

b maXX 4000 Modular servo drive



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.

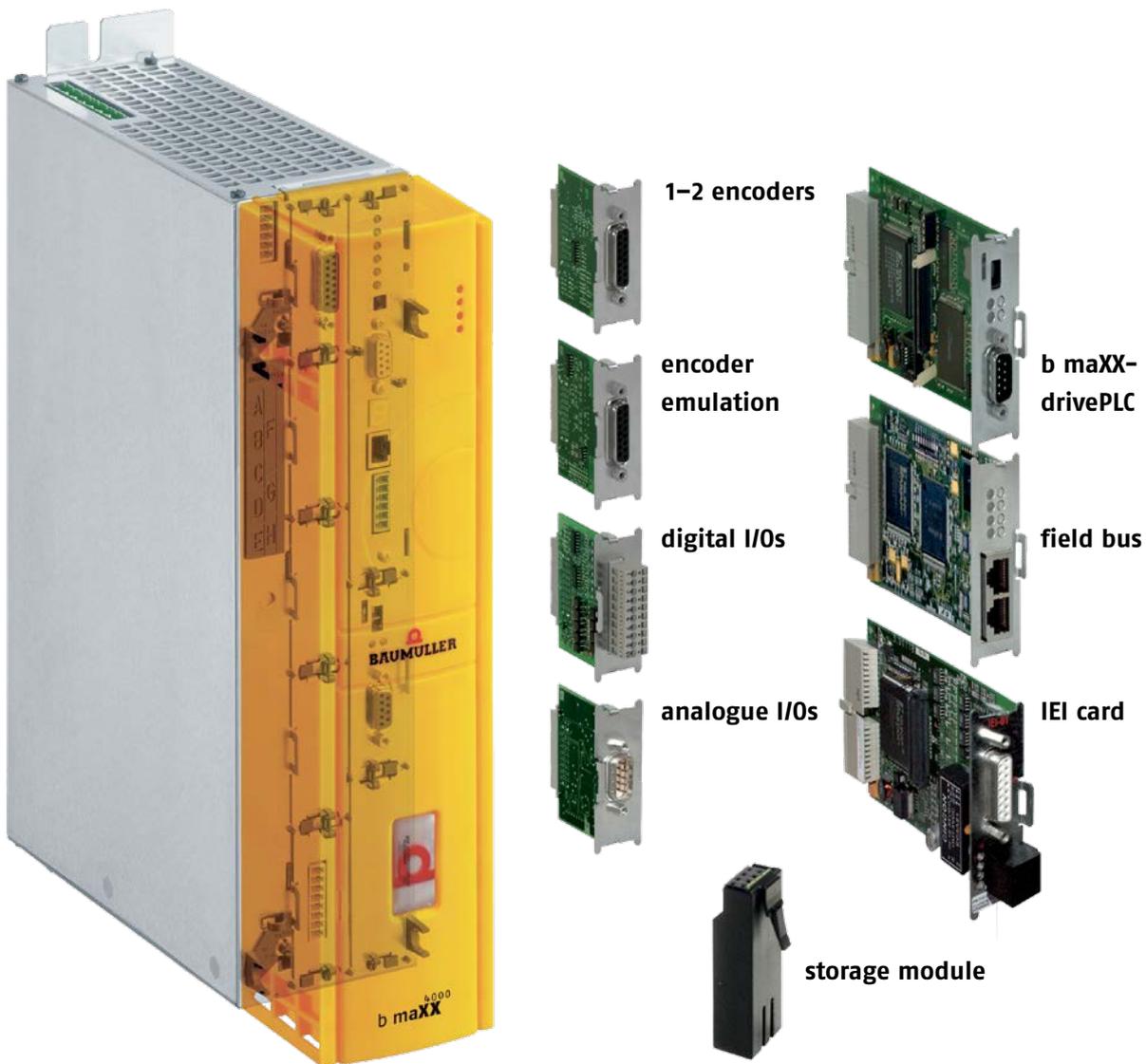
Function and option modules for b maXX 4400

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

Encoder Interfaces



- SinCos encoder
With hipurface 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

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. Servicing could not be easier.

