



WITTENSTEIN

cyber motor

connective
dynamic
compact

Industrial small servo drive system The second generation





**Catalogs, CAD data and operating manuals can
be found in our download center at**

<https://cyber-motor.wittenstein.de/en-en/download/>



cyber motor

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GROUP



alpha

WITTENSTEIN alpha GmbH
High-precision servo drives and
linear systems



WITTENSTEIN alpha develops, produces and sells mechanical and mechatronic servo drive systems for sectors that require maximum precision. Our products continue to set new standards around the world.

We have divided our product portfolio into four segments in order to meet varying, application-specific requirements: While the Premium and Advanced segments focus on technology and performance, the Value and Basic segments place more emphasis on price and satisfying basic customer requirements.



cyber motor

WITTENSTEIN cyber motor GmbH
Highly dynamic servo motors and
drive electronics



WITTENSTEIN cyber motor develops, produces and sells technologically advanced servo motors with sophisticated drive electronics as well as complete mechatronic drive systems with maximum power density. Our particular expertise lies in specialized motors for ultra-high vacuums, radioactive environments and high temperatures.

We collaborate closely with our customers on individual projects. During the development process, we share knowledge, learn from one another and develop new ideas together. The resulting solutions help differentiate our customers from their competitors.



galaxie

WITTENSTEIN galaxie GmbH
Superior gearboxes and drive systems



WITTENSTEIN galaxie develops, produces and sells radically innovative gearboxes and drive systems, whose functional superiority is based on an entirely new operating principle. Our unique expertise makes us the global leader in rotary mechatronic drive technologies.

Our innovations enable our customers to implement their machines and systems with previously unattainable performance parameters. Moreover, our solutions allow products to be manufactured in an efficient way that conserves resources.



WITTENSTEIN motion control GmbH
Drive systems for the most extreme
environmental requirements



WITTENSTEIN motion control develops, produces and sells customized systems for critical environmental conditions using servo motors, gearboxes, electronics and software. Our development expertise and the high level of vertical integration of the components ensure that our technologies meet our customers' requirements.

We focus our innovative solutions on fields that rely on maximum performance, robustness and reliability: Real-time security software completes our product portfolio.



attocube systems
Nanoprecision drive and measurement
technology solutions



attocube develops, produces and sells drive and measurement technology for highly demanding nanotech applications. Its product range includes everything from nano drives and complete microscope systems to innovative sensor solutions, which far exceed current measurement technology in their precision, speed and compactness and can also be used under extreme conditions.

Years of experience and expertise in both the scientific and industrial market segments have yielded an inspiring product catalog boasting maximum precision and user-friendliness. This superior technology revolutionizes existing applications and guarantees lasting competitive advantages for our customers.



baramundi software GmbH
Secure management of the
IT infrastructure in offices and
production



baramundi provides companies and organizations worldwide with efficient, secure and cross-platform management of networked endpoints in IT and manufacturing. The Management Suite provides our customers with integrated, future-orientated unified endpoint management.

baramundi leads the way in regard to unified endpoint management in networked production environments. We develop this solution in close cooperation with the WITTENSTEIN Digitalization Center.

Comprehensive product expertise

- Rotary and linear servo motors and servo actuators
- Drive electronics
- Mechatronic drive systems

Customized solutions

- Customized solutions with maximum customer benefits
- We act holistically and are eager to explore new possibilities
- From conception and development, production and qualification all the way to series delivery

Development and production in Germany

- Strong development team with profound expertise
- High level of vertical integration, including in-house winding room and certified test benches
- Premium quality based on innovative, controllable processes

Servo motors



Drive electronics

WITTENSTEIN – Products that know no limits

Packaging



Pharmaceuticals and food



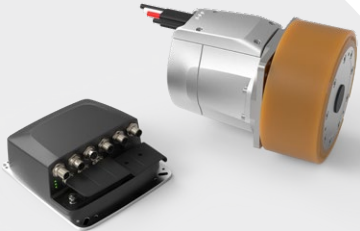
Assembly and measurement technology



Handling and robotics



Our core competencies



Mechatronic systems



Competent project management

- Preparation of feasibility studies for complex drive tasks
- Defined product development process supervised by certified project managers
- Certified according to DIN EN ISO 9001

