ACOPOSmulti Drive System

Perfection in Automation

www.br-automation.com

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"Maximum benefits for the customer was the main focus when developing ACOPOSmulti. We're proud to have achieved this goal."

ACOPOSmulti Drive System

The ACOPOSmulti drive system

ACOPOSmulti - The drive system for maximum customer benefits

In today's market, customers demand more than simply meeting technical requirements. Above all, customers require cost-effective solutions, investment security and a high degree of availability. ACOPOSmulti, the new drive generation from B&R, possesses these characteristics. It is the universal solution for all automation tasks in machine manufacturing. A new milestone on the path to "Perfection in Automation".

The ACOPOSmulti generation offers the highest degree of efficiency for multi-axis machines that are commonly used in the plastics, packaging, print, and textile industries.

Modular cooling design

The use of fans and climate control units in the switching cabinet means considerably higher costs as well as additional maintenance expenses.

ACOPOSmulti gives the designer the free space for conventional heat dissipation in the switching cabinet, a feed-through cooler with IP65 protection for releasing heat outside the switching cabinet and a "cold plate" variant for connecting to a cooling circulation system (water, oil).

Trend-setting power supply

Conventional drive systems convert only half of the applied power from the mains into actual mechanical power. The ACOPOSmulti drive system treading a new path:

- **Power factor correction**
  This means that only true power is taken from the power supply. This reduces the connected load and power consumption of the machine by approximately a factor of 2) This means less fuse safeguarding and smaller connection cross-sections.

- **Stabile voltage conditions**
  The DC bus voltage remains constant regardless of the mains supply voltage, which means maximum utilization by the inverter modules and motors no matter what country they are operating in.

- **Integrated power regeneration unit**
  All of the power supply modules are able to regenerate power. Instead of being converted to heat as is usually the case, kinetic energy generated during braking is converted to electrical energy that is regenerated into the power supply system.

- **Sophisticated diagnostics**
  The intelligent power supply modules with network connection via ETHERNET Powerlink offer completely new options for machine and system diagnostics.

Maximum customer benefits
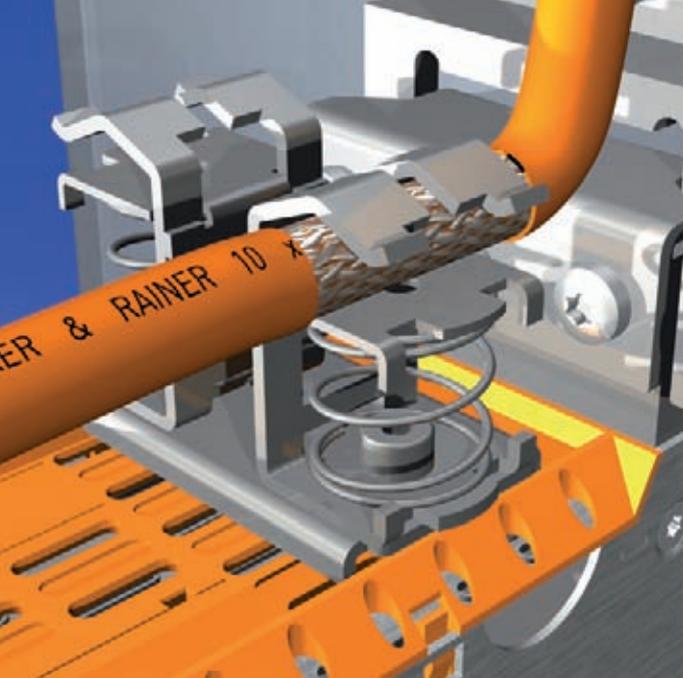
The ACOPOSmulti drive system
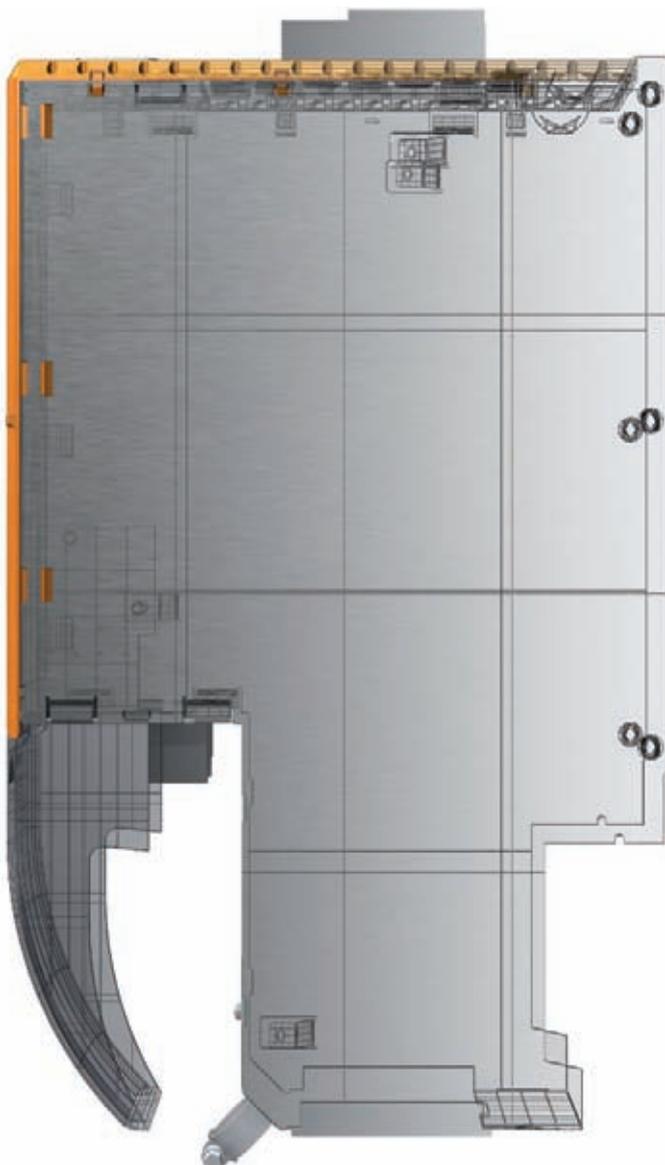
Handling power failures safely

Modern production machines rely on flexibility. Mechanical cam profiles are replaced by electronic cam profiles. The well-known advantages of flexibility and wear-free electronics also have a disadvantage: Loss of the cam profile link when a power failure occurs. This is not the case with the ACOPOSmulti drive system - the integrated 24V auxiliary supply module makes it possible to maintain a coordinated movement until the system reaches a standstill.

Compact, scalable performance

Compact, high-performance drive technology is the latest trend. The main reason for this is to achieve the best possible use of production halls, which requires small machine dimensions. Based on this principle, ACOPOSmulti offers maximum performance with minimum space requirements. The range of applications includes sensor-free asynchronous motors, permanent magnet servo motors in standard torque or linear motor versions, and ultra-dynamic ironless linear motors.

Maximum customer benefits

Investment security
Special attention was given to the topic of investment security during development of the ACOPOSmulti drive system.
As a result, it is just as easy to add the ACOPOSmulti drive system to an existing system as it is to use it in new machines. Thanks to software compatibility with the ACOPOS drive generation already established on the market, efforts can be concentrated on the most important factor - the application. That's all there is to it.

Safety as an integral system component
Trend-setting safety technology communicates via one network, ETHERNET Powerlink™ Safety. By integrating this open standard, the ACOPOSmulti drive system, together with the B&R safety-related components, has raised the bar in the area of secure automation solutions.

Integrated technology
Modern marketing demands individualization of the end product. Flexibility of the machine is therefore one of the decisive factors to rise above the competition. Modern machine concepts replace mechanical process technologies with sophisticated mechatronic concepts. As a result, the role of software in the process is constantly increasing in importance. B&R offers a multitude of industry-specific technology functions to make automation easy even for com-

plex applications. These intuitively built and easy-to-operate software components guarantee a cost-effective solution.

Outstanding usability
The ACOPOSmulti drive system is designed for the highest degree of usability throughout the entire life cycle.

■ **Designed for simple management of machine variations**
An ACOPOSmulti mounting plate is the basis for different variations of the machine. The machine's design determines which devices are used. The software recognizes the design automatically and provides the necessary functions.

■ **Ideally suited for industrial switching cabinet construction**
The ACOPOSmulti is designed with connection technology that allows prewiring of complete switching cabinets - ideal for manufacturing series machines.

■ **Easy maintenance**
ACOPOSmulti allows you to exchange drive components quickly - this considerably reduces downtimes for production machines.

Easy wiring
Industrial switching cabinet construction streamlines production cycles. Prefabricated cable trees make assembly easier and faster directly on the machine or system. The ACOPOSmulti drive system supports prewiring of the entire switching cabinet using its sophisticated wiring and mounting technology. The ACOPOSmulti drive components are mounted in the switching cabinet and connected to the prewired cable trees. ACOPOSmulti drastically reduces the amount of manual wiring.

Modular cooling design

The ideal cooling method for each machine

The use of fans and climate control units in the switching cabinet means additional maintenance expenses and considerably higher costs. The ideal solution would be a drive design that does not allow any power loss in the switching cabinet.

ACOPOSmulti gives the designer the free space required for conventional heat dissipation in the switching cabinet, a feed-through cooler with IP65 protection for releasing heat outside the switching cabinet and a "cold plate" variant for connecting to a cooling circulation system (water, oil).

Modular cooling design

The devices are connected consecutively without splicing and all have the same height. Only the width dif-fers and depends on the continuous power of the respective module.

The ACOPOSmulti drive system is designed so that you can easily implement the ideal cooling concept for your machine.

■ **Wall mounting**

Conventional mounting method. The heat is dissipated directly through the air in the switching cabinet. Suitable for a small number of axes with low power ratings. This limitation can be circumvented by using additional fans or climate control units in the switching cabinet.

■ **Feed-through mounting**

Based on a feed-through heat sink, the excessive heat is output directly to the ambient air outside of the switching cabinet. Suitable for a large number of axes with any range of power rating.

■ **Cold plate**

The excessive heat that is generated by the devices is output directly to the cooling medium via a plate cooled with oil or water. Suitable for a large number of axes with any range of power rating and a machine's own cooling circulation system.

Standard cooling

Standard cooling

This is based on a mounting plate. Backplane modules with integrated fans are attached to the mounting plate. The inverter modules, power supply modules and auxiliary supply modules can then be mounted.

The heat is dissipated directly through the air inside the switching cabinet.

Simple switching cabinet mounting

The mounting plate for wall mounting contains all of the right holes required to fasten the devices. The mounted backplane modules have an integrated rail system for distributing the power supply and auxiliary power supply. In addition, holes are also provided farther apart for mounting to the back wall of the cabinet.

Outstanding usability is the advantage:

- Fewer mounting holes with considerably larger tolerances are used instead of including holes on the back wall of the cabinet for every device with smaller tolerances.
- If the mounting plate is screwed into the back wall of the switching cabinet, the devices can be simply attached and fastened.

Feed-through cooling

Feed-through cooling
This is based on a feed-through heat sink. Backplane modules without fans are attached to the mounting plate. The inverter modules, power supply modes and auxiliary supply modules can then be mounted.

With this arrangement, heat is dissipated directly to the ambient air outside of the switching cabinet.

In the default arrangement, axial flow fans with a dimension of Ø 172x50 mm are added externally for convection.

Simple switching cabinet mounting
The feed-through heat sink contains all of the right holes required to fasten the devices. The mounted backplane modules have an integrated rail system for distributing the power supply and auxiliary power supply. In addition, holes are also provided for mounting to the back wall of the cabinet. The feed-through heat sink requires a rectangular cutout in the back wall of the switching cabinet for mounting.

Outstanding usability is the advantage:

- Mounting holes with considerably larger tolerances are used instead of including holes on the back wall of the cabinet for every device with smaller tolerances.
- The feed-through heat sink can be mounted so that it protrudes from the switching cabinet.
- The seal with the switching cabinet is in accordance with IP65 protection. The foamed seal guarantees impermeability even with a low amount of contact pressure.
- Once the feed-through heat sink is screwed into the back wall of the switching cabinet, the devices can be simply attached and fastened.

Flexible feed-through cooling design:
This cooling design offers a wide range of variations. Depending on the actual structure, the flow of air can be adjusted to meet the circumstances. Furthermore, the design also allows custom setting of the space between the cooling fins, to enable robust cooling conditions in environments with high amounts of dust.

Oil / water cooling

Oil / water cooling
This is based on a cold plate. Backplane modules without fans are attached to the mounting plate. The inverter modules, power supply modes and auxiliary supply modules can then be mounted.

With this arrangement, heat is dissipated directly to the cold plate and therefore to the attached cooling medium.

Flexible connection possibilities for the cooling medium
The cold plate cooling medium must be connected by the customer, this allows the user to install the cooling pipes in a way that ideally fits the circumstances. As a result, long pipework in the switching cabinet can be avoided and the exit can be placed at the most effective location.

Simple switching cabinet mounting
The cold plate contains all of the right holes required to fasten the devices. The mounted backplane modules have an integrated rail system for distributing the power supply and auxiliary power supply. In addition, holes are also provided farther apart for mounting to the back wall of the cabinet.

Outstanding usability is the advantage:

- Fewer mounting holes with a considerably larger tolerance range are used instead of including holes on the back wall of the cabinet for every with smaller tolerances.
- If the cold plate is screwed into the back wall of the switching cabinet, the devices can be simply attached and fastened.

Corrosion-resistant copper pipes:
To keep the pipe construction as simple as possible and to eliminate the resulting effects of galvanic corrosion, copper pipes are used in all cold plates. This high-quality metal is widely used and keeps the customer's installation work to a minimum.
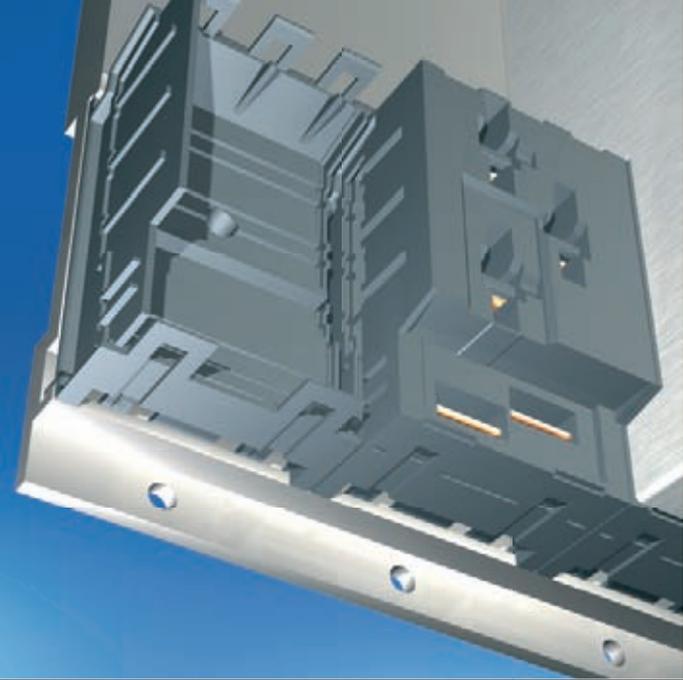
Wiring made easy

Wiring made easy

The wiring of electrical switching devices in the switching cabinet has been made considerably easier in previous years with plug-in rail-mount systems from various manufacturers. With its trend-setting connection design, ACOPOSmulti pioneers a new route on this path adapted for drive systems.

Simply attach to the mounting plate and fasten - this establishes the connections with the power supply module. In addition to the connection of the DC bus and the 24V auxiliary supply, the ground connection is established via the rail system. Additional grounding measures from module to module are not necessary.

The rails integrated in the mounting plate are sufficiently dimensioned. This makes it possible to freely arrange the sequence of modules without limitations.

The rail system integrated in the backplane module is designed to be protected from being touched. The 24V auxiliary supply voltage and the DC voltage from the DC bus are distributed.

The rail contacts are used for the power supply modules and the auxiliary supply modules to feed power in to the rail system and to supply inverter modules with power.
A protective ground conductor is integrated in the rail system. Therefore, external wiring is not needed for the modules.

The motor and encoder lines are connected in the easiest way imaginable using plugs and prefabricated cables. The network connection is also made the same way. For large power ratings (i.e. 64kW and up), threaded bolts and sufficient free space make it much easier to connect to the power supply module and inverter module.

All insertable connections (signal, motor connection) can be wired using screw terminals or cage clamps, according to the user's needs.

The principle - simply attach and tighten the screws - was also skillfully applied to the shield connections.

