces cost of ownership
- CANopen and ModBus onboard
- Auto tuning – improves ease of setup
- Automatic slip tracking – always provides optimum efficiency
- Starting torque up to 150% – simple compensation for high breakaway torques
- PID control – fast response to perturbation, constant speed
- 15 preset speeds – for optimum speed range
- S-curve function for smooth acceleration and deceleration – soft starting is better for your mechanical systems
- Detachable keypad available as an option



b maXX 1000 – Technical data

Type	frame size	I_N	I_{MAX}	typ. motor rating		Overload factor [3]	Dimensions WxHxD [4]
		[A]	[A]	[kW]	[hp]		[mm]
BM 1211 [1]	1	1.6	2.4	0.2	0.27	1.5	72 x 142 x 152
BM 1212 [1]	1	2.5	3.75	0.4	0.54	1.5	72 x 142 x 152
BM 1213 [1]	1	4.2	6.3	0.75	1.0	1.5	72 x 142 x 152
BM 1412 [2]	1	1.5	2.25	0.4	0.54	1.5	72 x 142 x 152
BM 1413 [2]	1	2.5	3.75	0.75	1.0	1.5	72 x 142 x 152
BM 1414 [2]	1	4.2	6.3	1.5	2.0	1.5	72 x 142 x 152
BM 1224 [1]	2	7.5	11.25	1.5	2.0	1.5	100 x 174 x 152
BM 1225 [1]	2	11.0	16.5	2.2	3.0	1.5	100 x 174 x 152
BM 1425 [2]	2	5.5	8.25	2.2	3.0	1.5	100 x 174 x 152
BM 1426 [2]	2	8.2	12.3	3.7	5.0	1.5	100 x 174 x 152
BM 1437 [2]	3	13.0	19.5	5.5	7.4	1.5	130 x 260 x 169
BM 1438 [2]	3	18.0	27.0	7.5	10.0	1.5	130 x 260 x 169
BM 1439 [2]	3	24.0	36.0	11.0	14.8	1.5	130 x 260 x 169

Supply voltage:
200–240 V ± 10 % (TN-, TT-, IT mains)
380–480 V ± 10 % (TN-, TT-, IT mains)
Supply frequency: 47–63 Hz
Clock frequency: 1–15 kHz

Adjustable frequency: 0.1–400 Hz
Electronics supply: internal, 24 V DC
Type of protection: IP20
Operating temperature: -10°C to 50°C (to 40°C if adding)
Certification: CE, UL

1) Single-phase, 230 V 2) Three-phase, 400 V
3) For 60 seconds
4) Height and depth with mounting brackets; depth without required bending radius of connecting cables
Subject to change

ProDrive

Commissioning and operation



Commissioning, parameterization and operation of all b maXX controllers is simplified with ProDrive – for the beginner as well as for the professional. Especially the initial commissioning can performed with ease and minimal effort due to ProDrive's intuitive operational guidance.

- Easy commissioning, parameterization and operation of all b maXX controllers
- Integrated power module, motor and encoder database
- Diagnosis and analysis tools
- On-/offline parameterization

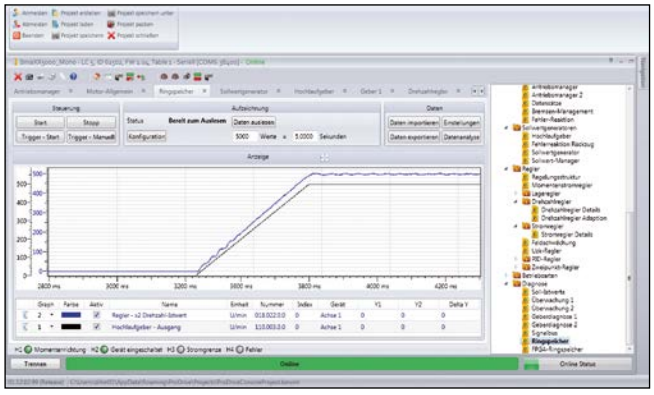
ProDrive is a tool that can save newcomers and advanced users a great deal of time: parameterization, commissioning, analysis and (remote) diagnosis