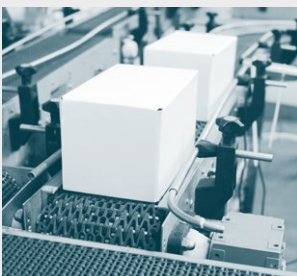
From standard industry to harsh environmental conditions

- High and low temperatures
- Radioactivity
- Vacuum
- Pressure
- Explosive atmospheres
- Clean room

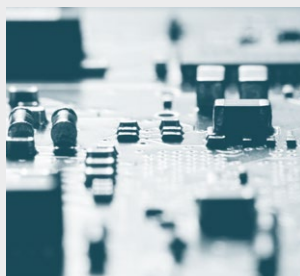
Testing, approval and certification

- CE
- UL
- IECEX (ATEX)
- EHEDG

Intralogistics



Semiconductor/
Electronics production



Electromobility



Oil and gas exploration



A plus in
performance:

small servo drive system
redefined.

Connectivity

Multi-Ethernet version for maximum flexibility and a variety of real-time capable fieldbus interfaces

Flexibility

Modular principle enables manifold solutions for a wide range of applications



Compactness

Size of the second-generation servo drives reduced by approx. 30%



Precision

Outstanding high-precision control thanks to the use of absolute encoders with a resolution of 12 bits in conjunction with a high current resolution of 14 bits

Dynamics

Realization of short cycle times thanks to inertia-optimized motors, decentralized control intelligence and high overload capability

Small servo drive system

Nearly endless possibilities

The second generation of WITTENSTEIN cyber motor's industrial small servo drive system guarantees a plus in performance in terms of connectivity, compactness and configurability:

The system is convincing in every respect.

The cyber® simco® drive 2 servo drives are up to 30% more compact than their predecessors and offer maximum connectivity with their multi-Ethernet interface. They also feature real-time CIP sync functionality, decentralized intelligence and STO safety function. These servo drives have also made it possible to realize the cyber® dynamic system compact drive system. The motor-integrated version boasts decentralized intelligence directly on the axis and saves space in the control cabinet.

The servo motors in the cyber® dynamic line and the cyber® dynamic system compact drive system are now also available with a multiturn encoder (size 32/40), holding brake (size 40), gearbox or screw drive.

This gives you a new level of freedom in your machine design.

connective

Flexible interfaces, intelligent software and technology functions coupled with connection options to a wide range of control systems make the small drive system a multi-talent in process design.

dynamic

Mass inertia-optimized motors, a high current resolution and coordinated control parameters permit high-precision and dynamic control of the system.

compact

Miniaturization is an integral part of the product and development strategy of WITTENSTEIN cyber motor. Servo motors with high torque density, a diameter of 17 mm and the option of decentralized use of the electronics for space savings in the switch cabinet are just a few aspects of the system.

Thanks to the numerous interfaces, the small servo drive system offers maximum flexibility for the most demanding tasks in modular machine construction.

The small servo drive system at a glance:

Servo drives – cyber® simco® drive 2

The servo drives feature a multi-Ethernet interface, real-time CIP sync functionality, decentralized intelligence and STO safety function. They have a very compact design and are available with protection class IP20 or IP65.



Drive system – cyber® dynamic system

The motor-integrated version boasts a multi-Ethernet interface and decentralized intelligence directly on the axis. You can choose to equip the system with different encoder variants as well as planetary gearboxes, a ball screw drive and a holding brake.



Servo motors and actuators – cyber® dynamic line

The industrial servo motors are the professional choice for dynamic applications with limited installation space. Equipped with a high-quality stainless-steel housing and absolute encoder (singleturn or multiturn), this motor series provides maximum reliability and precision. You can choose to equip the servo motors with a holding brake, planetary gearbox or ball screw drive.