Large amounts of space make wiring easier

Protected power connections
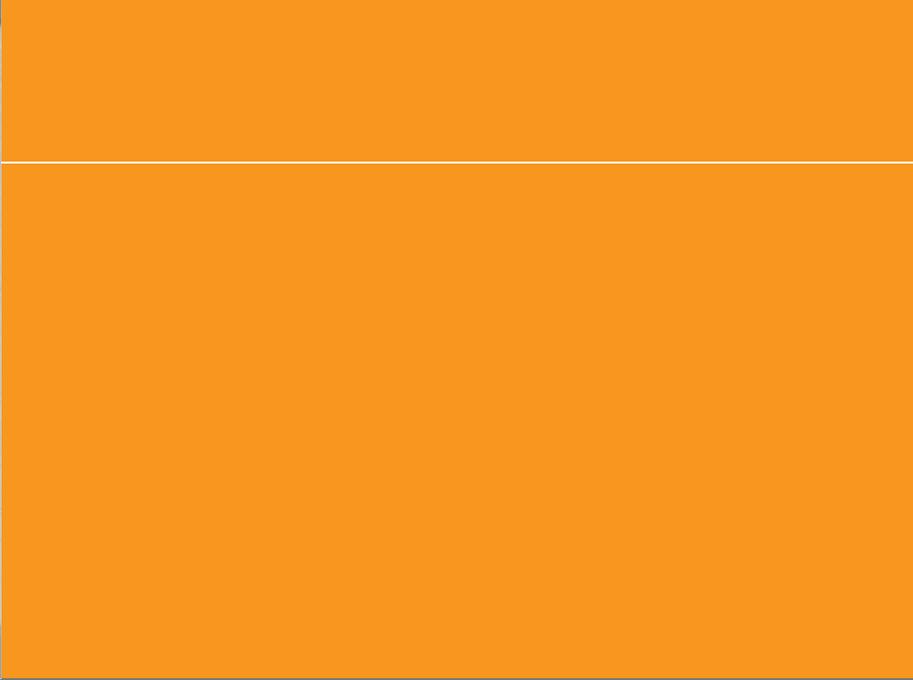
Wiring made easy

Simply hook it in, …

... and screw it on. The integrated contact rail system takes care of the rest.
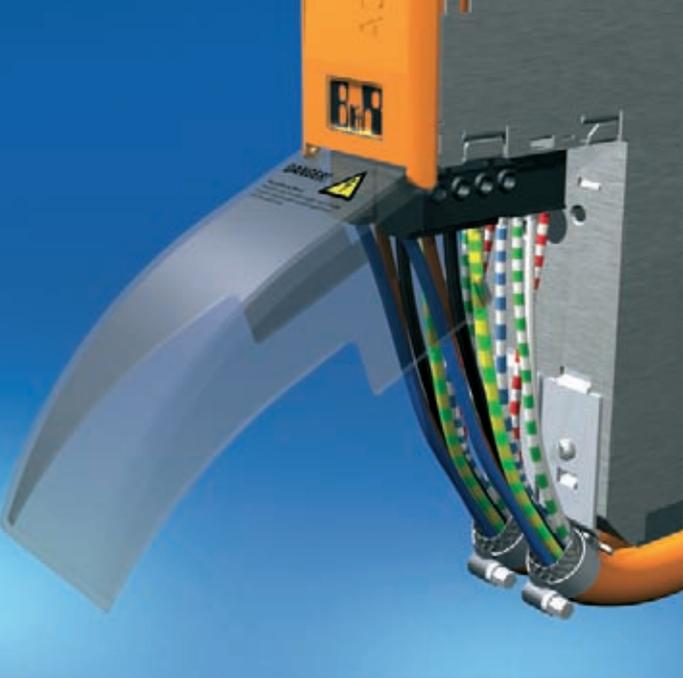
Labeling, identification

Module information

All of the information necessary for explicit identification is provided on the front side of the module. This data can be accessed anytime after installation by simply opening the plastic cover.

Plain text labeling

The axis label is integrated in the transparent power cable cover. This allows the customer to design their own labels for the axes.

Coding

Coding the motor connection is particularly useful for double-axis modules. This allows guarantees that the wrong module will not be accidentally replaced in high-stress situations.

All of the connectors on the device (the connectors on the insert modules are the only exception) are equipped with this type of mechanical coding.

Protection against small falling parts

Protection against small falling parts
A high degree of availability of the production systems is a decisive competitive advantage. Any measures that keep the systems running should be implemented. This includes protecting against small falling parts. Carelessness during wiring can result in a drive failure due to falling wire parts, which can cause the machine to breakdown. This is where the unique construction of the top ventilation grill in the ACOPOSmulti comes into play. The double-layered offset grills prevent small parts from falling into the interior of the device. These parts are caught in the middle layer.
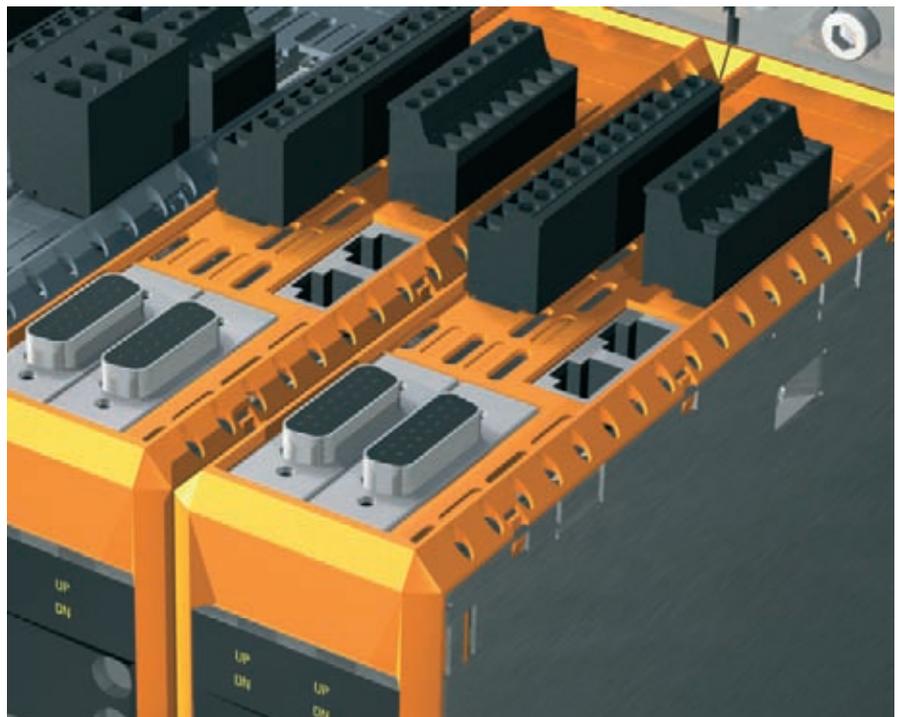
The offset ventilation grills prevent small parts from falling through.

Intelligent power supply modules

Intelligent power supply modules

Constant DC bus voltage regardless of the mains supply – that means maximum utilization by the inverter modules and motors no matter what country they are operating in.

Identical machine behavior worldwide, without additional upstream transformers. When using modern systems, valuable resources are lost because they have to be dimensioned according to the smallest mains voltage. Furthermore, it is also possible to operate ACOPOSmulti without upstream transformers on 3x220V voltage networks. However, this requires a changeover to the next larger power supply module.

Integrated power regeneration unit

All power supply modules are able to regenerate power. Instead of being converted to heat as is usually the case, kinetic energy generated during braking is converted to electrical energy that is regenerated into the power supply system. The advantage – the additional heat generated by braking resistors used inside switching cabinets in conventional devices does not occur. The integrated power regeneration system provides an efficient and environmentally-friendly solution for avoiding heat build-up in the switching cabinet which is otherwise generated by braking energy. This is especially important when arranging several small axes in a tight space.

Power factor correction

An additional advantage is that only effective power is taken from the power supply. The power factor correction mechanism considerably reduces the connected load and power consumption of the machine (by approximately a factor of 2). This means less fuse safeguarding and smaller connection cross-sections.

In general, the power supply module is designed so that all of the challenges for machine designers arising from the world's different power supply networks can be met optimally. ACOPOSmulti drives are already prepared for future standards.

Prepared for intelligent maintenance

Like all other modules in the ACOPOSmulti series, the power supply modules also have a network connection. This allows all data about power consumption, machine efficiency, etc. to be recorded and analyzed. Together with the information from the single axes, this represents a big step in the direction of "intelligent maintenance".

Integrated auxiliary supply modules

Integrated 24V auxiliary supply modules
The ACOPOSmulti drive system provides the 24V supply for drives as well as for the PLC, PC, or peripherals (optional). This doesn't just minimize space requirements; it also ensures predictable machine behavior when power is lost.

Supply for the PLC, drives and peripherals
Why was an effort made to include peripheral devices as well as drives in the 24V supply design of the ACOPOSmulti drive units? The answer comes easy when taking a closer look at modern production machines, particularly the behavior when power failures or power dips occur.

While earlier production machines were positively driven with the help of mechanical cams, modern systems are equipped with electronic cam profiles. The well-known advantages of flexibility and wear-free electronics also have a disadvantage: Loss of the cam profile link when a power failure occurs.

Power failures are not a problem
ACOPOSmulti addresses this issue with its integrated 24V auxiliary supply module. The kinetic energy created in the motors when braking is returned to the DC bus where it is available as electrical energy. This electrical energy is distributed to the drives and even the PLC, PC, or peripherals if necessary. To ideally distribute this limited energy during a power failure, the auxiliary supply modules have a fixed output as well as a 24V output that can be switched off in order to cut off the supply for non-essential peripheral components.

Devices can be connected directly to the common DC bus on the drive and have open-circuit, short-circuit, and overload protection.

This is the ideal solution for electronically linked systems to utilize the advantage of mechanical cams - the defined reference for the angle of the axes is maintained during a loss of or dip in the power supply.

Scalable inverter modules

Inverter modules

Space inside the switching cabinet is highly valuable. Minimum volume is a decisive factor between survival and failure on the market. Based on this principle, the ACOPOSmulti drive system offers maximum performance with minimum space requirements. To further optimize the compact design, inverter modules up to 11A are also available as double-axis modules. Depending on the application, this enables you to establish the best possible individual configuration of inverter modules consisting of single and double-axis modules. Above 11A, all devices are single-axis modules, which means the customer does not have to sacrifice compactness.

Scalable dynamic features

The paradigm shift for the designers of production machines is in full swing. As a result, the number of hybrid drive systems is increasing. ACOPOSmulti is the perfect solution for this mix of conventional motor-gear combinations and direct drive technology. The scalability of drive computing power allows the best possible utilization of devices in the vast field of motion technology. The range of applications includes sensor-free asynchronous motors, permanent magnet servo motors in standard torque or linear motor versions, and ultra-dynamic ironless linear motors.

Of course, all inverter modules are equipped with protection against short-circuit and ground faults.

Safely taking it to the physical limits

IGBTs (Insulated Gate Bipolar Transitor) are one of the key components in the inverter. They are responsible for the power output of the respective inverter module. Pulse width modulated signals are used to generate an output voltage with a controlled amplitude, frequency and phase.

The temperature and the increase in temperature in the actual component represents one of the most important factors affecting the lifespan of the IGBTs . Strict adherence to the limits is a measure of quality for an inverter, even under the toughest conditions. B&R guarantees adherence to the limits at maximum output power by using a sophisticated mathematical model from the IGBT structure.
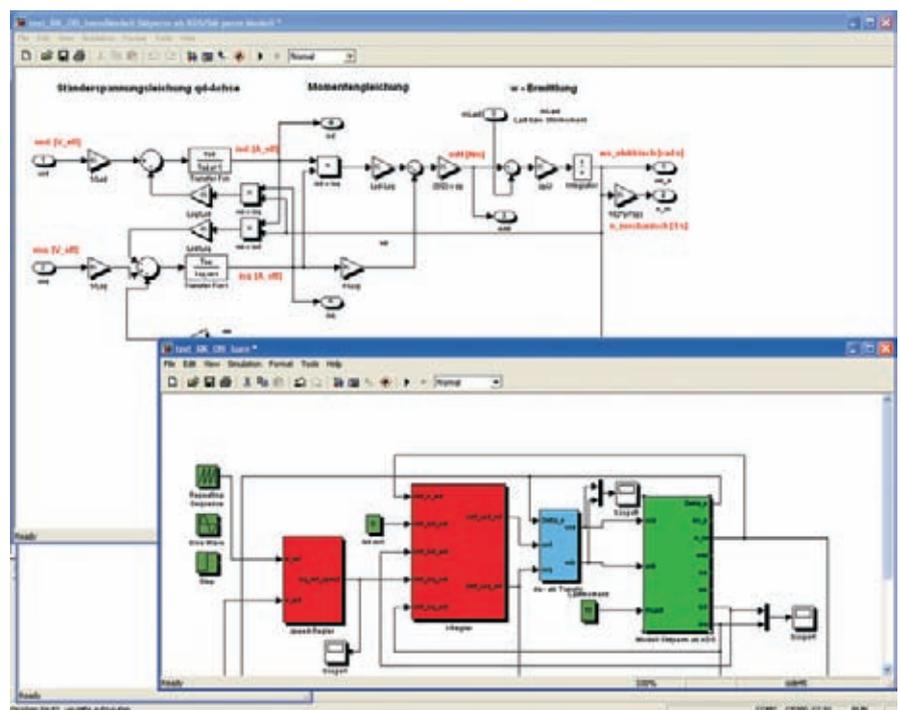
Thermal models for getting the best usage out of the semiconductor

Finding a solution to this apparent contradiction provides a number of benefits for the user:

- Safe inverter operation independent of the operating mode and the environmental conditions.
- The connected motor does not spin out when the temperature limit is exceeded. Instead, the brakes are applied until reaching standstill, without overloading the IGBTs.
- Internal computer-aided models (IGBTs, motor) make it possible to predict the load on a power transmission system after all of its components have completely warmed up after a cycle. This function considerably reduces the typically long settling times during thermal processes and allows the machine operator to optimize the production process extremely efficiently.
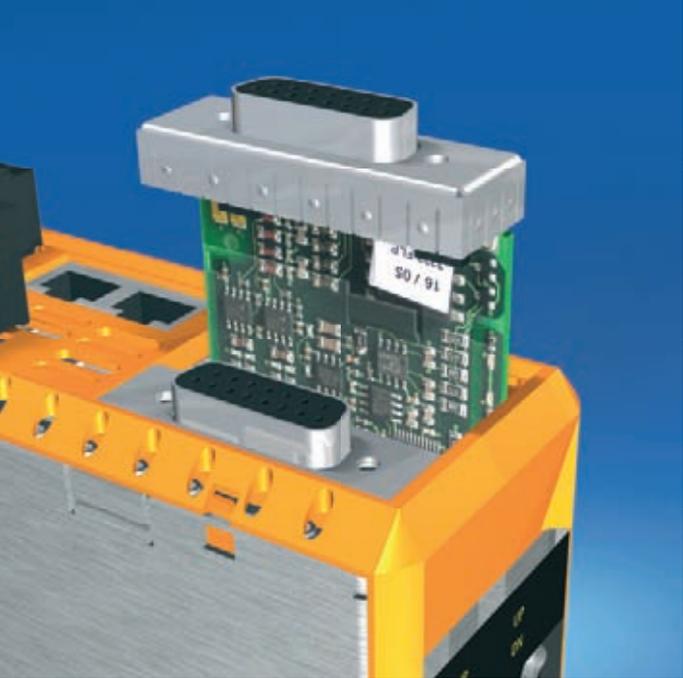
Accurate encoder plug-in modules

Accurate encoder plug-in modules
The highly accurate encoder interfaces for resolvers, EnDat 2.1 and 2.2 as well as encoders with sinusoidal output signals play a significant role in the excellent results of the entire control network.

The parameter memory in the EnDat encoders is used by B&R to store motor data (among other things). In this way, the ACOPOSmulti inverters are always automatically provided with the correct motor parameters and limit values. This is referred to as the "embedded parameter chip".

Nonvolatile application memory also integrated in the embedded parameter chip allows the machine manufacturer to store initialization and calibration parameters such as zero points and torque linearization. Furthermore, modules or additional units which have been finished, tested, and aligned can then be integrated into the production process or installed at the end customer's facilities without extensive calibration testing.

EnDat 2.1 from Heidenhain
EnDat is a standard developed by Johannes Heidenhain GmbH (www.heidenhain.de), incorporating the advantages of absolute and incremental position measurement and also offers a read/write parameter memory in the encoder.

The incremental process allows the short delay times necessary for position measurement on drives with exceptional dynamic properties. With the sinusoidal incremental signal and the fine resolution in the EnDat encoder plug-in module, a very high positioning resolution is achieved in spite of the moderate signal frequencies used.

During start-up, the module is automatically identified, configured and its parameters set by the ACOPOS-multi inverter's operating system.