Analog I/Os



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

Field bus modules for b maXX 4400



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

Field bus interfaces

Field bus	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





b maXX-drivePLC

PLC
INSIDE

Clever. Fast. Effective.

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.

Speed up your applications

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

In-drive PLC

With a cycle time of 100 μ s 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.

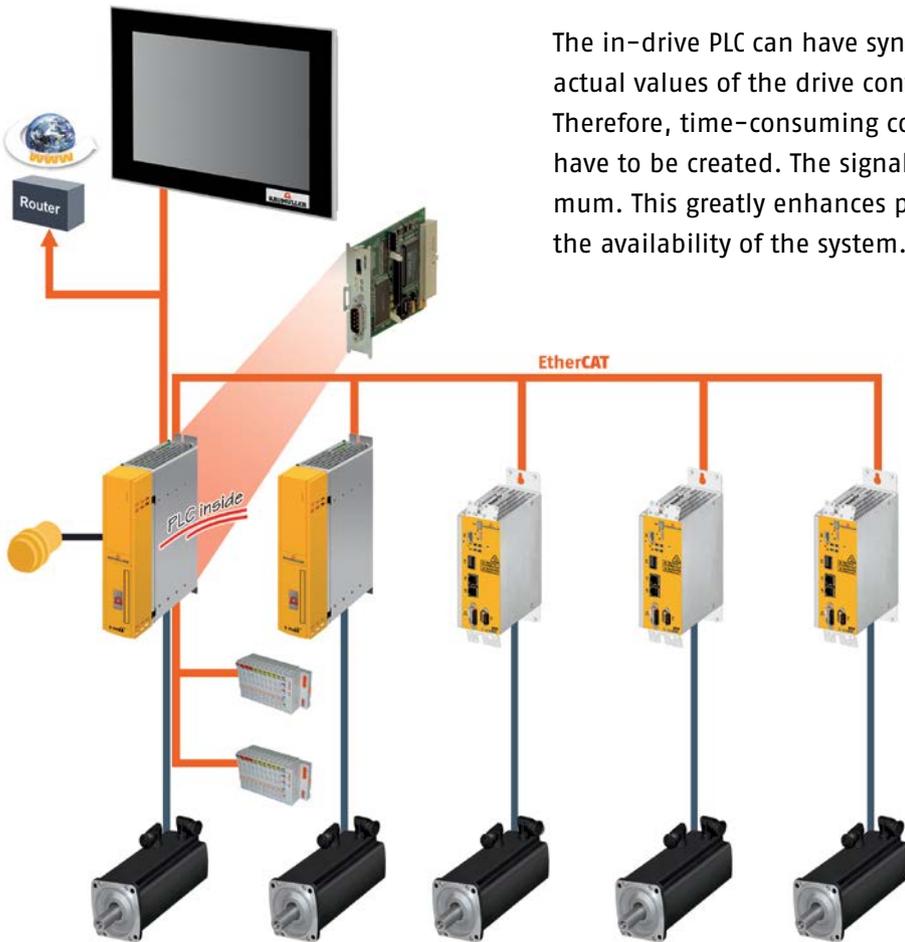
The program memory of the b maXX-drivePLC is sufficient for typical 120,000 lines of IL. 2 MB of RAM are available for variables. The optional residual data memory of 100 KB is buffered battery-free with a NVRAM. This means there is enough memory available for sufficient code. Costly memory expansions 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.

- 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



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

b maXX 4400 – The modular servo drive

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.