Find out more about
the small servo drive system



Small servo drive system

Connective at all levels

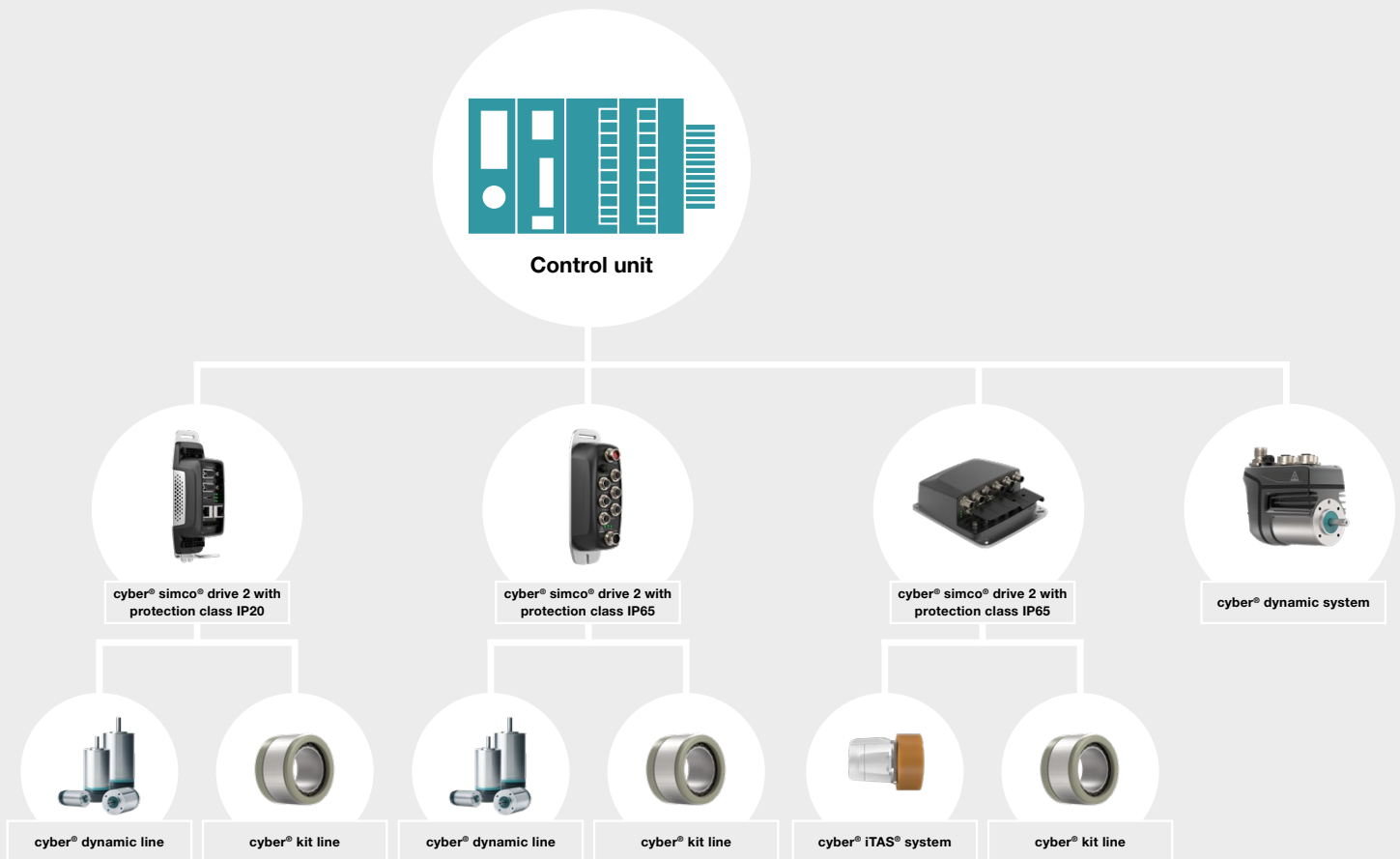
With its flexible fieldbus interfaces EtherCAT, PROFINET RT / IRT, EtherNet/IP CIP Sync, Sercos III, CANopen and TCP/IP, the servo drives in the cyber® simco® drive 2 series and the cyber® dynamic system compact drive system can be connected to a wide range of control systems.

The multi-Ethernet interface of the cyber® simco® drive 2 servo drive and the cyber® dynamic system compact drive system sets the new benchmark in this market segment. It allows the user to freely choose between the fieldbus variants EtherCAT, PROFINET, EtherNet/IP CIP Sync and SERCOS III using the same piece of hardware. This ensures proven, simple and

real-time connectivity to a range of different control environments.