With absolute position measurement, the homing procedure is not required. A motor with a multi-turn encoder (4096 revolutions) might also have to be installed depending on the movement range.

EnDat 2.2 from Heidenhain
This compatible enhancement of the EnDat 2.1 interface brings new advantages. With just four signal lines, additional information can be transferred as well as position values. Optimized signal creation and an expanded supply voltage range increase the system performance.

Incremental encoder with sinusoidal output signal
Incremental encoders with sinusoidal output signals are mostly used in linear motors and systems with high-resolution optical or magnetic position measurement systems.

This encoder plug-in module has inputs for two differential sinusoidal incremental signals with a 90° phase shift and a reference mark signal. The permissible signal amplitudes are dimensioned with a high tolerance and ideally matched to the subsequent evaluation electronics to achieve the best possible resolution.

Resolver

The resolver is a measuring principle optimally suited for tough environmental conditions. Its transformer functions do not require any electronic components in the motor. Resolution and accuracy are limited compared to inductive or optical position measurement systems.

All of the information contained in the resolver signals is used by the ACOPOSmulti encoder plug-in modules to evaluate the signal, allowing extraordinarily good results. This makes it possible to detect broken connections, shorted lines and encoder supply failure (reference signal), in addition to position information.

Universal temperature sensor connection

Depending on the motor structure, the temperature sensor is connected either via the power connection or via the plug for the position encoder. EnDat 2.2 offers another possibility. This encoder transfers the temperature information digitally; additional lines are not required for this procedure.

The ACOPOSmulti drive system can work with all of the versions described above. The connections are designed to be universal.

EnDat 2.2 - The bidirectional interface:
The EnDat interface from HEIDENHAIN is a digital, bidirectional interface for measurement devices. This device is able to output position values from incremental and absolute measurement devices and can read, update or store new information saved in the measurement device. Only 4 signal lines are needed because of the serial data transfer. The data is transferred synchronous to the clock signal defined by the subsequent electronics. The transfer method (position values, parameters, diagnostics, etc.) is selected using mode commands sent to the measurement device by the subsequent electronics.

Embedded parameter chip

Embedded parameter chip
Each module in the ACOPOSmulti drive system can be uniquely identified using an embedded parameter chip. This makes it possible to identify each module on the network. This paves the way for an automatic system configuration using the application program, which is of particular interest for many different machine types.

Consequently, not only ACOPOSmulti modules use this method of identification. B&R motors are also equipped with an embedded parameter chip. It contains all of the mechanical and electronic data relevant to the motor. This makes it possible for the application program to identify the entire power transmission system. The work-intensive and error-prone task of manually setting parameters is no longer necessary and start-up times are substantially reduced.

A simple comparison of the machine configuration when performing service helps to quickly diagnose faulty arrangements and minimizes costly downtimes.

This valuable additional information also allows you to draw conclusions about the usage and possible errors.

Future compatibility ensured with electronic parameter chip:
The unique identification of the ACOPOSmulti modules via electronic parameter chip meets the necessary demands when using systems in validated environments. It must be possible to identify each exchange of modules. Applications with these demands (e.g. FDA, GAMP, 21CFR11) are becoming more and more common.

Perfection in Automation

Quality made by B&R

The name B&R stands for many years of experience in developing and manufacturing industrial electronics. In addition to electronics, mechanics are increasingly becoming a key element for the best possible operation.

Several man-years have been invested in the development of the ACOPOSmulti drive system's mechanical design to achieve the highest degree of component density, outstanding performance and simple handling.

The use of high-quality components together with the high demands on EMC properties guarantees high availability of modern production systems. A requirement for usage in rough industrial environments is to meet all of the main EMC standards.

The ACOPOSmulti drive system was developed exclusively by B&R and is produced in-house. The shortest distances between development and production have proven to be the best solution over the years and make up one of the pillars of our outstanding quality. There is just one company behind the entire palette of hardware and software, who carries sole responsibility - B&R.

Construction support

Macros for ECAD systems

The electronics in a machine must be designed in a manner which optimally utilizes the materials and space available. Graphic ECAD systems have established themselves as the right tool for the job.

Every module in the ACOPOSmulti drive system comes with pre-designed electronic descriptions of the mechanical dimensions and the electrical signals. These macros are loaded directly to the well-established ECAD systems.

Design and changes are immediately reflected at all levels of development. This saves time for the most important tasks and prevents errors right from the start.

The accelerated development, programming, maintenance and documentation involved with the ACOPOSmulti drive system mean lower costs, enhanced quality and increased sales by entering the market earlier.

3D CAD documents

The goal is always to get the most out of a switching cabinet, however it is becoming more and more common for electronic components to be placed wherever the machine construction allows. These machine-specific switching cabinets can be designed optimally. 3D CAD data in STEP format is used to design the switching cabinets when using various modules in the ACOPOSmulti drive system.
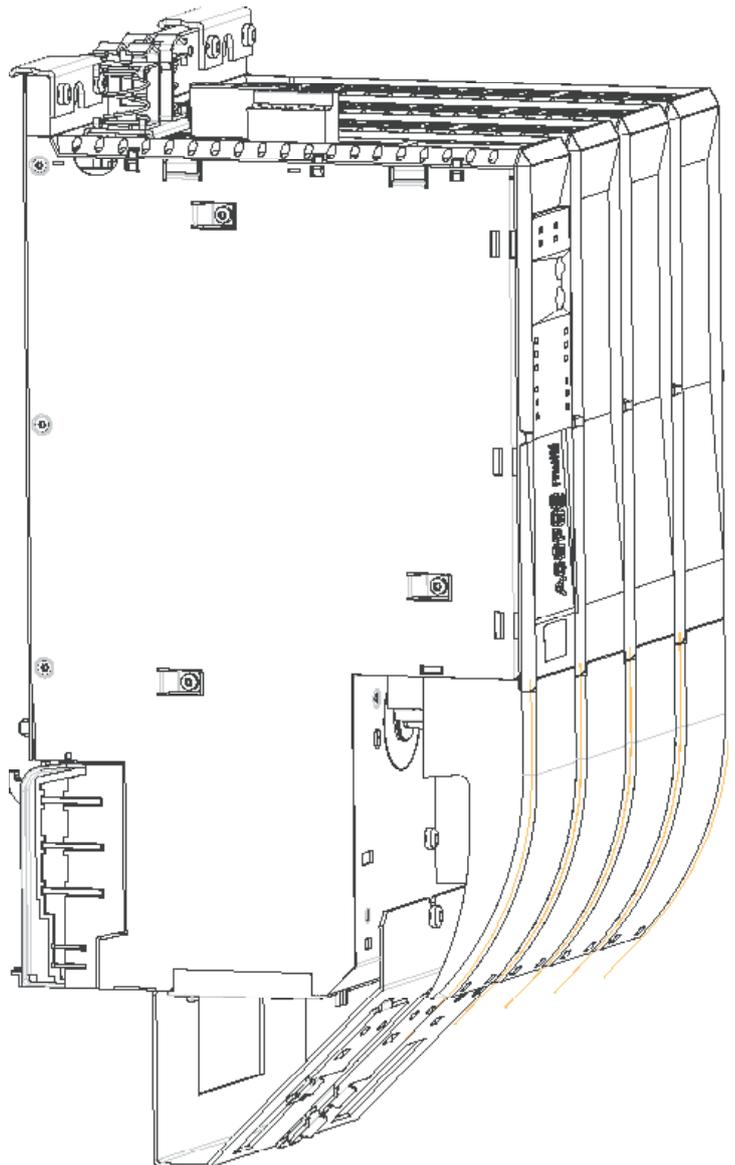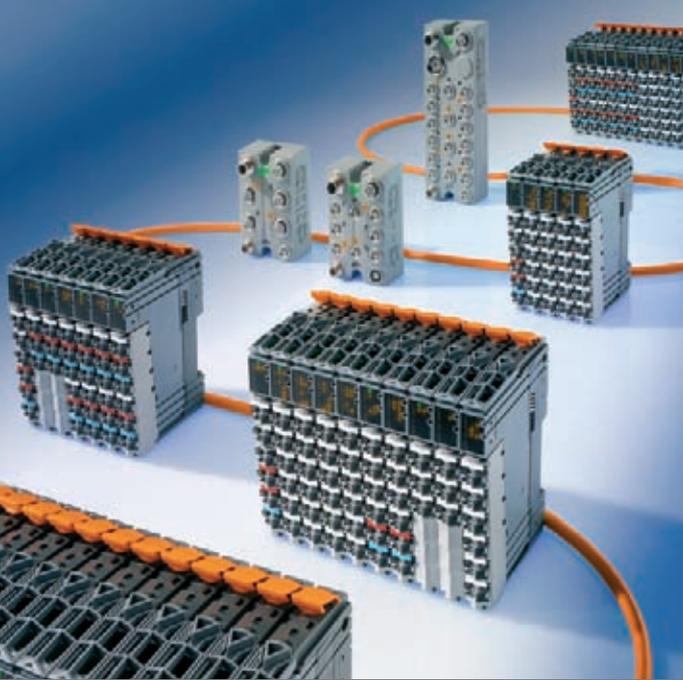
Remote peripheral connection

Remote peripheral connection
Flexibility of the wiring is not limited as a result of using remote B&R I/O systems X20 and X67. All of the signals required for the power transmission system (e.g. end switch, reference switch) can be wired on-sight with IP67 protection or in the switching cabinet in accordance with the requirements.

ACOPOSmulti

X20

X67

ACOPOSmulti

X20

X20

Panelware

X20

Compact I/O

X67

X67

X67
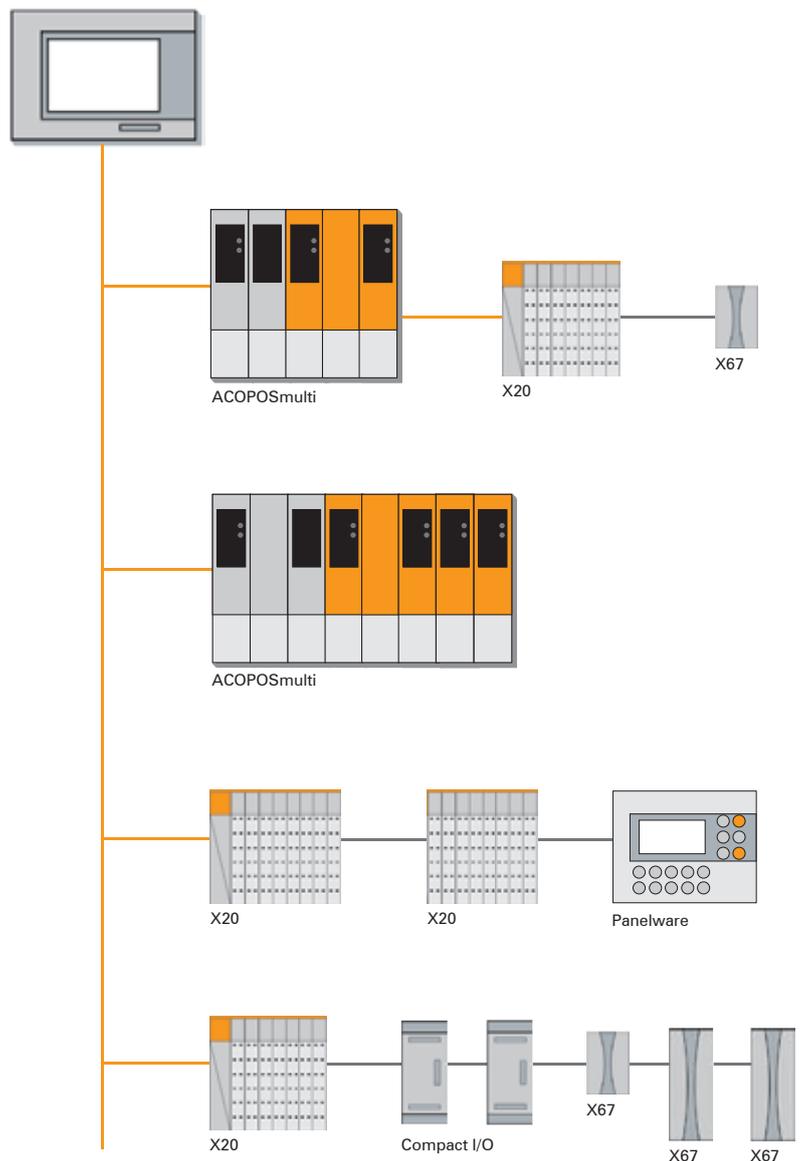
Expanding existing systems
ETHERNET Powerlink allows the con-
nection of ACOPOSmulti drive sys-
tems to existing B&R systems. ACO-
POS and ACOPOSmulti drive systems
can be combined without limitations.
The result is in an ideal motion control
building block for modern machine
architectures, which demand both
central as well as remote devices.

ACOPOS

ACOPOSmulti

X20   X20   Panelware

X20   Compact I/O   X67   X67   X67
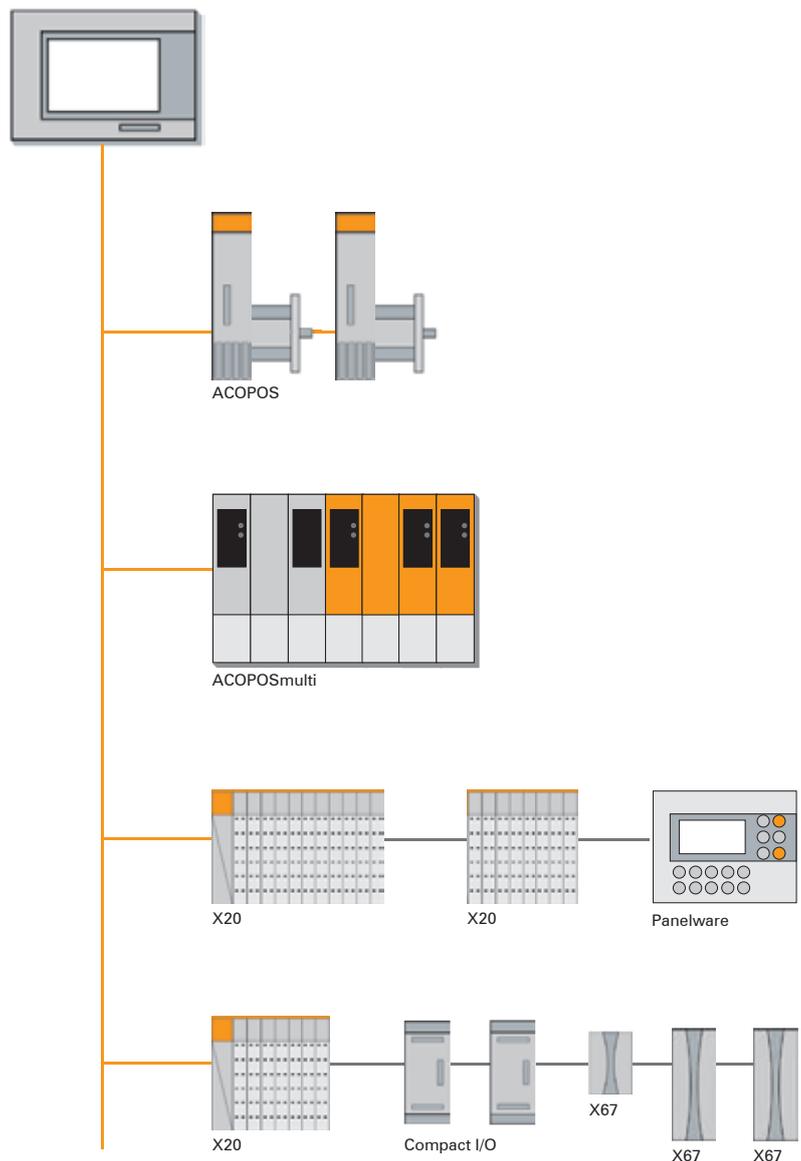
Integrated technology

Integrated technology

The individualization of end products places consistently higher demands on machine flexibility. More and more mechanical process technology is designed with sophisticated mechatronic concepts using software. To keep process precision from falling behind, especially at high production speeds, B&R offers a multitude of industry-specific technology functions.

Taking it to the physical limits

Both trigger inputs or touch probe inputs on the ACOPOSmulti process their signals in the sub-microsecond range, which enables them to meet the toughest demands for precision. The area of application for these inputs ranges from detecting index marks for packaging, printing or print post-processing to measurement tasks in the metal processing sector.

The ACOPOSmulti inverter is optionally available with two 14-bit analog inputs. These analog inputs can be directly integrated in the control process. These inputs are read and further processed every $50\mu s$. The resulting high-speed reaction times in the process are practically predestined for applications which change between different motion states such

as position and torque control.
This quick and exact detection of process parameters, such as pressure sensors, makes it possible to accurately control processes that are extremely sensitive despite their dynamic properties.