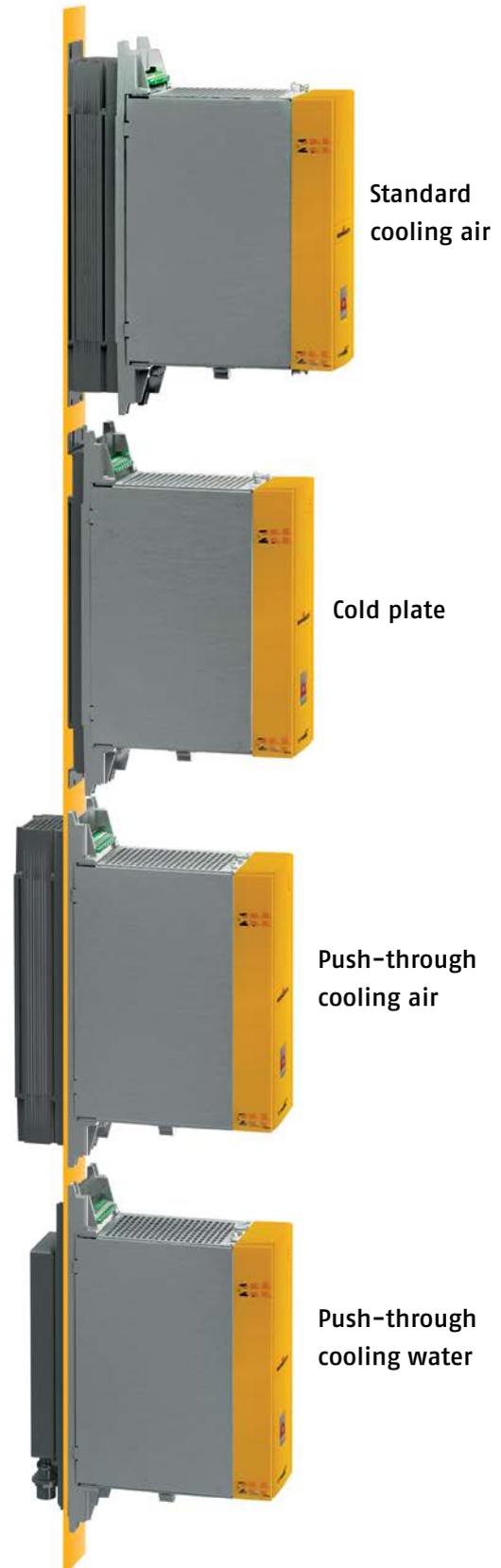
DC link coupling

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.

Types of cooling

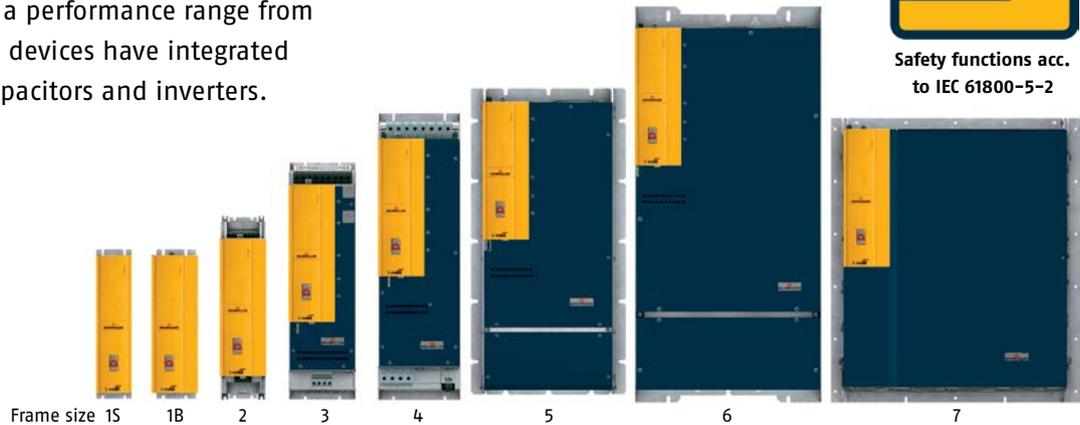


b maXX 4400 servo drive family

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



Safety functions acc. to IEC 61800-5-2



Technical data b maXX 4400

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

Subject to alteration

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

b maXX 4100 Regenerative power supply unit

It is often the case with electrical drives that energy costs make up almost 90% of the overall life-cycle costs. With this in mind, regenerative systems help to reduce the total cost of ownership.