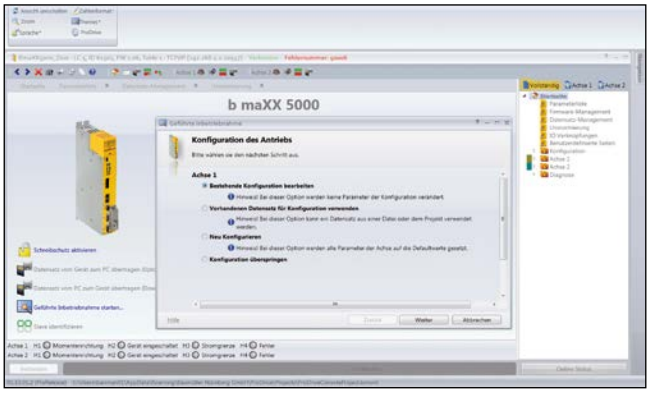
User friendly

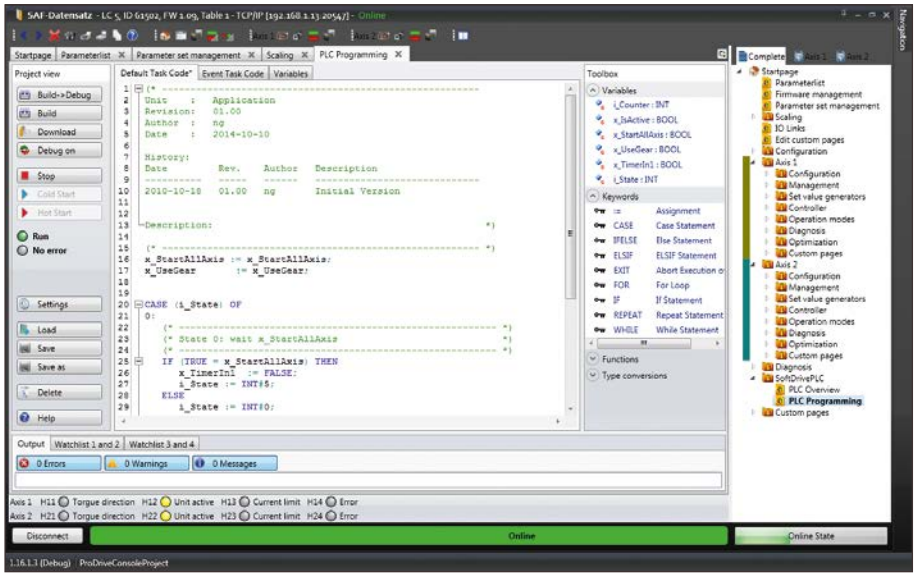
The support provided by the graphic user interface is very important for newcomers when parameterizing the controller. By clicking on the overview page, the user gains quick access to the individual interfaces of the drive functions. Here, he will initially only find the most important parameters, clearly arranged. In the details view, all the parameters of the corresponding drive function are listed on one page. This enhances transparency and eliminates the possibility of a maloperation.

Range of functions

- Integrated, updateable power module, motor and encoder database, thus ensuring up-to-date maintenance via subsequently loaded modules
- Diagnosis/analysis tools such as oscilloscope function and FFT-analysis for optimization down to the last detail and for the simple and transparent analysis of the drive system; additional diagnosis devices are not necessary
- On-/offline parameterization
- Single Axis or Multi Axis operation via Ethernet
- Language selection: German/English
- Guided commissioning with wizard







b maXX-softdrivePLC

With the softdrivePLC Baumüller combines motion control and SPS functions in the controller and makes separate control hardware unnecessary for some applications.

Automation – control platforms

With the b maXX control units, you can consistently implement the concept of scalability and modularity for flexible and individual adaptation to today's mechanical engineering requirements. Depending on the application, we support you during the development of central, modular decentralized and hybrid control architectures.

The control platforms are also suitable for highly synchronous drives and are completely integrated in the ProMaster engineering framework.



b maXX servo drives



With its converters, Baumüller provides its customers with important advantages: From cost savings to higher dynamics to increased safety.

Together, the converter series of the b maXX family cover a wide power range up to 400 kW. The b maXX family includes both stackable devices and powerful mono units. With optional safety packs, all devices in this series can be easily adapted to meet your individual safety needs.

Motors

You are looking for the right motor for your application? We offer you a wide portfolio of motors from 0.3 to 530 kW.

Depending on your requirements, we equip your plants or your mobile application with disk motors, dynamic three-phase motors, high-torque motors or if necessary, direct current motors also.



Software tools

As the complexity of machines and plants increases, so too do the demands on automation software. For this reason, it is important to provide users in the engineering field with the most user-friendly and flexible tools and software modules possible in each process phase in order to keep theengineering work required to a minimum. This allows software engineers to concentrate on their actual tasks and reach their goals faster. We offer the right tools and software modules for every stage of the engineering process. Because only with a holistic approach can state-of-the-art automation tasks be solved with minimum resources.

Sheet metal working / control cabinet construction

For many years, we have been implementing custom solutions for renowned machine and plant manufacturers – from sheet metal parts to completely wired control cabinets. You receive everything from us, a single source that can therefore deal optimally with your needs and wishes.

Planning | design | sheet metal production | serial production | assembly | installation



Service / Retrofit / drive modernization



With our services we support maintenance personnel, who are responsible for the smooth running of machines and plants every day, in all topics of industrial maintenance – and regardless of the manufacturer.

Regardless of the manufacturer, we offer you tailored and multi-level solutions for the modernization of your electrical drive systems.

HOUSE OF AUTOMATION



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