Smart Process Technology

Smart Process Technology (the freely configurable technology library in the drive), which has already produced amazing results in numerous series production machines with ACOPOS servo drives through its options and reaction times in the sub-millisecond range by cutting production speeds in half, is also available for the ACOPOSmulti drive generation.

Here a few applications that come up time and time again, which are already relying on Smart Process Technology:

- **Positioning paired with smart torque control**
  In many applications, mechanically forced processes are replaced with fine, adaptive electronic processes. This can be illustrated with the processes used when closing drink bottles or welding small parts. All of these processes have something in common; optimal control and coordination of position and torque is crucial for reproducibility and therefore the quality of the product.

- **Smart drum sequencer**
  In addition to its qualities as all-around talent, this drum sequencer also runs in the sub-millisecond range, thereby allowing exceptional process speeds at identical quality.

PLCopen motion control

Standardized programming

The creation of PLCopen motion control function blocks fulfills a long-awaited demand for a standard that can handle positioning tasks quickly, easily, and efficiently.

They can be programmed in the proven IEC 61131 standard programming languages Structured Text, Instruction List, Ladder Diagram, or Sequential Function Chart. In addition to these languages, B&R also supports programming in B&R Automation Basic and C.

All motor types supported by the ACOPOSmulti drive system such as synchronous motors, asynchronous motors, linear motors, torque motors, and direct drives can be controlled with these PLCopen function blocks.

The universal availability of PLCopen function blocks for all B&R products makes it possible to optimize the component selection to match the performance demands of every application.

Like the drive firmware, the PLCopen library is included in the Automation Studio package. Selecting this library in the project automatically imports it and makes the function blocks available for programming.

Administrative motion control function blocks

Name	Description
MC_Power	Switches the controller on or off.
MC_ReadStatus	Reads the type of movement performed by the axis.
MC_ReadAxisError	Reads error messages.
MC_ReadParameter	Reads a selected PLCopen parameter.
MC_ReadBoolParameter	Reads a selected PLCopen parameter of data type BOOL.
MC_WriteParameter	Writes a selected PLCopen parameter.
MC_WriteBoolParameter	Writes a selected PLCopen parameter of data type BOOL.
MC_ReadActualPosition	Reads the current axis position.
MC_Reset	Takes the axis out of an error state. All error messages are acknowledged.

PLCopen motion control

Single-axis motion control function blocks

Name	Description
MC_Home	References the axis to a specified position.
MC_MoveAbsolut	Starts a movement to a target position with a predefined speed and acceleration. Motion parameters such as target position, speed, and acceleration can be modified in real time. When this is the case, the axis is driven using the new parameters without the movement being interrupted. Switching to a different single-axis movement (MC_MoveAdditive, MC_MoveVelocity) is possible at any time.
MC_MoveAdditive	Covers a specified path with a predefined speed and acceleration. Motion parameters such as target position, speed, and acceleration can be modified in real time. When this is the case, the axis is driven using the new parameters without the movement being interrupted. Switching to a different single-axis movement (MC_MoveAdditive, MC_MoveVelocity) is possible at any time.
MC_MoveVelocity	Starts a motion with a specified speed and acceleration. Motion parameters such as target position, speed, and acceleration can be modified in real time. When this is the case, the axis is driven using the new parameters without the movement being interrupted. Switching to a different single-axis movement (MC_MoveAbsolut, MC_MoveAdditive) is possible at any time.
MC_TouchProbe	An axis position is stored for the selected edge of the trigger input. This has to do with a highly precise measurement with a timing resolution of 50 ns. This function block is suitable e.g. for recording a print mark position. Depending on the application, this can be used to calculate a position correction. This can be brought back into the system using the MC_Phasing function block to perform the necessary correction.
MC_AbortTrigger	Cancels the trigger input function (MC_TouchProbe).
MC_DigitalCamSwitch	Switches a digital output according to an axis position (drum sequencer). Switching time compensation and hysteresis can be configured.
MC_Stop	Stops a movement using a predefined deceleration ramp.

Multi-axis motion control function blocks

Name	Description
MC_GearIn	Starts a speed coupling to a master axis. If the master is already moving, a gentle run-in movement is calculated to reach the speed of the master axis as quickly as possible while still adhering to the specified limit values. The gear ratio can be modified anytime when the coupling is active. As with the start of the coupling, a gentle transitional movement is calculated in the new coupling ratio here as well.
MC_GearOut	Ends an active speed gear, and the axis continues moving at the current speed.
MC_CamTableSelect	ACOPOS drives use polynomial cam profiles. Their calculations take place either offline using the Automation Studio help system or math/kinematics programs or online on the controller. With this function block, one of these cam profiles is transferred to a drive so that it can be used for a coupling.
MC_CamIn	Starts a cam profile link to a master axis with a selected cam profile. The course of the cam profile to the master or slave position is configured using offsets. Multiplication factors allow the cam profile dimensions to be adjusted at any time. Switching the cam profile is also possible at any time, even if the coupling is active. When doing so, the currently active curve is driven to the end before switching to the newly started curve. When using periodic axes (e.g. packaging machines), this method ensures that the axes remain synchronous to one another.
MC_CamOut	Ends an active cam profile coupling, and the axis continues moving at the current speed.
MC_Phasing	Applies a phase shift on the master's side for the drive and cam profile coupling with a predefined speed and acceleration.

Effective and transparent task execution:
Technology function blocks are available as a supplement to standard applications. These are based on PLCopen function blocks, used according to their functionality, and can be found in "open source."

Automation Studio integrated motion

B&R Automation Studio
B&R Automation Studio is comprised of all the software tools that the user will require for the entire machine life-cycle. It covers configuration, programming, and diagnostics, as well as operation and maintenance of the controllers, the integrated drive technology, and the visualization.

Support for all IEC 61131-3 programming languages is a given. ANSI C and Automation Basic offer an additional degree of freedom.

Complex drive solutions can be created after a short orientation period. Adding hardware components and prefabricated program sections and technology functions, as well as their configuration, is done in dialog boxes; this reduces project development times considerably.

Cost-effective project setup
Motion control integrated in the automation software provides a solution for the development, configuration, and diagnosis of gear, positioning, and cam profile applications based on the ACOPOSmulti drive system. Like other components, axes are integrated in the project as objects, where they can be edited and managed.

A parameter editor is provided that allows you to edit, copy, and display initialization parameters for an axis (e.g. encoder interface, limit values).

The parameters are listed in plain text and are defined using selection lists when possible.

Efficient coordination
The integration of powerful tools, such as the cam editors, reduces programming for complex linked movements to simple drag-and-drop procedures. The results and effects on speed, acceleration and jolt can be immediately analyzed graphically.
Together with custom cam profiles, desired movement sequences are achieved using predefined functions (e.g. incoming, outgoing cam profiles, compensation gears).

Motion rules are defined using dialog boxes. The system tries its best to follow these rules depending on the specified boundary conditions.
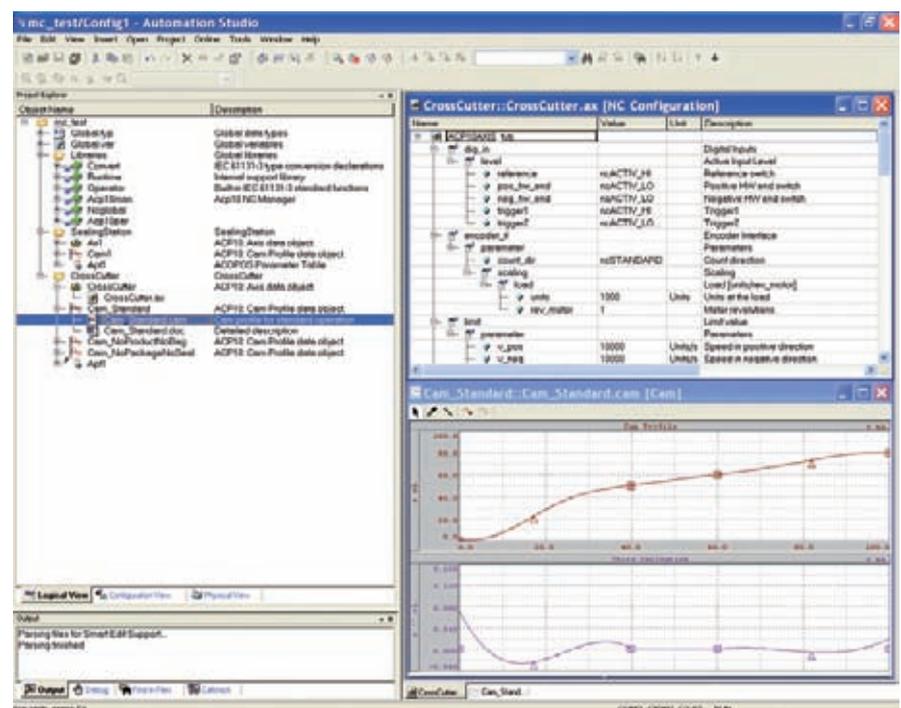
Motion control project configuration in Automation Studio

Add-ons for fixed points, synchronous sections, and spline segments round off the editor functions. Cam profiles are optimized according to position, speed, acceleration, jolt, and dynamic torque (power).

Powerful editor functions allow curves to be easily modified using the cursor and provide a clear workflow even with complex associations.

Effective diagnostics

As is the case when programming the PLC, the variable monitor can be used to display all relevant data while one or more axes are being operated (e.g. movement active/inactive, controller on/off, simulation mode on/off, errors yes/no, etc.). The user can adjust how the parameters are displayed to meet his requirements.

Control axes easily and effectively with NC Test

All types of movements, such as point-to-point, gear functions and cam profile functions, can be carried out interactively. The reaction of the axis can be seen online in the monitor window. Additionally, the oscilloscope function draws the data configured by the user for a final evaluation.

The graphic display allows the user to make fine adjustments and optimizations of the movement in the microsecond range (sampling rate 50 μs). The results and effects on speed, acceleration and jolt can be immediately analyzed graphically.
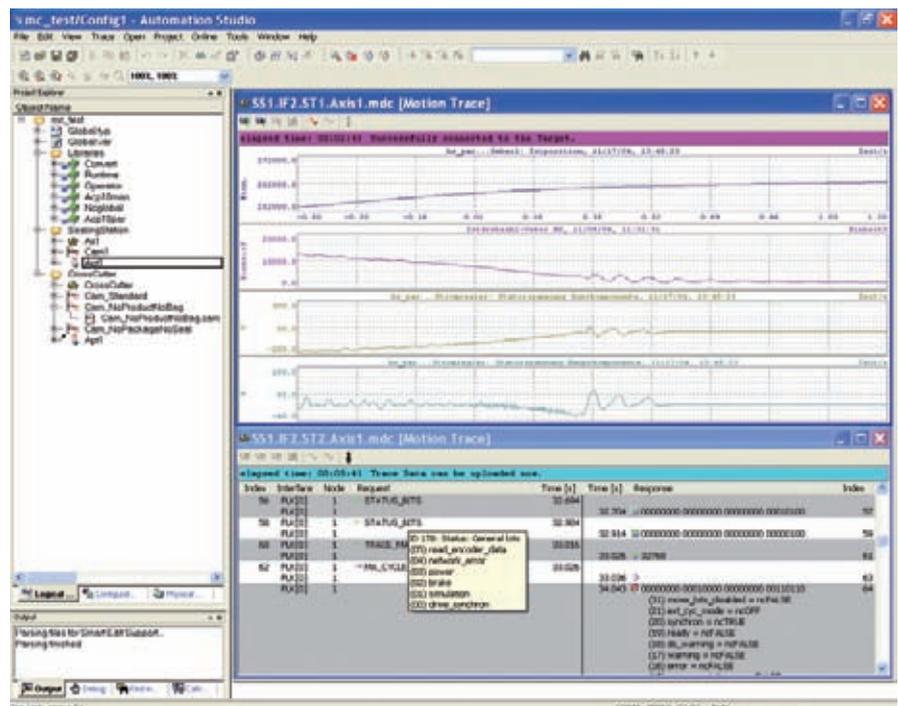
Optimization of the drive unit and diagnosis of the machine sequences in Automation Studio

Soft PLC

Soft CNC

Motion control

Integrated visualization

Open fieldbuses

TCP/IP, Internet

Automation Studio integrated Motion

Easy to use

ACOPOSmulti applies the concept of central data storage, which has been proven time and time again. All of the data required for the power transmission system, such as control parameters and firmware, is stored in the PLC's CPU. This makes it possible to easily handle function expansions in the application program or in the firmware by updating the software in the CPU. During startup, the system automatically detects and distributes the new versions to all of the axes. As a result, the exchange of a module is also similarly automated. This reduces the work required by the service personnel to simple tasks. These tasks can also be handled externally from a remote location by connecting the production machine to a network with external access rights.

Test and optimization of motion control in Automation Studio

Compatibility

100% software compatibility with the well-established ACOPOS drive generation

Investment security is an important factor at B&R. This is evident by the software compatibility of the ACOPOSmulti system with the ACOPOS drive generation already established on the market.

In this case, compatibility does not mean remaining stagnant. It means that the ACOPOSmulti drive generation inherited all of the functions from the ACOPOS generation and further advanced both generations.

The user can build upon this and implement the additional functions that can be used to improve performance and take advantage of intelligent maintenance.
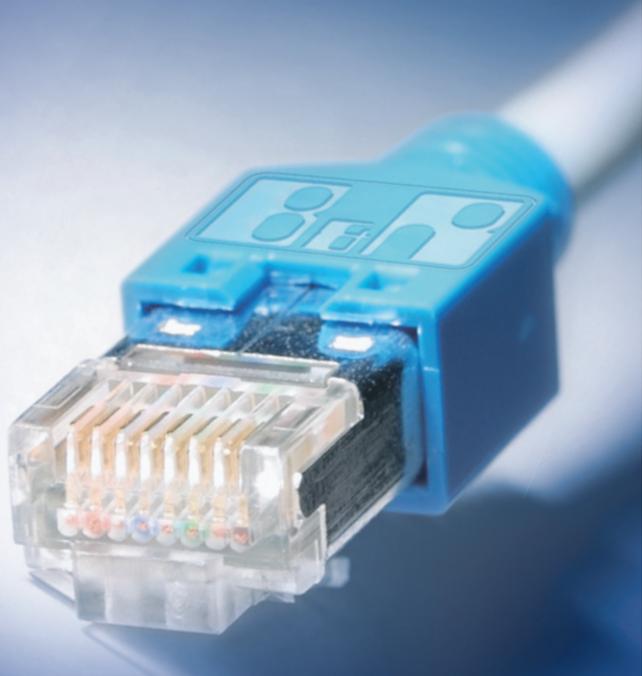
The new standard - ETHERNET Powerlink

ETHERNET Powerlink – The next fieldbus generation

Since first applied to serial production in 2001, ETHERNET Powerlink has been the only real-time Ethernet technology available on the market which is capable of precision down to the microsecond. The foundation of ETHERNET Powerlink rests on standards such as IEEE 802.3, CANopen device profiles, IP protocols and conventional Ethernet chips.

The protocol is characterized by the following features:

- Optimal transfer of time-critical and non time-critical data on the medium Ethernet
- Seamless integration in office and factory networks
- Continued use of standard network components (e.g. fiber optic converter)
- All network topologies: The network adapts itself to the machinery
- Open and free of dependencies on licenses or special ASICs
- Conformity with international standards
- Wide range of suppliers and users www.ethernet-powerlink.org
- Available today and well-established, with over 80,000 nodes in the field

In addition to its real-time capabilities, ETHERNET Powerlink makes it easy to use networks in industrial environments. This is a substantial reason for the success of this protocol. Right now, it's being used around the world in serial production in more than 80,000 nodes on machines and systems. In addition, current areas such as machine safety, availability, and engineering have allowed it to secure the path to the future.