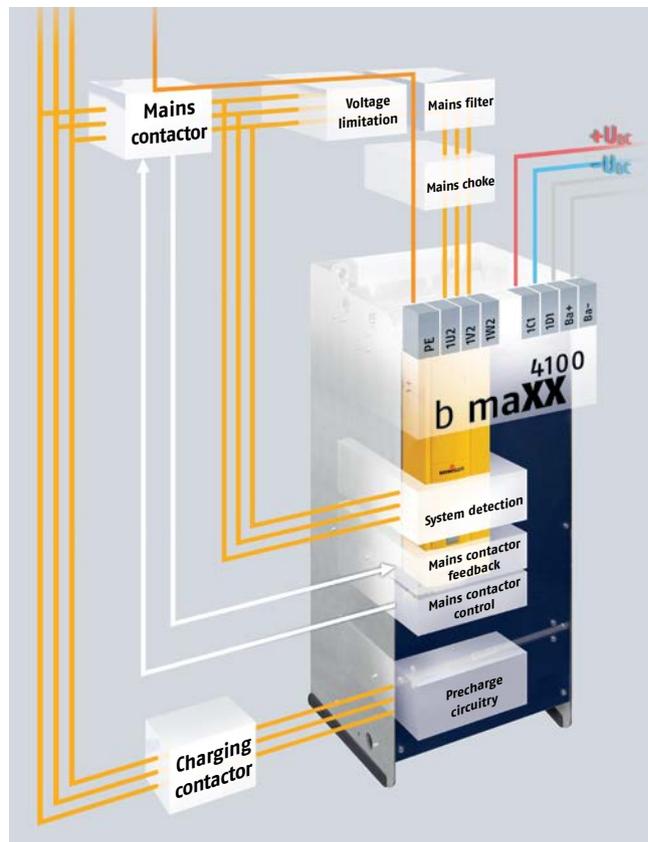
Baumüller's tried-and-tested b maXX automation and drive solution is being expanded with the addition of the new b maXX 4100 series regenerative power supplies. These units work in conjunction with b maXX 4400 series units, and can supply the DC link voltage to one or more drives. By using a b maXX 4100, all excess regenerative brake energy generated by the system is returned to the AC

mains supply rather than wastefully dissipating this energy as heat.

From the standpoint of energy costs, this offers the user considerable savings over the machine's service life. Regenerative systems help to lower energy consumption (and do their bit for the environment) by feeding the available brake energy back to the power grid rather than wasting it via a regenerative resistor.

The b maXX 4100 units are fully integrated into Baumüller's b maXX automation and drive solution family of products. The benefits which the b maXX series offers to its users such as modularity and flexibility, are also provided by the b maXX 4100. Four different frame sizes cover a DC link power range of 35 kW to 150 kW with the option of air or water cooling. The b maXX 4100 can also be integrated in the Baumüller automation environment by means of various optional fieldbuses. System consistency is achieved by adopting the same housing technology and connection arrangements as well as integrating the parameters of the b maXX 4400 into the existing b maXX ProDrive operating software.

- Regenerative brake energy is returned as a sine wave
- 3 frame sizes with 35 kW to 150 kW
- 60 second overload capability
- Current-controlled charging circuit
- Integrated control of charging and mains contactors
- Integral regenerative switching transistor
- Monitoring of mains, charging connection, mains contactor, DC link voltage, and heat sink temperature
- Optional fieldbus modules



Technical data b maXX 4100

Type	Frame size	DC link power ¹⁾		DC link peak power		Overload factor ²⁾	Dimensions WxHxD ³⁾ [mm]
		[kW]	[hp]	[kW]	[hp]		
4135	3	35	47	52	70	1.5	155 x 510 x 340
4145	4	80	107	104	139	1.3	190 x 624 x 374
4163	6	150	201	190	255	1.3	437 x 815 x 378