Just one piece of hardware also means just one material number. This means that the unique multi-Ethernet feature reduces the usual number of variants. This, in turn, dispenses with costs and work in terms of electrical construction, procurement, item administration as well as commissioning, service and maintenance.

You also benefit from an OPC UA interface for platform- and manufacturer-independent data exchange.



High transmission rates through real-time protocols measurably increase the productivity of the machine.

Fieldbus interfaces



- PROFINET RT/IRT interface supports application classes 1, 3, 4
- Simplest integration into SIEMENS software (TIA portal/ SIMOTION Scout) via the PROFIdrive drive profile
- Utilization of all standard technology functions from SIEMENS
- Simplest configuration using the GSDML file provided – simplified axis configuration
- Deviation of max. 1 µs in the bus cycle with PROFINET IRT



- Industrial drive system for connection to the Rockwell control system
- Implementation of different applications with cycle times of up to 1 ms
- Simple commissioning and full utilization of the Rockwell control system save time and costs – no additional expertise required
- Pre-prepared add-on instructions for implementation of different applications



- EtherCAT (CoE) fieldbus interface for connecting the servo drive to a Beckhoff controller – the parameters used are therefore the same as the CANopen standard
- Time-saving and easy to use thanks to File over EtherCAT: load files via the EtherCAT bus from the control system directly to the servo drive. Data can be simultaneously distributed to any number of servo drives in the network, e.g. no additional wiring for firmware updates, use of existing expertise



- The FSP Drive profile allows synchronous motion profiles with low cycle times and jitter to be implemented
- The usual axis modules and technology functions of the Schneider Electric control system can be used, making the integration and configuration of the servo drive extremely easy.



- Integration of the servo drive with CANopen according to protocol standard 402
- Implementation of numerous operating modes, e.g. profile position, profile velocity, etc.
- Maximum flexibility in process design through dynamic PDO mapping: process data can be changed via dynamic PDO mapping even during operating time



- Parametrization of n-axes via the TCP/IP interface (without connecting each individual simco® drive to a PC)
- No wiring required

Industry 4.0 interfaces



- OPC UA (Open Platform Communications Unified Architecture) for platform and manufacturer-independent data exchange
- Open interface standard for a reliable, secure and service-oriented architecture
- Optimum industrial communication between the production level and the production planning and ERP system or the cloud
- Optional OPC UA server available in conjunction with the fieldbus variants PROFINET and Ethernet/IP
- OPC UA functions: asset management, status display and single axis motion