ETHERNET POWERLINK STANDARDIZATION GROUP
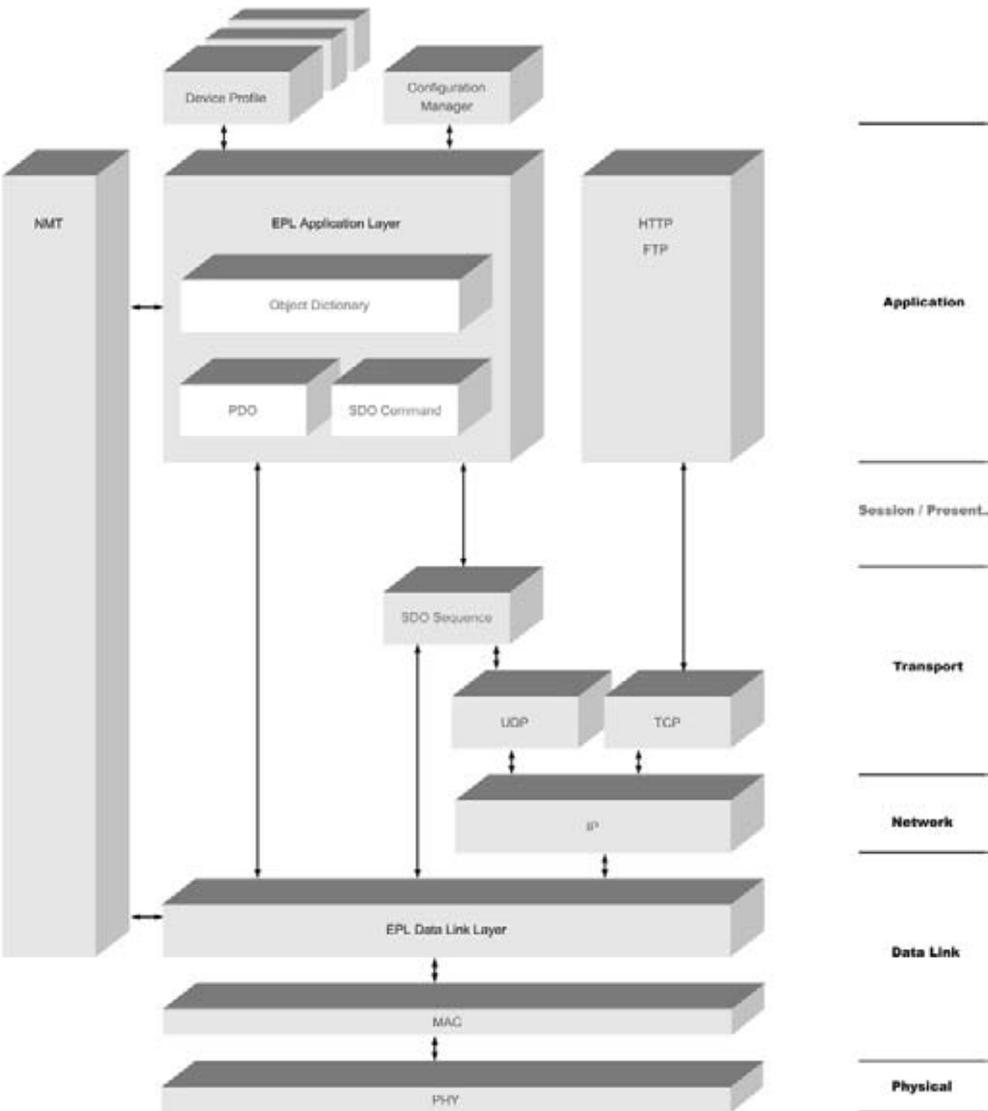
ETHERNET Powerlink layer model

Integrated safety

Safety as an integral system component

Nowadays, safety technology is a rigid technology separate from the flexible machine control. Next to the sleek automation of production machines designed with well-established field bus systems, the implementation of safety technology seems archaic by comparison. In many cases, the lack of flexibility makes it necessary to work restrictively with protective measures. This in turn hinders the productivity of a system due to time-consuming and complicated procedures.

EPLsafety sets a technical standard

There are a number of new approaches to secure field bus systems that are heavily influenced by proprietary standards and long response times. The ACOPOSmulti drive system is different. This system is based on ETHERNET Powerlink Safety.

The activation of functions such as safely limited speed is done directly over the network. Wiring these safety-related signals to the drive is now a thing of the past. The information is collected from its source via secure digital inputs and outputs, then distributed to the affected sensors and actuators, in this case the drive, via a secure central unit, the Safe Logic.

ETHERNET Powerlink provides the best possible communication connection between the Safe Logic and the non-secure controller.

Secure drive functions

Safety in the ACOPOSmulti drive system comprises the following function taken from Cat. 3, EN 954-1:

- Uncontrolled and controlled stops
- Secure stop and operation halt
- Secure limited step measurement and secure limited absolute position
- Secure limited speed
- Secure direction of rotation

The functions described above are offered as options with the understanding that they are not a part of all the drives in a production machine.

Basic functions like uncontrolled stop and secure stop or secure output for the motor holding brake (both according to Cat. 3, EN 954-1) are provided as standard. Therefore, the safety-related functions can be implemented in simple applications via conventional wiring.

Secure configuration and programming

All secure connections run in the Safe Logic. This is where the logical relationships between the individual secure devices are defined together. Function block based programming is also possible, in addition to pure configuration. The programmer is supported by a number of pre-defined safety function blocks.

Routing to the Safe Logic can be set up via the normal CPU and ETHER-NET Powerlink for programming.

Open standard

EPLsafety, like all ETHERNET Powerlink components, is an open standard. Various manufacturers from all fields of automation technology work together to specify the concepts and requirements. The balance of different demands means that useful solutions which are then certified and implemented can be found for all areas of use.

The result is EPLsafety; the first fully independent real-time Ethernet based safety bus, which meets the safety category IEC 61508 SIL 3 even with short cycle times of 100 μs.

EPSG Working Group Safety

ETHERNET Powerlink is supported by EPSG (ETHERNET Powerlink Standardization Group), an open association of leading end users, manufacturers and research institutes for automation technology. The group's goal is to provide an open standard for Industrial Ethernet with precise real-time behavior in the microsecond range.

ACOPOSmulti configuration

Configuration of an ACOPOSmulti drive system

An ACOPOSmulti drive system consists of a regeneration choke, line filter and three device groups - supply voltage modules, auxiliary voltage modules and inverter modules. Configuration significantly depends on the following factors: Cooling methods, medium and maximum total power of the drives and the peripheral supply (e.g. PLC, actuators, motor with brake, sensors) as well as the power and current of the individual drive units.

1 Cooling designs	**2** Axis modules	**3** Plug-in modules	**4** Optional and reserve slots	**5** Supply voltage range
Standard cooling (wall mounting)	Single-axis modules 8BVI0007HWS0.000-1 8BVI0014HWS0.000-1 8BVI0028HWS0.000-1 8BVI0055HWS0.000-1 8BVI0110HWS0.000-1 8BVI0220HWS0.000-1 8BVI0440HWS0.000-1 Double-axis modules 8BVI0007HWD0.000-1 8BVI0014HWD0.000-1 8BVI0028HWD0.000-1 8BVI0055HWD0.000-1 8BVI0110HWD0.000-1	8BAC0122.000-1 8BAC0120.000-1	Determine the number of optional and reserve slots	Determine the supply voltage range
Feed-through cooling (feed-through mounting)	Single-axis modules 8BVI0007HCS0.000-1 8BVI0014HCS0.000-1 8BVI0028HCS0.000-1 8BVI0055HCS0.000-1 8BVI0110HCS0.000-1 8BVI0220HCS0.000-1 8BVI0440HCS0.000-1 8BVI0880HCS0.000-1 8BVI1650HCS0.000-1 Double-axis modules 8BVI0007HCD0.000-1 8BVI0014HCD0.000-1 8BVI0028HCD0.000-1 8BVI0055HCD0.000-1 8BVI0110HCD0.000-1	8BAC0122.000-1 8BAC0120.000-1		
Oil / water cooling (cold plate mounting)				

	6 Power supply module with filter components	**7** 24 V auxiliary supply design	**8** Width units	**9** Mounting plate	**10** Backplane
	Inverter modules 8BVP0110HW00.000-1 8BVP0440HW00.000-1 **Line filter** 8BVF0110H000.000-1 8BVF0440H000.000-1 **Regeneration chokes** 8BVR0110H000.000-1 8BVR0440H000.000-1	**Internal 24 V** 8B0C0160HW00.000-1 8B0C0320HW00.000-1 **Internal and external 24 V** 8B0C0160HW00.001-1 8B0C0320HW00.002-1	Specify width units	8B0MnnnnHW00.000-1	8B0BnnnnHW00.000-1
	Inverter modules 8BVP0110HC00.000-1 8BVP0440HC00.000-1 8BVP0880HC00.000-1 8BVP1650HC00.000-1 **Line filter** 8BVF0110H000.000-1 8BVF0440H000.000-1 8BVF0880H000.000-1 8BVF1650H000.000-1 **Regeneration chokes** 8BVR0110H000.000-1 8BVR0440H000.000-1 8BVR0880H000.000-1 8BVR1650H000.000-1	**Internal 24 V** 8B0C0160HC00.000-1 8B0C0320HC00.000-1 **Internal and external 24 V** 8B0C0160HC00.001-1 8B0C0320HC00.002-1		8B0MnnnnHF00.000-1 8B0MnnnnHC00.000-1	8B0BnnnnHC00.000-1

Product overview

Line filters

Model number	Short description	Page
8BVF0110H000.000-1	ACOPOSmulti line filter 11A, 480V	50
8BVF0440H000.000-1	ACOPOSmulti line filter 44A, 480V	50
8BVF0440H000.001-1	ACOPOSmulti line filter 44A, 480V, increased peak current load capacity	50
8BVF0880H000.000-1	ACOPOSmulti line filter 88A, 480V	50
8BVF1650H000.000-1	ACOPOSmulti line filter 165A, 480V	50

Regeneration chokes

Model number	Short description	Page
8BVR0110H000.000-1	ACOPOSmulti regeneration choke 11A, 480V	51
8BVR0440H000.000-1	ACOPOSmulti regeneration choke 44A, 480V	51
8BVR0440H000.001-1	ACOPOSmulti regeneration choke 44A, 480V, increased peak current load capacity	51
8BVR0880H000.000-1	ACOPOSmulti regeneration choke 88A, 480V	51
8BVR1650H000.000-1	ACOPOSmulti regeneration choke 165A, 480V	51

Plug-in modules

Model number	Short description	Page
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat encoder interface EnDat 2.1	71
8BAC0120.001-1	ACOPOSmulti plug-in module, EnDat encoder interface EnDat 2.2	72
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface	73
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos encoder interface	74

Wall mounting

Mounting plates

Model number	Short description	Page
8B0MnnnnHW00.000-1	ACOPOSmulti mounting plate nnnn slots, 800V, wall mounting	52

Backplanes

Model number	Short description	Page
8B0BnnnnHW00.000-1	ACOPOSmulti backplane nnnn slots, 800V, wall mounting, 75mm² and 22mm², complete	53

Power supply modules

Model number	Short description	Page
8BVP0110HW00.000-1	ACOPOSmulti power supply module 11A, 800V, wall mounting	55
8BVP0440HW00.000-1	ACOPOSmulti power supply module 44A, 800V, wall mounting	55

Auxiliary supply modules

Model number	Short description	Page
8B0C0160HW00.000-1	ACOPOSmulti auxiliary supply module 16A, 800V, wall mounting	58
8B0C0320HW00.000-1	ACOPOSmulti auxiliary supply module 32A, 800V, wall mounting	58
8B0C0160HW00.001-1	ACOPOSmulti auxiliary supply module 16A, 800V, wall mounting, 24VOut 1x16A 1x5A	58
8B0C0320HW00.002-1	ACOPOSmulti auxiliary supply module 32A, 800V, wall mounting, 24VOut 1x32A 1x5A	58

Inverter modules

Single-axis modules

Model number	Short description	Page
8BVI0014HWS0.000-1	ACOPOSmulti inverter module 1.4A, 800V, wall mounting	63
8BVI0028HWS0.000-1	ACOPOSmulti inverter module 2.8A, 800V, wall mounting	63
8BVI0055HWS0.000-1	ACOPOSmulti inverter module 5.5A, 800V, wall mounting	63
8BVI0110HWS0.000-1	ACOPOSmulti inverter module 11A, 800V, wall mounting	63
8BVI0220HWS0.000-1	ACOPOSmulti inverter module 22A, 800V, wall mounting	63
8BVI0440HWS0.000-1	ACOPOSmulti inverter module 44A, 800V, wall mounting	63

Double-axis modules

Model number	Short description	Page
8BVI0014HWD0.000-1	ACOPOSmulti inverter module 1.4A, 800V, wall mounting, 2 axes	67
8BVI0028HWD0.000-1	ACOPOSmulti inverter module 2.8A, 800V, wall mounting, 2 axes	67
8BVI0055HWD0.000-1	ACOPOSmulti inverter module 5.5A, 800V, wall mounting, 2 axes	67
8BVI0110HWD0.000-1	ACOPOSmulti inverter module 11A, 800V, wall mounting, 2 axes	67

Product overview

Cold plate / Feed-through mounting

Mounting plates

Model number	Short description	Page
8B0MnnnnHC00.000-1	ACOPOSmulti mounting plate nnnn slots, 800V, cold plate mounting	52
8B0MnnnnHF00.000-1	ACOPOSmulti mounting plate nnnn slots, 800V, feed-through mounting	52

Backplanes

Model number	Short description	Page
8B0BnnnnHC00.000-1	ACOPOSmulti backplane, nnnn slots, 800V, cold plate mounting, 75mm² and 22mm², complete	54

Power supply modules

Model number	Short description	Page
8BVP0110HC00.000-1	ACOPOSmulti power supply module 11A, 800V, cold plate mounting	56
8BVP0440HC00.000-1	ACOPOSmulti power supply module 44A, 800V, cold plate mounting	56
8BVP0880HC00.000-1	ACOPOSmulti power supply module 88A, 800V, cold plate mounting	56
8BVP1650HC00.000-1	ACOPOSmulti power supply module 165A, 800V, cold plate mounting	56

Auxiliary supply modules

Model number	Short description	Page
8B0C0160HC00.000-1	ACOPOSmulti auxiliary supply module 16A, 800V, cold plate mounting	60
8B0C0320HC00.000-1	ACOPOSmulti auxiliary supply module 32A, 800V, cold plate mounting	60
8B0C0160HC00.001-1	ACOPOSmulti auxiliary supply module 16A, 800V, cold plate mounting, 24VOut 1x16A 1x5A	60
8B0C0320HC00.002-1	ACOPOSmulti auxiliary supply module 32A, 800V, cold plate mounting, 24VOut 1x32A 1x5A	60

Inverter modules

Single-axis modules

Model number	Short description	Page
8BVI0014HCS0.000-1	ACOPOSmulti inverter module 1.4A, 800V, cold plate mounting	65
8BVI0028HCS0.000-1	ACOPOSmulti inverter module 2.8A, 800V, cold plate mounting	65
8BVI0055HCS0.000-1	ACOPOSmulti inverter module 5.5A, 800V, cold plate mounting	65
8BVI0110HCS0.000-1	ACOPOSmulti inverter module 11A, 800V, cold plate mounting	65
8BVI0220HCS0.000-1	ACOPOSmulti inverter module 22A, 800V, cold plate mounting	65
8BVI0440HCS0.000-1	ACOPOSmulti inverter module 44A, 800V, cold plate mounting	65
8BVI0880HCS0.000-1	ACOPOSmulti inverter module 88A, 800V, cold plate mounting	65
8BVI1650HCS0.000-1	ACOPOSmulti inverter module 165A, 800V, cold plate mounting	65

Double-axis modules

Model number	Short description	Page
8BVI0014HCD0.000-1	ACOPOSmulti inverter module 1.4A, 800V, cold plate mounting, 2 axes	69
8BVI0028HCD0.000-1	ACOPOSmulti inverter module 2.8A, 800V, cold plate mounting, 2 axes	69
8BVI0055HCD0.000-1	ACOPOSmulti inverter module 5.5A, 800V, cold plate mounting, 2 axes	69
8BVI0110HCD0.000-1	ACOPOSmulti inverter module 11A, 800V, cold plate mounting, 2 axes	69

Line filters

Line filters
- Wider power input voltage range
- Optimally aligned to ACOPOSmulti power supply modules
- Adherence to the limits according to CISPR11, Group 2, Class A

General information	8BVF0110H000.000-1	8BVF0440H000.000-1	8BVF0440H000.001-1	8BVF0880H000.000-1	8BVF1650H000.001-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting	Wall mounting	Wall mounting	Wall mounting
Power mains connection	**8BVF0110H000.000-1**	**8BVF0440H000.000-1**	**8BVF0440H000.001-1**	**8BVF0880H000.000-1**	**8BVF1650H000.001-1**
Mains input voltage	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%
Frequency	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %
Allocation to the power supply module	10 kW	25 kW	60 kW	60 kW	120 kW
Continuous current	15 A_{eff}	37 A_{eff}	37 A_{eff}	89 A_{eff}	177 A_{eff}
Line filter according to EN 61800-3-A11 second environment (limits from CISPR11, group 2, class A)	Yes	Yes	Yes	Yes	Yes

Regeneration chokes   51

Regeneration chokes
- Connection for temperature sensor
- Shield connection on the device
- Optimally aligned to ACOPOSmulti power supply modules

General information	8BVR0110H000.000-1	8BVR0440H000.000-1	8BVR0440H000.001-1	8BVR0880H000.000-1	8BVR1650H000.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting	Wall mounting	Wall mounting	Wall mounting
Mains or device connection	8BVR0110H000.000-1	8BVR0440H000.000-1	8BVR0440H000.001-1	8BVR0880H000.000-1	8BVR1650H000.000-1
Mains input voltage	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%
Frequency	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %
Allocation to the power supply module	10 kW	25 kW	60 kW	60 kW	120 kW
Continuous current	15 A_{eff}	44 A_{eff}	44 A_{eff}	90 A_{eff}	177 A_{eff}

Mounting plates

Mounting plates

- Modular cooling design
- Sophisticated mounting technology
- Feed-through mounting with IP65 protection

Wall mounting

General information	8B0MnnnnHW00.000-1
C-UL-US listed	In preparation
Cooling and mounting methods	Wall mounting
Module width[1]	nnnn

Feed-through mounting

General information	8B0MnnnnHF00.000-1
C-UL-US listed	In preparation
Cooling and mounting methods	Feed-through mounting
Module width[1]	nnnn

Cold plate mounting

General information	8B0MnnnnHC00.000-1
C-UL-US listed	In preparation
Cooling and mounting methods	Cold plate mounting
Module width[1]	nnnn

[1] The desired number of slots must be specified in the order key by nnnn (0160 equals 16 slots).