Supply voltage: 360–528 V ± 0% AC
 Supply frequency: 45–65 Hz
 Supply rated voltage: 400 V AC
 DC link rated voltage: 640 V DC
 Switching frequency: 8 kHz
 Regenerative switching transistor: Integrated

Electronics supply: external, 19.3–30 V DC (diagnostic capability)
 Fan connection: frame size 3: 24 V DC electronics supply
 frame sizes 4–6: 230 V AC ± 10%
 Certification: CE, CSA, UL

Subject to alteration

1) For 640 V DC DC link rated voltage
 2) For 60 seconds
 3) Height and depth without mounting brackets; depth including required bending radius of connecting cables

b maXX 4600/4700 Peak and nominal load devices



Peak and nominal load devices available in five sizes supplement the proven b maXX series. Regardless of whether you require maximum performance on a continuous or temporary basis – the b maXX series offers customised drive solutions for every application.

The tried-and-tested b maXX automation and drive solution is being expanded to include new peak and nominal load devices from the 4600 and 4700 series. Baumüller is now able to meet the specific requirements of applications in the injection moulding or extrusion sector, for example, where either short-term peak output or permanent

high performance is required. As a result, the drive can be adapted perfectly to the power requirements of the relevant application.

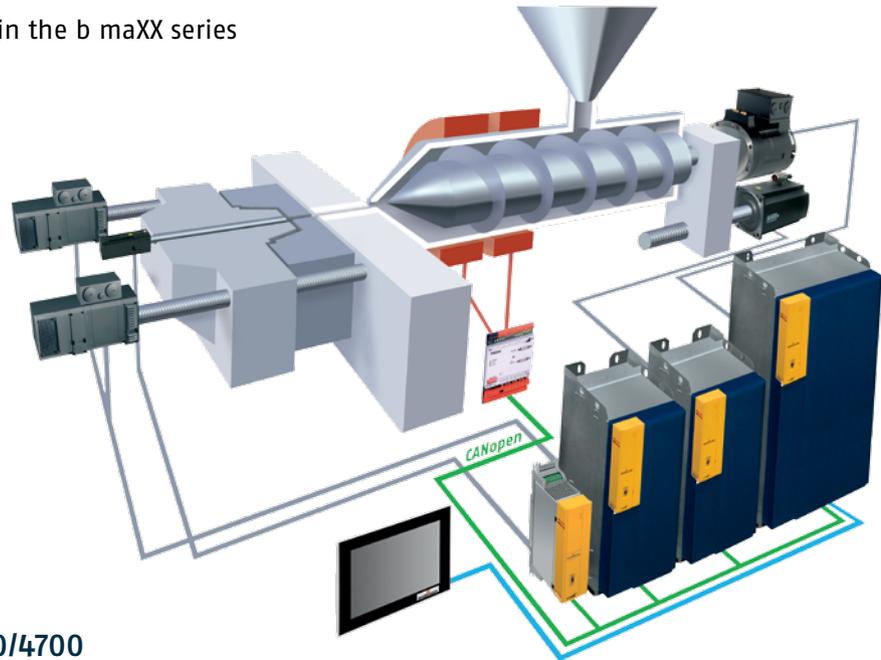
Although the devices in the series are more powerful, they have a compact design and take up much less space in the control cabinet – double benefits for the user.