Small servo drive system

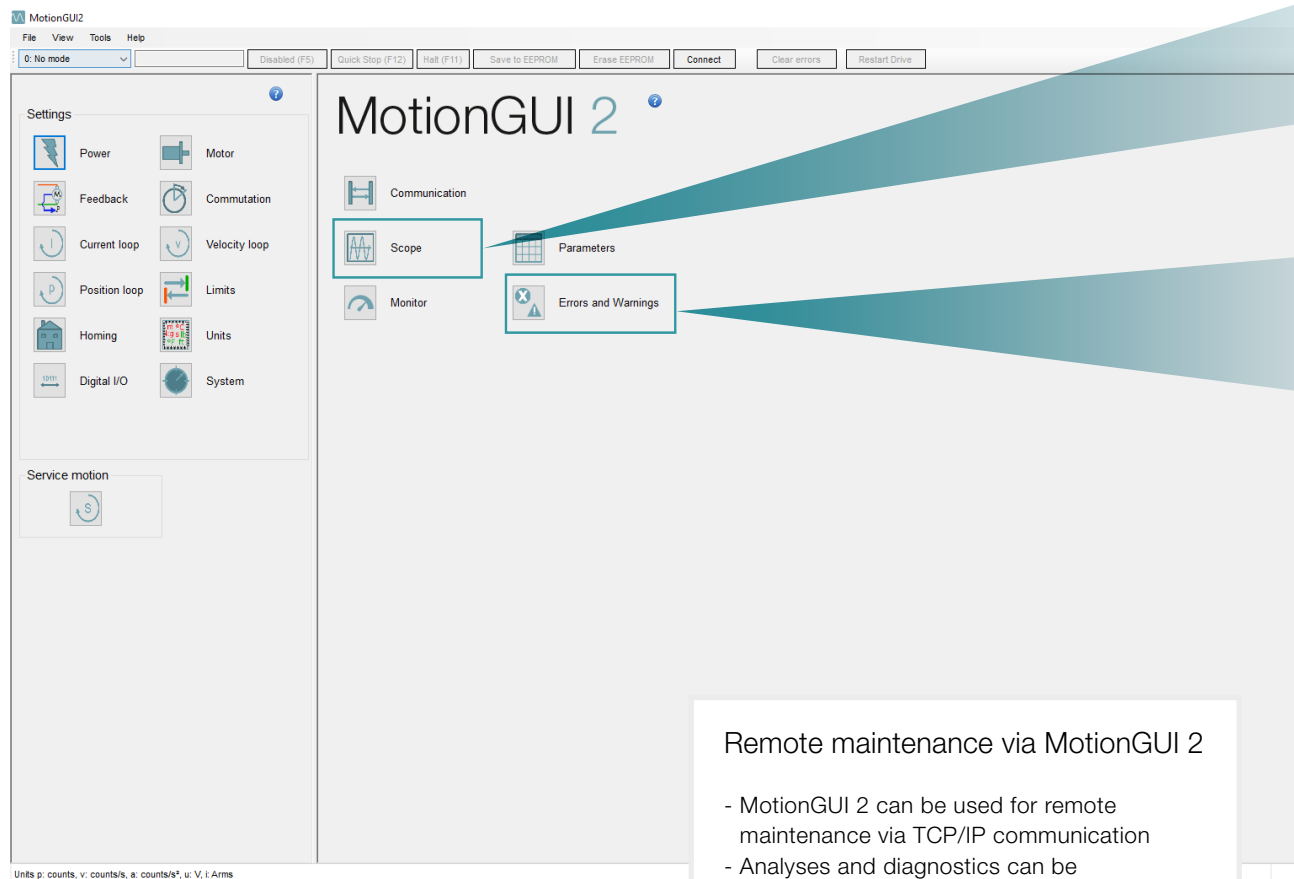
Software MotionGUI 2

Intuitive guidance during commissioning and operation

The MotionGUI 2 graphical user interface guides the user intuitively during commissioning and operation of the drive system.

Diagnoses, optimizations and parametrization of the drive can be performed via a number of functions.

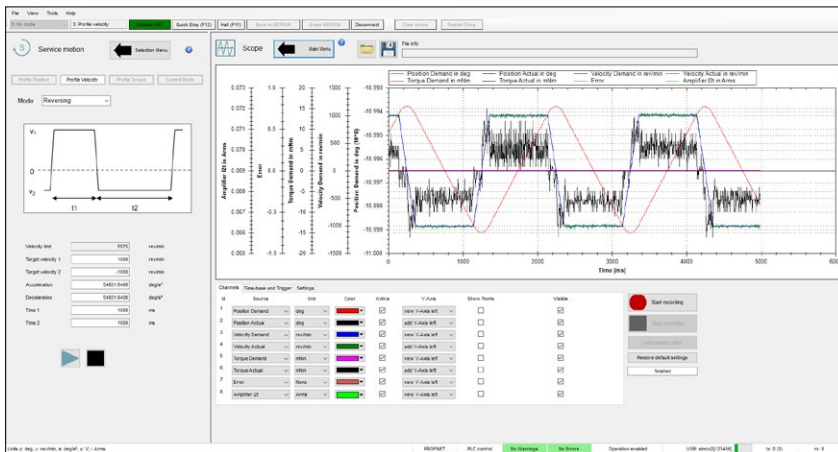
Diagnostic routines and event logging are carried out by means of a timestamp. This allows condition monitoring as well as integration and maintenance work to be carried out in an efficient and time-saving way – visible at any time in software MotionGUI 2.