Backplanes

Backplanes
- Groundbreaking power distribution system
- Integrated distribution of the power and auxiliary supply voltage
- Touch-proof
- Optional slots possible

Wall mounting

General information	8B0BnnnnHW00.000-1
C-UL-US listed	In preparation
Cooling and mounting methods	Wall mounting
Module width[1]	nnnn
DC bus	**8B0BnnnnHW00.000-1**
Voltage	800 VDC
Max.	900 VDC
Continuous power	200 kW
Reduction of continuous power depending on environmental temperature > 40 °C	In preparation
Cross section	
DC+, DC-	75 mm²
PE	75 mm²
24 VDC auxiliary supply	**8B0BnnnnHW00.000-1**
Voltage	25 VDC ±1.6%
Continuous power	1500 W
Reduction of continuous power depending on environmental temperature > 40 °C	In preparation
Cross section	
24 VDC, COM	22 mm²
Mechanical characteristics	**8B0BnnnnHW00.000-1**
Dimensions	
Width	nnnn / 10 x 53.5 mm
Height	In preparation
Depth	In preparation

[1] The desired number of slots must be specified in the order key by nnnn (0160 equals 16 slots). For wall mounting, the backplanes are made up of units with a width of 3 and 4 slots. This is why backplanes are now only available with 3 or more slots. A slot cover is required for 5 slots.
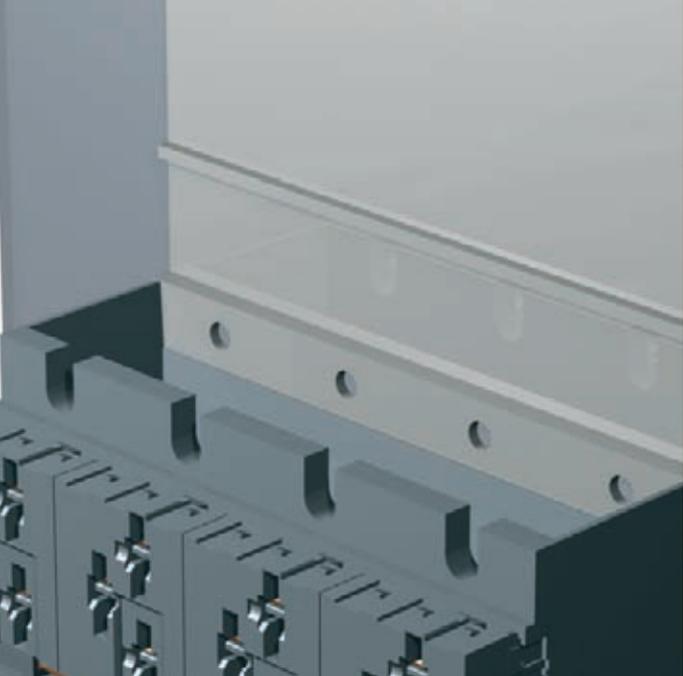
Backplanes

Cold plate / Feed-through mounting

General information	8B0BnnnnHC00.000-1
C-UL-US listed	In preparation
Cooling and mounting methods	Cold plate / Feed-through mounting
Module width[1]	nnnn
DC bus	**8B0BnnnnHC00.000-1**
Voltage	800 VDC
Max.	900 VDC
Continuous power[1]	200 kW
Cross section	
DC+, DC-	75 mm²
PE	75 mm²
24 VDC auxiliary supply	**8B0BnnnnHC00.000-1**
Voltage	25 VDC ±1.6%
Continuous power	1500 W
Reduction of continuous power depending on environmental temperature > 40 ℃	In preparation
Cross section	
24 VDC, COM	22 mm²
Mechanical characteristics	**8B0BnnnnHC00.000-1**
Dimensions	
Width	nnnn / 10 x 53.5 mm
Height	In preparation
Depth	In preparation

1 The desired number of slots must be specified in the order key by nnnn (0160 equals 16 slots). For cold plate and feed-through mounting, the backplane is made up of units with a width of 1 slot.

Power supply modules

Power supply modules
- Wide input voltage range
- Capable of regeneration
- Integrated connection for temperature sensors
- 2 slots for master axis encoder

Wall mounting

General information	8BVP0110HW00.000-1	8BVP0440HW00.000-1
C-UL-US listed	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting
Module width	1	2
Power mains connection	**8BVP0110HW00.000-1**	**8BVP0440HW00.000-1**
Mains input voltage[1]	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%
Frequency	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %
Installed load	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation
Starting current at 400 VAC	In preparation	In preparation
Switch-on interval	> 10 sec	> 10 sec
Max. chargeable DC bus voltage	2 mF	4 mF
Integrated line filter according to EN 61800-3-A11 second environment (limits from CISPR11, group 2, class A)	No	No
Integrated regeneration choke	No	No
Capable of regeneration	Yes	Yes
PFC	Yes	Yes
Design		
L1, L2, L3, PE	Connectors	Connectors
Shield connection	Yes	Yes

[1] When operating with 3 x 200 VAC to 3 x 400 VAC, the continuous power is derated (250 W per volt).
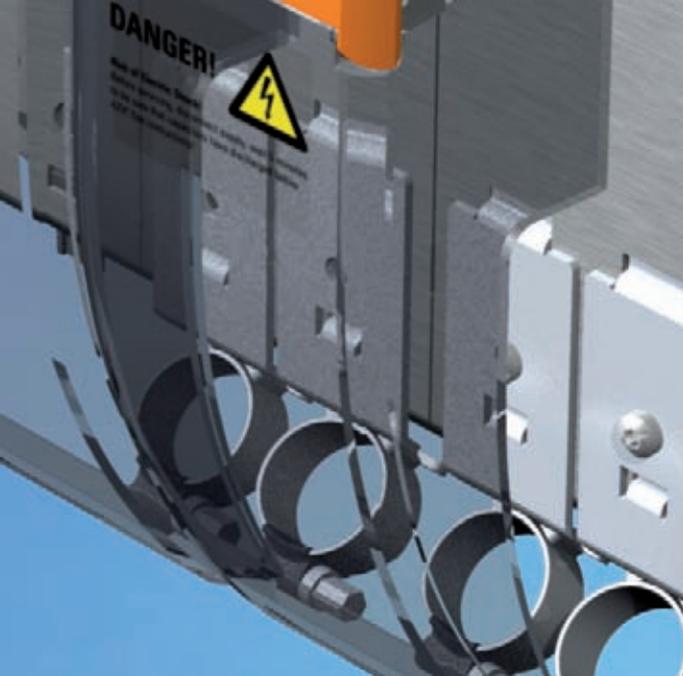
Power supply modules

DC bus connection	8BVP0110HW00.000-1	8BVP0440HW00.000-1
Voltage	800 VDC	800 VDC
Max.	900 VDC	900 VDC
Continuous power (supply and regeneration)	10 kW	25 kW
Peak power (supply and regeneration)	25 kW	50 kW
DC bus capacitance	330 μF	In preparation
Protective measures		
Overload protection	Yes	Yes
Short circuit and ground fault	No	No
Design	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	8BVP0110HW00.000-1	8BVP0440HW00.000-1
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane
Mechanical characteristics	8BVP0110HW00.000-1	8BVP0440HW00.000-1
Dimensions		
Width	53 mm	106.5 mm
Height	317 mm	317 mm
Depth	263 mm	263 mm

Cold plate / Feed-through mounting

General information	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting
Module width	1	2	4	6
Power mains connection	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
Mains input voltage[1]	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%	3x220 to 3x480VAC ±10%
Frequency	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %	50 / 60 Hz ± 4 %
Installed load	In preparation	In preparation	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation
Starting current at 400 VAC	In preparation	In preparation	In preparation	In preparation
Switch-on interval	> 10 sec	> 10 sec	> 10 sec	> 10 sec
Max. chargeable DC bus voltage	2 mF	4 mF	8 mF	16 mF
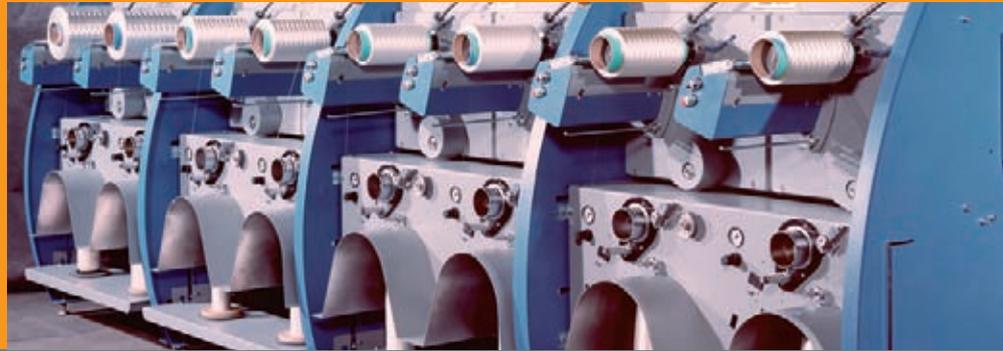
Power mains connection	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
Integrated line filter according to EN 61800-3-A11 second environment (limits from CISPR11, group 2, class A)	No	No	No	No
Integrated regeneration choke	No	No	No	No
Capable of regeneration	Yes	Yes	Yes	Yes
PFC	Yes	Yes	Yes	Yes
Design				
L1, L2, L3, PE	Connectors	Connectors	Threaded M8 bolt	Threaded M8 bolt
Shield connection	Yes	Yes	Yes	Yes
DC bus connection	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
Voltage	800 VDC	800 VDC	800 VDC	800 VDC
Max.	900 VDC	900 VDC	900 VDC	900 VDC
Continuous power (supply and regeneration)	10 kW	25 kW	60 kW	120 kW
Reduction of continuous power depending on environmental temperature > 40 °C	In preparation	In preparation	In preparation	In preparation
Peak power (supply and regeneration)	25 kW	50 kW	108 kW	216 kW
DC bus capacitance	330 μF	In preparation	1650 μF	In preparation
Protective measures				
Overload protection	Yes	Yes	Yes	Yes
Short circuit and ground fault	No	No	No	No
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
Mechanical characteristics	8BVP0110HC00.000-1	8BVP0440HC00.000-1	8BVP0880HC00.000-1	8BVP1650HC00.000-1
Dimensions				
Width	53 mm	106.5 mm	213.5 mm	320.5 mm
Height	317 mm	317 mm	317 mm	317 mm
Depth (cold plate mounting)	212 mm	212 mm	212 mm	212 mm
Depth (feed-through mounting)	209 mm	209 mm	209 mm	209 mm

[1] When operating with 3 x 200 VAC to 3 x 400 VAC, the continuous power is derated (250 W per volt).
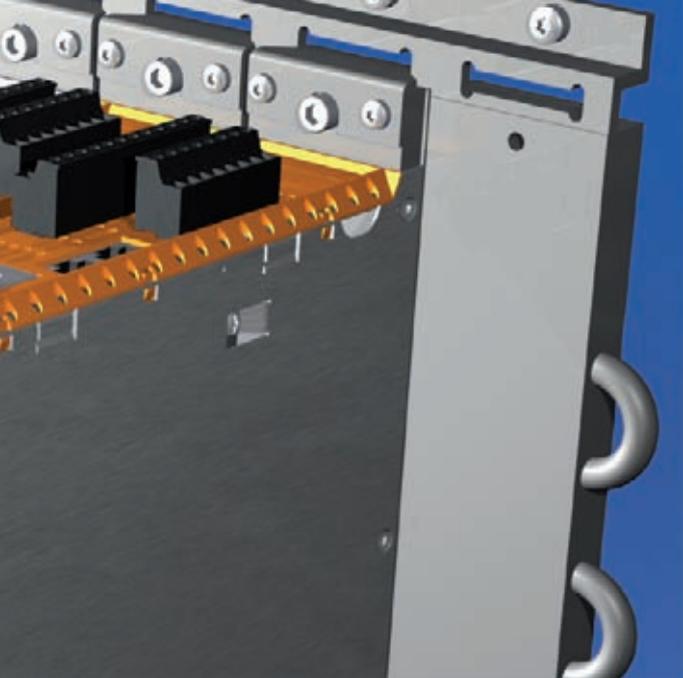
Auxiliary supply modules

Auxiliary supply modules
- For supplying external 24V devices
- Extensive protective measures

Wall mounting

General information	8B0C0160HW00.000-1	8B0C0160HW00.001-1	8B0C0320HW00.000-1	8B0C0320HW00.002-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting	Wall mounting	Wall mounting
Module width	1	1	1	1
DC bus connection	**8B0C0160HW00.000-1**	**8B0C0160HW00.001-1**	**8B0C0320HW00.000-1**	**8B0C0320HW00.002-1**
Voltage	800 VDC	800 VDC	800 VDC	800 VDC
Operating range in continuous operation	350 - 900 VDC	350 - 900 VDC	350 - 900 VDC	350 - 900 VDC
Full continuous power	750 - 850 VDC	750 - 850 VDC	750 - 850 VDC	750 - 850 VDC
Destruction protection	0 - 1000 VDC	0 - 1000 VDC	0 - 1000 VDC	0 - 1000 VDC
Continuous power consumption	Max. 470 W	Max. 470 W	Max. 940 W	Max. 940 W
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC output	**8B0C0160HW00.000-1**	**8B0C0160HW00.001-1**	**8B0C0320HW00.000-1**	**8B0C0320HW00.002-1**
Continuous power	400 W	400 W	800 W	800 W
Output voltage	25 VDC	25 VDC	25 VDC	25 VDC
Continuous current	0 - 16 ADC	0 - 16 ADC	0 - 32 ADC	0 - 32 ADC
Reduction of continuous power depending on environmental temperature > 40 °C	No	No	No	No
Startup delay	Max. 1 sec.	Max. 1 sec.	Max. 1 sec.	Max. 1 sec.
Startup time	Approx. 5 – 20 ms	Approx. 5 – 20 ms	Approx. 5 – 20 ms	Approx. 5 – 20 ms
Residual ripple	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$

24 VDC internal	8B0C0160HW00.000-1	8B0C0160HW00.001-1	8B0C0320HW00.000-1	8B0C0320HW00.002-1
Output voltage[1]	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Peak current (< 4 s) over the total operating range of the DC bus voltage.	21 ADC	21 ADC	42 ADC	42 ADC
Protective measures				
Open circuit protection	Yes	Yes	Yes	Yes
Overload protection	Yes	Yes	Yes	Yes
Short circuit protection	Yes	Yes	Yes	Yes
Feedback protection	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)
Over-temperature protection	Yes	Yes	Yes	Yes
Dielectric strength to ground	±50 VDC	±50 VDC	±50 VDC	±50 VDC
Output / input isolation	SELV / PELV requirements	SELV / PELV requirements	SELV / PELV requirements	SELV / PELV requirements
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC out	8B0C0160HW00.000-1	8B0C0160HW00.001-1	8B0C0320HW00.000-1	8B0C0320HW00.002-1
Output voltage[1]	---	24 VDC ±6%	---	24 VDC ±6%
Peak current (< 4 s) over the total operating range of the DC bus voltage.	---	No	---	No
Protection of 24 VDC Out 1 output	---	16 A (slow-blow) electronic, automatic reset	---	32 A (slow-blow) electronic, automatic reset
Protection of 24 VDC Out 2 output	---	5 A (slow-blow) electronic, automatic reset	---	5 A (slow-blow) electronic, automatic reset
Protective measures				
Open circuit protection	---	Yes	---	Yes
Overload protection	---	Yes	---	Yes
Short circuit protection	---	Yes	---	Yes
Feedback protection	---	Max. 35 VDC (also when turned off)	---	Max. 35 VDC (also when turned off)
Over-temperature protection	---	Yes	---	Yes
Dielectric strength to ground	---	±50 VDC	---	±50 VDC
Output / input isolation	---	SELV / PELV requirements	---	SELV / PELV requirements

[1] With a DC bus voltage > 350 VDC and an output current > 100 mA.