Safety functions acc.
to IEC 61800-5-2

b maXX 4600/4700 – 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



Technical data b maXX 4600/4700

b maXX 4600 Type	Frame size	I_N [A]	I_{MAX} [A]	Overload factor ¹⁾	Dimensions WxHxD [mm]
4632-F	3	60	120	2	208 x 556.5 x 325
4641-F	4	85	170	2	242 x 681 x 327
4642-F	4	100	200	2	242 x 681 x 327
4650-F ²⁾	5	130	260	2	360 x 550 x 285
4651-F ²⁾	5	165	330	2	360 x 550 x 285
4652-F ²⁾	5	200	400	2	360 x 550 x 285
4661-F ²⁾	6	250	500	2	490 x 710 x 285
4662-F ²⁾	6	300	600	2	490 x 710 x 285

b maXX 4700 Type	Frame size	I_N [A]	I_{MAX} [A]	Overload factor ¹⁾	Dimensions WxHxD [mm]
4755-F ²⁾	5	260	260	1	360 x 550 x 285
4766-F ²⁾	6	450	450	1	490 x 710 x 285
4773-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 alteration

Motors



DSD2 – Dynamic servo motors



The servo motors for highly dynamic applications with the highest requirements of acceleration capacity and the best start-stop qualities.

Sizes 28, 36, 45, 56, 71, 100, 132, power range 0.3–150 kW (0.4–200 hp), speeds up to 6000 min⁻¹, up to IP65 type of protection

DSC1 – Compact servo motors

The DSC 45–100 is a series of high-torque servo motors that are up to 30% more compact than conventional servo designs.

Sizes 45, 56, 71, 100, power range 0.5–18 kW (0.67–24 hp), speeds up to 6000 min⁻¹, up to IP65 type of protection



DSP1 – For high speed performance



For applications requiring high rotary speeds, the DSP motors complete the existing DSD range.

Sizes 45, 56, 71, 100, power range 1.2–32 kW (1.6–43 hp), speeds up to 6000 min⁻¹, up to IP65 type of protection

DSH1 – High precision motors

The DSH1 high-precision servo motors were developed specifically for applications with the highest standards for quality and smooth operation.

Sizes 45, 56, 71, 100, power range 0.5–8 kW (0.68–11 hp), speeds up to 6000 min⁻¹, up to IP65 type of protection



DS/DS2/DA1 – General purpose servo motors

The servo motor for all applications with strict energy efficiency requirements.

Type DS/DS2: Sizes 45, 56, 71, 100, 132, 160, 200, power range 0.25–295 kW (0.33–396 hp), speeds up to 6000 min⁻¹, type of protection: unventilated IP54, ventilated IP23/IP54, water-cooled IP54.

Type DA1: Sizes 100, 132, 160, 180, 225, 280, power range 3.5–400 kW (4.7–536 hp), speeds up to 8000 min⁻¹, type of protection: ventilated IP23/IP54, water-cooled IP54



DST2 – Powerful high-torque motors

The high-torque motor DST2 for application with maximum torque requirements.

Sizes 135, 200, 260, 315, 400, 560*,

power range 2.7–1150 kW (3.6–1542 hp), speeds up to 1500 min⁻¹,

torque up to 80,000 Nm, IP54 type of protection, water-cooled *) on request



GDM & DSM – Disc motors

Baumüller offers a wide range of disc rotors for use in a large number of different applications where installation space is at a premium.

GDM DC disc motors: Power range 16–3000 W (0.02–4 hp)

DSM brushless disc motors: Power range 180–6300 W (0.24–8.4 hp)



DSE – Embedded three-phase current synchronous motors

The DSE synchronous motors are available either as a housing version or as a built-in motor. The motor covering a rotational speed range of up to 9000 min⁻¹ features buried magnets and therefore impresses with a particularly high power density.



BPx – Planetary gear series

The BPx planetary gear series in combination with our servo motors are ideally suited for applications with high demands on torque and dynamic.



LSC – Coreless linear motors

The coreless LSC linear motors from Baumüller achieve maximum current and power rise rates. They are therefore ideal for highly dynamic applications with maximum resilience against disruptive forces.



DSDI/DSMI – Motors with integrated control/power electronics

The DSDI and DSMI servo motors with integrated control and power electronics meet the requirements of modern, decentralized drive architectures. The DSDI is a highly dynamic motor and the DSMI is a high torque servo drive. Power range 170–385 W (0.23–0.52 hp), speeds up to 6000 min⁻¹, type of protection up to IP65



House of Automation



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