Remote maintenance via MotionGUI 2

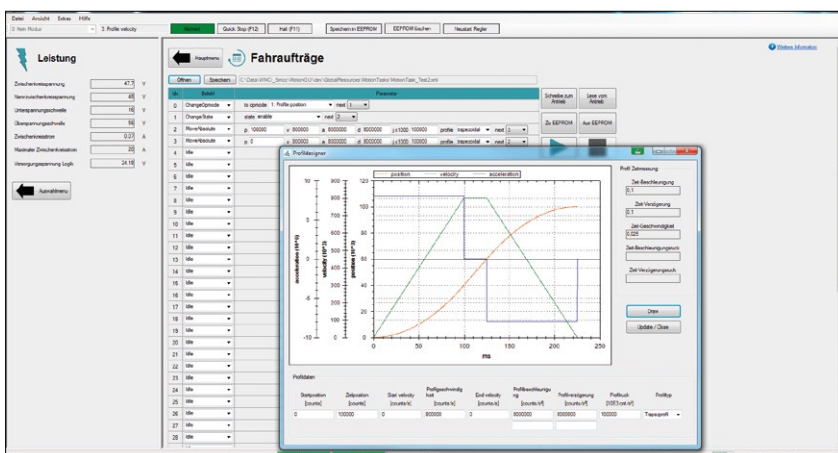
- MotionGUI 2 can be used for remote maintenance via TCP/IP communication
- Analyses and diagnostics can be performed in installed state (e.g. during machine breakdowns)

Dagnostic functions



- Oscilloscope function Analysis of applications and movement sequences – also possible in offline mode
- Errors and warnings Logging of errors and warnings for rapid troubleshooting – storage of errors in error history

Motion tasks



- Extended motion block table with “decentralized intelligence” for individual modification and flexible programming of the application
- Simple creation of motion tasks with reduced programming effort for the machine manufacturer
- Complex single-axis movements, such as clamping processes or actuation of lifting modules, can also be generated and executed decentrally
- In the case of several synchronized axes, movements can be started simultaneously via a synchronization signal from the control system
- Realization of stand-alone solutions by omitting the control system

Small servo drive system

Solutions for complex motion tasks

+ Filling

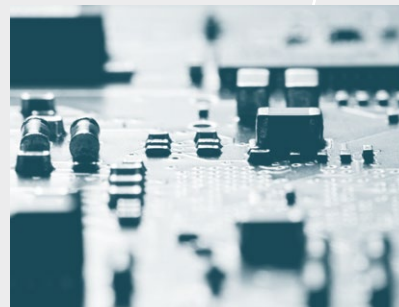
Precise filling with servo-motor-controlled filling valves through flexible control of the filling volume.



Precise.
Cost-effective.
Flexible.

+ Positioning

Positioning of sensitive components with maximum precision and dynamics.



+ Adjustment

High-precision and dynamic servo motors for automated and process-monitored format or valve adjustment.



+ Bonding and dispensing

Brushless servo motors with the highest reliability for sophisticated and precise bonding and dispensing systems.



+ Gripping

Servo-electric grippers with high power density and minimal weight for sophisticated pick & place applications.



+ Measuring and testing

Low-noise and reliable drives for innovative measurement and testing solutions suitable for industrial use.



Applications in practice

Precise dosing of fluids for process reliability and product quality



“Repeatable dosing precision is enormously important, both in the interests of a reliable process and to ensure uniform product quality.”

Hubert Rypalla, project manager

Customer:

Harro Höfliger GmbH from Allmersbach, Germany

Industry:

High-tech packaging systems, process solutions and services for pharmaceutical and medical technology, chemicals industry, food and consumer goods industry



Application:

It was a complex challenge: Liquids of varying viscosity needed to be dosed into pads efficiently and precisely in a dishwasher pad forming machine at Harro Höfliger GmbH – up to six million times a day.