Auxiliary supply modules

Mechanical characteristics	8B0C0160HW00.000-1	8B0C0160HW00.001-1	8B0C0320HW00.000-1	8B0C0320HW00.002-1
Dimensions				
Width	53 mm	53 mm	53 mm	53 mm
Height	317 mm	317 mm	317 mm	317 mm
Depth	263 mm	263 mm	263 mm	263 mm

Cold plate / Feed-through mounting

General information	8B0C0160HC00.000-1	8B0C0160HC00.001-1	8B0C0320HC00.000-1	8B0C0320HC00.002-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting
Module width	1	1	1	1
DC bus	**8B0C0160HC00.000-1**	**8B0C0160HC00.001-1**	**8B0C0320HC00.000-1**	**8B0C0320HC00.002-1**
Voltage	800 VDC	800 VDC	800 VDC	800 VDC
Operating range in continuous operation	350 - 900 VDC	350 - 900 VDC	350 - 900 VDC	350 - 900 VDC
Full continuous power	750 - 850 VDC	750 - 850 VDC	750 - 850 VDC	750 - 850 VDC
Destruction protection	0 - 1000 VDC	0 - 1000 VDC	0 - 1000 VDC	0 - 1000 VDC
Continuous power consumption	Max. 470 W	Max. 470 W	Max. 940 W	Max. 940 W
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC output	**8B0C0160HC00.000-1**	**8B0C0160HC00.001-1**	**8B0C0320HC00.000-1**	**8B0C0320HC00.002-1**
Continuous power	400 W	400 W	800 W	800 W
Output voltage	25 VDC	25 VDC	25 VDC	25 VDC
Continuous current	0 - 16 ADC	0 - 16 ADC	0 - 32 ADC	0 - 32 ADC
Reduction of continuous power depending on environmental temperature > 40 ℃	No	No	No	No
Startup delay	Max. 1 sec.	Max. 1 sec.	Max. 1 sec.	Max. 1 sec.
Startup time	Approx. 5 – 20 ms	Approx. 5 – 20 ms	Approx. 5 – 20 ms	Approx. 5 – 20 ms
Residual ripple	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$	Typ. 50 mV$_{pp}$

24 VDC internal	8B0C0160HC00.000-1	8B0C0160HC00.001-1	8B0C0320HC00.000-1	8B0C0320HC00.002-1
Output voltage[1]	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Peak current (< 4 s) over the total operating range of the DC bus voltage.	21 ADC	21 ADC	42 ADC	42 ADC
Protective measures				
Open circuit protection	Yes	Yes	Yes	Yes
Overload protection	Yes	Yes	Yes	Yes
Short circuit protection	Yes	Yes	Yes	Yes
Feedback protection	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)	Max. 26 VDC (also when turned off)
Over-temperature protection	Yes	Yes	Yes	Yes
Dielectric strength to ground	±50 VDC	±50 VDC	±50 VDC	±50 VDC
Output / input isolation	SELV / PELV requirements	SELV / PELV requirements	SELV / PELV requirements	SELV / PELV requirements
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC out	8B0C0160HC00.000-1	8B0C0160HC00.001-1	8B0C0320HC00.000-1	8B0C0320HC00.002-1
Output voltage[1]	---	24 VDC ±6%	---	24 VDC ±6%
Peak current (< 4 s) over the total operating range of the DC bus voltage.	---	No	---	No
Protection of 24 VDC Out 1 output	---	16 A (slow-blow) electronic, automatic reset	---	32 A (slow-blow) electronic, automatic reset
Protection of 24 VDC Out 2 output	---	5 A (slow-blow) electronic, automatic reset	---	5 A (slow-blow) electronic, automatic reset
Protective measures				
Open circuit protection	---	Yes	---	Yes
Overload protection	---	Yes	---	Yes
Short circuit protection	---	Yes	---	Yes
Feedback protection	---	Max. 35 VDC (also when turned off)	---	Max. 35 VDC (also when turned off)
Over-temperature protection	---	Yes	---	Yes
Dielectric strength to ground	---	±50 VDC	---	±50 VDC
Output / input isolation	---	SELV / PELV requirements	---	SELV / PELV requirements
Design				
24 VDC, COM	---	Connectors	---	Connectors

[1] With a DC bus voltage > 350 VDC and an output current > 100 mA.

Auxiliary supply modules

Mechanical characteristics	8B0C0160HC00.000-1	8B0C0160HC00.001-1	8B0C0320HC00.000-1	8B0C0320HC00.002-1
Dimensions				
Width	53 mm	53 mm	53 mm	53 mm
Height	317 mm	317 mm	317 mm	317 mm
Depth (cold plate mounting)	212 mm	212 mm	212 mm	212 mm
Depth (feed-through mounting)	209 mm	209 mm	209 mm	209 mm

Inverter modules

Inverter modules

- Available in single or double axis model
- Integrated uncontrolled stops and secure halt[1]
- Integrated connection for motor holding break and temperature sensor
- 2 slots for motor encoder

[1] TÜV inspection in preparation.

Single-axis modules

Wall mounting

General information	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting	Wall mounting	Wall mounting	Wall mounting	Wall mounting
Module width	1	1	1	1	2	2
DC bus	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Voltage Max.	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC
Continuous power consumption	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	165 μF	165 μF	165 μF	330 μF	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
Motor connector	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Continuous power	1kW	2kW	4kW	8kW	16kW	32kW
Continuous current	1.4 Aeff	2.8 Aeff	5.5 Aeff	11.0 Aeff	22.0 Aeff	43.9 Aeff
Maximum current	3.4 Aeff	6.9 Aeff	13.7 Aeff	27.5 Aeff	54.9 Aeff	87.9 Aeff
Rated switching frequency	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz
Possible switching frequencies	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz

Inverter modules

Motor connector	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Protective measures						
Overload protection	Yes	Yes	Yes	Yes	Yes	Yes
Short circuit and ground fault	Yes	Yes	Yes	Yes	Yes	Yes
Design						
U, V, W, PE	Connectors	Connectors	Connectors	Connectors	Connectors	Connectors
Shield connection	Yes	Yes	Yes	Yes	Yes	Yes
Maximum motor line length	75 m	75 m	75 m	75 m	75 m	75 m
Motor holding brake connection	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Output voltage	24V +5.8%/+0,2%	24V +5.8%/+0.2%	24V +5.8%/+0.2%	24V +5.8%/-0.1%	24V +5.8%/-0.1%	24V +5.8%/-0.1%
Continuous current	1.1 A	1.1 A	1.1 A	2.1 A	4.2 A	4.2 A
Maximum switching frequency	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Protective measures						
Overload and short circuit protection	Yes	Yes	Yes	Yes	Yes	Yes
Cable breakage monitoring	Yes	Yes	Yes	Yes	Yes	Yes
Undervoltage monitoring	Yes	Yes	Yes	Yes	Yes	Yes
Mechanical characteristics	8BVI0014HWS0.000-1	8BVI0028HWS0.000-1	8BVI0055HWS0.000-1	8BVI0110HWS0.000-1	8BVI0220HWS0.000-1	8BVI0440HWS0.000-1
Dimensions						
Width	53 mm	53 mm	53 mm	53 mm	106.5 mm	106.5 mm
Height	317 mm	317 mm	317 mm	317 mm	317 mm	317 mm
Depth	263 mm	263 mm	263 mm	263 mm	263 mm	263 mm

Cold plate / Feed-through mounting

General information	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting
Module width	1	1	1	1	2	2	4	6
DC bus	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Voltage Max.	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC
Continuous power consumption	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	165 μF	165 μF	165 μF	330 μF	In preparation	In preparation	1980 μF	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
Motor connector	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Continuous power	1 kW	2 kW	4 kW	8 kW	16 kW	32 kW	64 kW	132 kW
Continuous current	1.4 A_{eff}	2.8 A_{eff}	5.5 A_{eff}	11.0 A_{eff}	22.0 A_{eff}	43.9 A_{eff}	87.9 A_{eff}	164.6 A_{eff}
Maximum current	3.4 A_{eff}	6.9 A_{eff}	13.7 A_{eff}	27.5 A_{eff}	54.9 A_{eff}	87.9 A_{eff}	158.2 A_{eff}	296.2 A_{eff}
Rated switching frequency	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz	5 kHz
Possible switching frequencies	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz

Inverter modules

Motor connector	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Protective measures								
Overload protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Short circuit and ground fault	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Design								
U, V, W, PE	Connectors	Connectors	Connectors	Connectors	Connectors	Connectors	Threaded M8 bolt	Threaded M8 bolt
Shield connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maximum motor line length	75 m	75 m	75 m	75 m	75 m	75 m	75 m	75 m
Motor holding brake connection	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Output voltage	24V +5.8%/+0.2%	24V +5.8%/+0.2%	24V +5.8%/+0.2%	24V +5.8%/+0.1%	24V +5.8%/+0.1%	24V +5.8%/+0.1%	24V +5.8%/+0.1%	24V +5.8%/+0.1%
Continuous current	1.1 A	1.1 A	1.1 A	2.1 A	4.2 A	4.2 A	4.2 A	4.2 A
Maximum switching frequency	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Protective measures								
Overload and short circuit protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable breakage monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Undervoltage monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mechanical characteristics	8BVI0014H CS0.000-1	8BVI0028H CS0.000-1	8BVI0055H CS0.000-1	8BVI0110H CS0.000-1	8BVI0220H CS0.000-1	8BVI0440H CS0.000-1	8BVI0880H CS0.000-1	8BVI1650H CS0.000-1
Dimensions								
Width	53 mm	53 mm	53 mm	53 mm	106.5 mm	106.5 mm	213.5 mm	320.5 mm
Height	317 mm	317 mm	317 mm	317 mm	317 mm	317 mm	317 mm	317 mm
Depth (cold plate mounting)	212 mm	212 mm	212 mm	212 mm	212 mm	212 mm	212 mm	212 mm
Depth (feed-through mounting)	209 mm	209 mm	209 mm	209 mm	209 mm	209 mm	209 mm	209 mm

Double-axis modules

Wall mounting

General information	8BVI0014HWD0.000-1	8BVI0028HWD0.000-1	8BVI0055HWD0.000-1	8BVI0110HWD0.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Wall mounting	Wall mounting	Wall mounting	Wall mounting
Module width	1	1	1	2
DC bus connection	**8BVI0014HWD0.000-1**	**8BVI0028HWD0.000-1**	**8BVI0055HWD0.000-1**	**8BVI0110HWD0.000-1**
Voltage Max.	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC
Continuous power consumption	In preparation	In preparation	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	165 μF	165 μF	330 μF	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	**8BVI0014HWD0.000-1**	**8BVI0028HWD0.000-1**	**8BVI0055HWD0.000-1**	**8BVI0110HWD0.000-1**
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
Motor connector	**8BVI0014HWD0.000-1**	**8BVI0028HWD0.000-1**	**8BVI0055HWD0.000-1**	**8BVI0110HWD0.000-1**
Continuous power	1 kW	2 kW	4 kW	8 kW
Continuous current	1.4 A_{eff}	2.8 A_{eff}	5.5 A_{eff}	11.0 A_{eff}
Maximum current	3.4 A_{eff}	6.9 A_{eff}	13.7 A_{eff}	27.5 A_{eff}
Rated switching frequency	5 kHz	5 kHz	5 kHz	5 kHz
Possible switching frequencies	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz
Protective measures				
Overload protection	Yes	Yes	Yes	Yes
Short circuit and ground fault	Yes	Yes	Yes	Yes
Design				
U, V, W, PE	Connectors	Connectors	Connectors	Connectors
Shield connection	Yes	Yes	Yes	Yes
Maximum motor line length	75 m	75 m	75 m	75 m

Inverter modules

Motor holding brake connection	8BVI0014HWD0.000-1	8BVI0028HWD0.000-1	8BVI0055HWD0.000-1	8BVI0110HWD0.000-1
Output voltage	24V +5.8%/+0.2%	24V +5.8%/+0.2%	24V +5.8%/+0.2%	4V +5.8%/+0.1%
Continuous current	1.1 A	1.1 A	1.1 A	2.1 A
Maximum switching frequency	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Protective measures				
Overload and short circuit protection	Yes	Yes	Yes	Yes
Cable breakage monitoring	Yes	Yes	Yes	Yes
Undervoltage monitoring	Yes	Yes	Yes	Yes
Mechanical characteristics	8BVI0014HWD0.000-1	8BVI0028HWD0.000-1	8BVI0055HWD0.000-1	8BVI0110HWD0.000-1
Dimensions				
Width	53 mm	53 mm	53 mm	106.5 mm
Height	317 mm	317 mm	317 mm	317 mm
Depth	263 mm	263 mm	263 mm	263 mm

Cold plate / Feed-through mounting

General information	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
C-UL-US listed	In preparation	In preparation	In preparation	In preparation
Cooling and mounting methods	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting	Cold plate or feed-through mounting
Module width	1	1	1	2
DC bus	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
Voltage Max.	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC	800 VDC 900 VDC
Continuous power consumption	In preparation	In preparation	In preparation	In preparation
Power loss at max. device power	In preparation	In preparation	In preparation	In preparation
DC bus capacitance	165 μF	165 μF	330 μF	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
24 VDC supply	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
Input voltage	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%	25 VDC ±1.6%
Power consumption	In preparation	In preparation	In preparation	In preparation
Design	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane	ACOPOSmulti backplane
Motor connector	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
Continuous power	1 kW	2 kW	4 kW	8 kW
Continuous current	1.4 Aeff	2.8 Aeff	5.5 Aeff	11.0 Aeff
Maximum current	3.4 Aeff	6.9 Aeff	13.7 Aeff	27.5 Aeff
Rated switching frequency	5 kHz	5 kHz	5 kHz	5 kHz
Possible switching frequencies	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz	5/10/20 kHz
Protective measures				
Overload protection	Yes	Yes	Yes	Yes
Short circuit and ground fault	Yes	Yes	Yes	Yes
Design				
U, V, W, PE	Connectors	Connectors	Connectors	Connectors
Shield connection	Yes	Yes	Yes	Yes
Maximum motor line length	75 m	75 m	75 m	75 m

Inverter modules

Motor holding brake connection	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
Output voltage	24V +5.8%/+0.2%	24V +5.8%/+0.2%	24V +5.8%/+0.2%	4V +5.8%/+0.1%
Continuous current	1.1 A	1.1 A	1.1 A	2.1 A
Maximum switching frequency	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Protective measures				
Overload and short circuit protection	Yes	Yes	Yes	Yes
Cable breakage monitoring	Yes	Yes	Yes	Yes
Undervoltage monitoring	Yes	Yes	Yes	Yes
Mechanical characteristics	8BVI0014HCD0.000-1	8BVI0028HCD0.000-1	8BVI0055HCD0.000-1	8BVI0110HCD0.000-1
Dimensions				
Width	53 mm	53 mm	53 mm	106.5 mm
Height	317 mm	317 mm	317 mm	317 mm
Depth (cold plate mounting)	212 mm	212 mm	212 mm	212 mm
Depth (feed-through mounting)	209 mm	209 mm	209 mm	209 mm

Plug-in modules

EnDat encoder interface EnDat 2.1
- Encoder monitoring
- EnDat 2.1 protocol
- High precision analog signal processing
- Embedded parameter chip with B&R motors

General information	8BAC0120.000-1
C-UL-US listed	In preparation
Module type	ACOPOSmulti plug-in module
Encoder input	**8BAC0120.000-1**
Connection, module-side	15-pin DSUB socket
Indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOS	No
Encoder monitoring	Yes
Encoder supply	
Output voltage	Type 5 V
Load capacity	200 mA
Sense lines	2, compensation of max. 2 x 0.7 V
Sine-cosine inputs	
Signal transfer	Differential signals, symmetric
Differential voltage	0.5 ... 1.25 V_{ss}
Common mode voltage	Max. ± 7 V
Terminating resistance	120 Ω
Signal frequency	DC ... 400 kHz
Resolution [1]	16384 * number of encoder lines
Precision	Limited by the encoder
Serial interface	Synchronous
Protocol	EnDat 2.1
Signal transfer	RS485
Baud rate	625 kBaud

[1]Noise on the encoder signal reduces the resolution that can be used by approx. 4 bits (factor of 16).
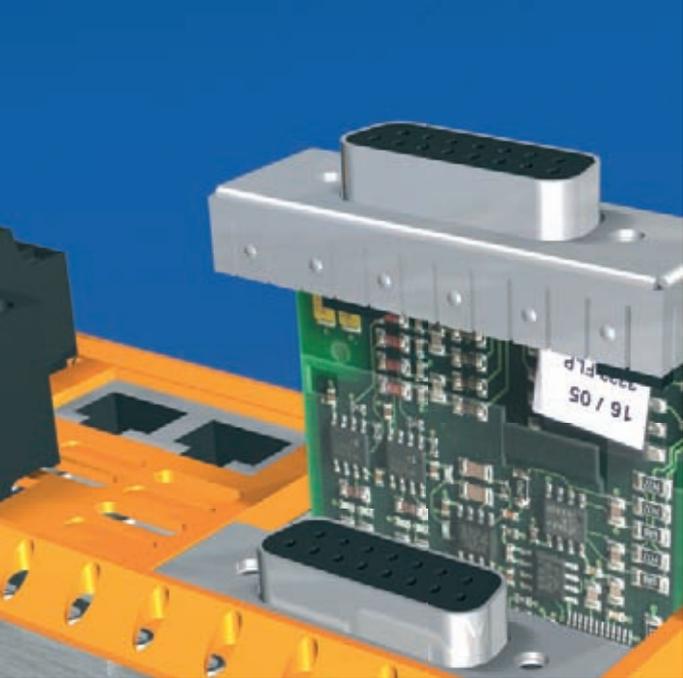
Plug-in modules

EnDat encoder interface EnDat 2.2
- Encoder monitoring
- Completely digital EnDat 2.2 protocol with motor temperature transfer
- Reduced time and effort needed for wiring
- Embedded parameter chip with B&R motors

General information	8BAC0120.001-1
C-UL-US listed	In preparation
Module type	ACOPOSmulti plug-in module
Encoder input	**8BAC0120.001-1**
Connection, module-side	15-pin DSUB socket
Indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOS	No
Encoder monitoring	Yes
Encoder supply	
Output voltage	In preparation
Load capacity	In preparation
Sense lines	In preparation
Serial interface	Synchronous
Protocol	EnDat 2.2
Signal transfer	RS485
Baud rate	In preparation

Resolver interface
- Encoder monitoring
- High resolution

General information	8BAC0122.000-1
C-UL-US listed	In preparation
Module type	ACOPOSmulti plug-in module
Resolver input	**8BAC0122.000-1**
Encoder requirements	
Number of pins	2-pin
Rated voltage ratio	$0.5 \pm 5\ \%$
Input frequency	10 kHz
Input voltage	3 to 7 V_{rms}
Connection, module-side	9-pin DSUB socket
Indicators	UP/DN LEDs
Electrical isolation	
Resolver - ACOPOS	No
Encoder monitoring	Yes
Resolution	14-bit/revolution
Precision	In preparation
Reference output	
Signal transfer	Differential signals
Differential voltage	Typically 3.4 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Sine-cosine inputs	
Signal transfer	Differential signals
Input impedance at 10 kHz (per pin)	10.4 kΩ - j 11.1 kΩ
Electrical isolation encoder - ACOPOSmulti	No, common-mode voltage on the sine cosine inputs max $\pm$ 20 V
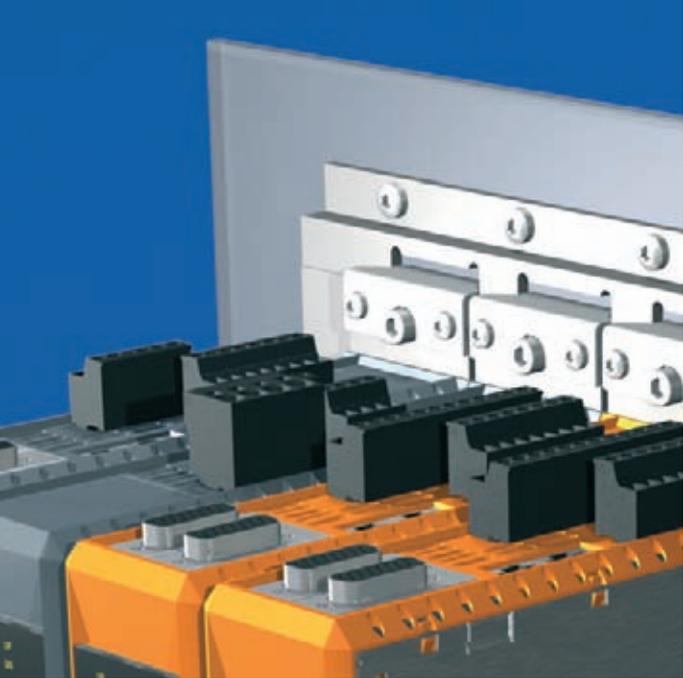
Plug-in modules

SinCos encoder interface
- High precision analog signal processing
- Encoder monitoring

General information	8BAC0124.000-1
C-UL-US listed	In preparation
Module type	ACOPOSmulti plug-in module
Encoder input	**8BAC0124.000-1**
Connection, module-side	15-pin DSUB socket
Indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOS	No
Encoder monitoring	Yes
Encoder supply	
Output voltage	Type 5 V
Load capacity	200 mA
Sense lines	2, compensation of max. 2 x 0.7 V
Sine-cosine inputs	
Signal transfer	Differential signals, symmetric
Differential voltage	0.5 ... 1.25 V_{ss}
Common mode voltage	Max. ± 7 V
Terminating resistance	120 Ω
Signal frequency	DC ... 400 kHz
Resolution [1]	16384 * number of encoder lines
Precision	Limited by the encoder
Reference input	
Signal transfer	Differential signal, symmetric
Differential voltage for high	≥ +0.2 V
Differential voltage for low	≤ -0.2 V
Common mode voltage	Max. ± 7 V
Terminating resistance	120 Ω

[1] Noise on the encoder signal reduces the practical resolution by approx. 4 bits (by a factor of 16).
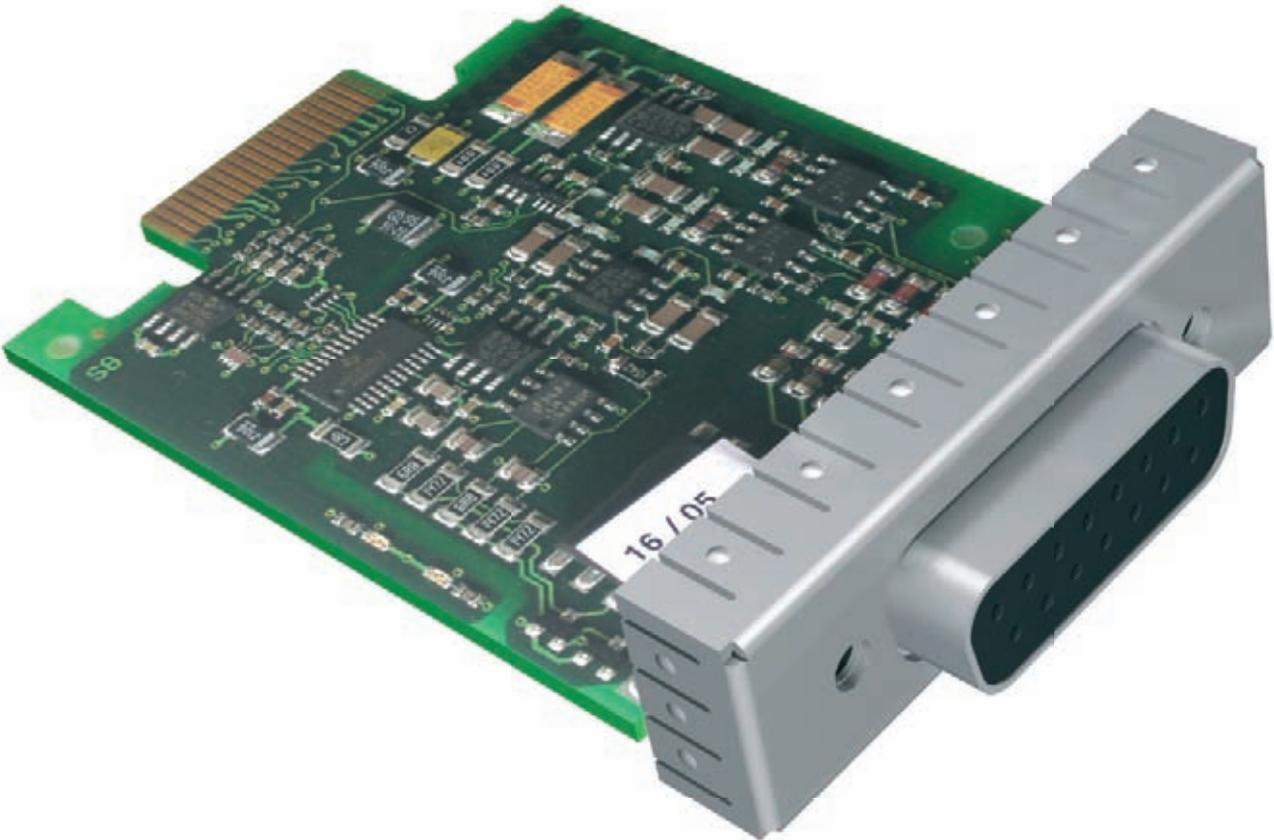
8LSA synchronous servo motors

ACOPOSmulti – 8LSA synchronous servo motors

The new 8LSA line of servo motors feature more torque at smaller volumes. The new motor design, combined with neodymium iron boron magnets, delivers extraordinary drive qualities.

Modern production machines demand compact, dynamic servo motors. With their low mass moment of inertia, the new construction, and robust structure, the 8LSA servo motors are an ideal solution to these demands.

The ACOPOSmulti drive system and the 8LSA servo motor line make up an unbeatable team for high performance dynamics, precision, and operating safety.

Robust and dynamic

The dynamics of a system can generally be characterized based on two values. The ratio of available motor torque to the mass moment of inertia of the power transmission system, which consists of the moment of inertia of both the motor and the load, is a measurement of the system's dynamics. Low motor mass moment of inertia is clearly an important factor. Another factor is a clear indicator of a system's robustness: the ratio of load moment of inertia to motor moment of inertia. The combination with ACOPOSmulti drive system makes extraordinarily high ratios possible, thereby allowing for unrestricted

and effective usage of the low motor mass moment of inertia.

Accurate

The use of 19-bit encoders as a standard feature ensures consistent movements and accurate positioning. Encoders with up to 25-bit resolution are available for higher demands. Both types are also available as multi-turn encoders. This means that inconvenient homing procedures and additional sensors are no longer necessary. The absolute encoder functions without a battery and is therefore absolutely maintenance free.

Versions are also available with resolvers for applications with lower precision and speed requirements.

Reliable

Other than the bearings, permanent magnet servo motors have no mechanical parts that are subject to wear. Their dimensioning, therefore, plays a decisive role with regard to the life-span and reliability of the motor. The bearings in the 8LSA servo motors are sufficiently dimensioned and filled with high quality synthetic lubricant.

For unusually high demands, such as those that occur in belt drives, the motors are available with reinforced bearings that withstand high radial forces.

The temperature levels in the motor are monitored with two indepen-

dently functioning systems: A linear temperature sensor is located in the motor winding. This sends the temperature, measured to the degree, to the higher-level inverter. A second temperature model in the inverter calculates a virtual motor temperature from the process data. A combination of the data from both sources ensures all around protection of the motor winding even during heavy operation.

CE conformity and UL certification

All B&R servo motors were designed for international use, and in addition to the obligatory CE conformity they are also certified as a UL "Recognized Component".

Embedded parameter chip included

All relevant mechanical and electrical information and data is stored in the encoder used for the 8LSA servo motors. This means that the user doesn't have to make settings on the servo drive in the field. As soon as the encoder is connected to the servo drive and the power is applied to the electronics, the motor is automatically identified. The motor sends its rated parameters and limit parameters to the servo drive. The drive then automatically determines the current limits and current control parameters required for optimal control of the motor.

Compact and dynamic   77

Flexibility

The motors are available in a number of variations, which enables them to provide the best possible solution for any drive task.

- Depending on the motor's size, the rated motor speed can be selected from a range in order to form the best possible combination of inverter, motor, and gears.
- Permanent magnet holding brakes with low mass moment of inertia and no play, ideally selected based on the motor size, keep loads with no current applied in an exact position.
- The motors are delivered with cylindrical shaft ends and without a key.
- Flexible cabling is provided by straight and rotating angled plugs for the power and encoder connections.

Technical data for the 8LSA motors can be found in the product catalog.

Compact, dynamic, safe operation. The 8LSA line of servo motors from B&R will drive your machine to new levels of performance.

8LSC synchronous servo motors

Powerful and dynamic
Production machines with high clock rates demand dynamic motors. Systems with large moving masses require not only a high rated speed but also an extremely low mass moment of inertia.

With their long and sleek form, the 8LSC motors are ideally suited for this type of application. In addition, the conventional air cooling ensures an uncomplicated integration in any system.

Technical data - 8LSC5

	8LSC5A. ee020ffgg-0	8LSC5A. ee030ffgg-0	8LSC5A. ee045ffgg-0	8LSC5B. ee020ffgg-0	8LSC5B. ee030ffgg-0	8LSC5B. ee045ffgg-0
Rated speed n_N [min^{-1}]	2000	3000	4500	2000	3000	4500
Number of pins		4			4	
Rated torque M_N [Nm]	29.5	26.4	20	47	42	32
Rated power P_N [kW]	6.18	8.29	9.42	9.84	13.19	15.08
Rated current I_N [A]	12.08	16.21	18.93	19.30	25.80	30.29
Stall torque M_0 [Nm]		31			50	
Stall current I_0 [A]	12.69	19.04	29.34	20.47	30.71	47.32
Peak torque M_{max} [Nm]		64			107	
Peak current I_{max} [A]	31.47	47.21	72.75	52.62	78.93	121.63
Maximum angular acceleration without brake a [rad/s^2]		50394			53234	
Maximum speed n_{max} [min^{-1}]		9000			9000	
Torque constant K_T [Nm/A]	2.44	1.63	1.06	1.06	2.44	1.63
Voltage constant K_E [V/1000 min^{-1}]	147.65	98.43	63.88	63.88	147.65	98.43
Stator resistance R_{2ph} [Ω]	1.64	0.66	0.27	0.27	0.68	0.28
Stator inductance L_{2ph} [mH]	0.0096	0.0039	0.0016	0.006	0.0024	0.001
Electrical time constant t_{el} [ms]	5.89	5.89	6.06	8.84	8.83	9.09
Thermal time constant t_{therm} [min]		55			60	
Moment of inertia without brake J [kgcm^2]		12.7			20.1	
Weight without brake m [kg]		17.5			26	
Moment of inertia for brake J_{Br} [kgcm^2]		1.66			1.66	
Weight of brake m_{Br} [kg]		0.9			0.9	
Holding torque of the brake M_{Br} [Nm]		15			15	

	8LSC5C. ee020ffgg-0	8LSC5C. ee030ffgg-0	8LSC5C. ee045ffgg-0
Rated speed n_N [min^{-1}]	2000	3000	4500
Number of pins		4	
Rated torque M_N [Nm]	65	58	44
Rated power P_N [kW]	13.61	18.22	20.73
Rated current I_N [A]	26.62	35.62	41.64
Stall torque M_0 [Nm]		70	
Stall current I_0 [A]	28.66	42.99	66.25
Peak torque M_{max} [Nm]		150	
Peak current I_{max} [A]	73.77	110.65	170.51
Maximum angular acceleration without brake a [rad/s^2]		54152	
Maximum speed n_{max} [min^{-1}]		9000	
Torque constant K_T [Nm/A]	2.44	1.63	1.06
Voltage constant K_E [V/1000 min^{-1}]	147.65	98.43	63.88
Stator resistance R_{2ph} [Ω]	0.48	0.19	0.09
Stator inductance L_{2ph} [mH]	0.004	0.0017	0.0008
Electrical time constant t_{el} [ms]	9.47	9.42	8.96
Thermal time constant t_{therm} [min]		65	
Moment of inertia without brake J [kgcm^2]		27.7	
Weight without brake m [kg]		34.5	
Moment of inertia for brake J_{Br} [kgcm^2]		1.66	
Weight of brake m_{Br} [kg]		0.9	
Holding torque of the brake M_{Br} [Nm]		15	

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