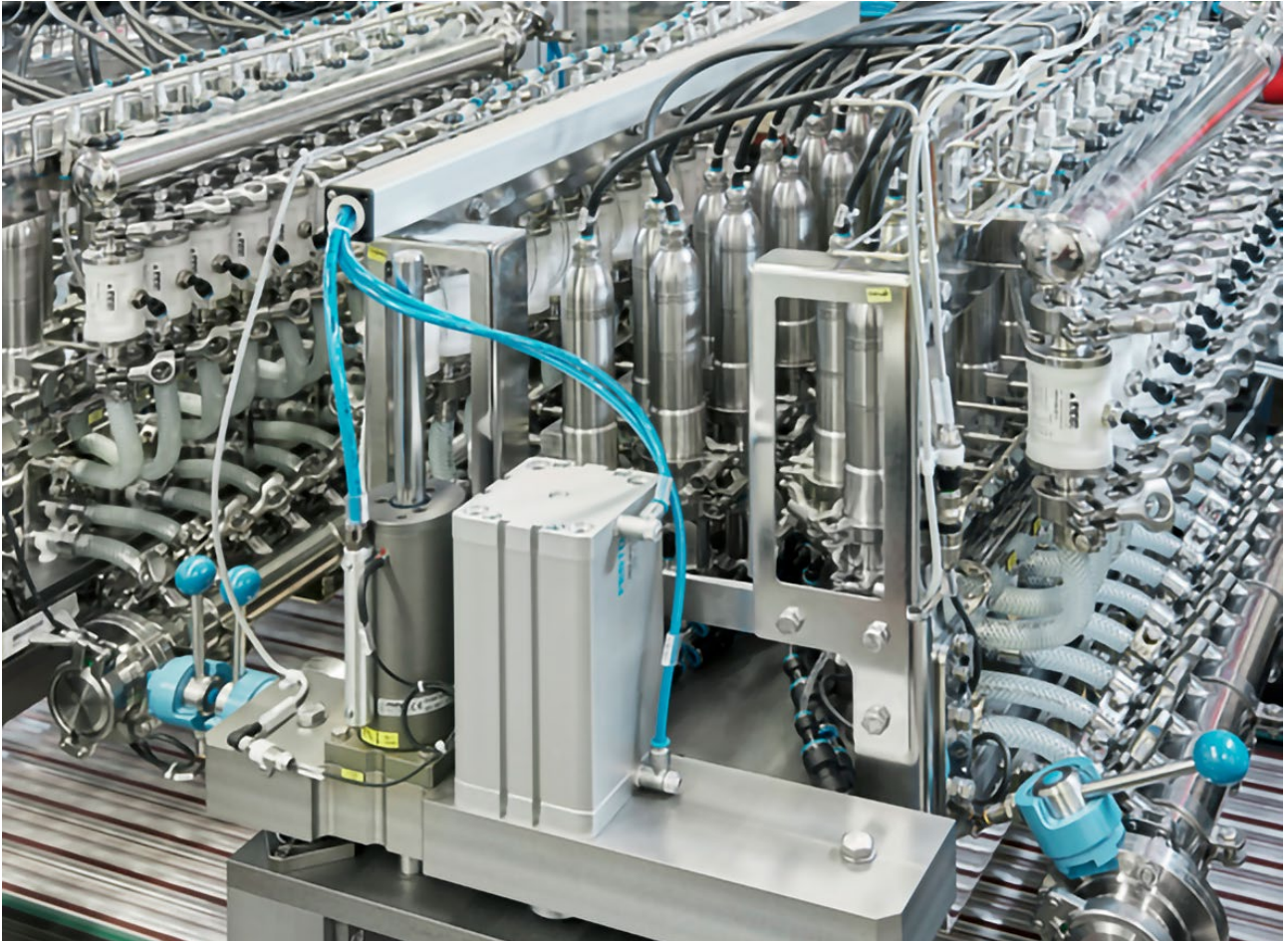
Solution:

Harro Höfliger's developers put their trust in small servo drive systems made from 100% stainless steel and hence resistant to corrosion. The compact, lightweight design also impressed the customer thanks to the significant space savings. In addition, a web server integrated into the drive amplifier ensures constant connectivity to enable access to the dosing stations and each individual dosing drive for optimization or service work.

Description:

Inox small servo drives from the cyber® dynamic line in size d40 (outer diameter in mm) and gear ratio $i=30.67$ as well as compact servo drives from the cyber® simco® line SIM2010D in protection class IP20 with ProfiNet interface are used in two dosing stations on the dishwasher pad forming machine. 100% stainless steel was chosen

Dynamic and precise.
Repeatable precision.
Process reliability.



because in the event of product leakage, the detergent substances have a corrosive effect on surfaces, and the systems are also cleaned from the outside. The drives and servo drives are connected using integration-friendly single-cable technology suitable for use with drag chains.

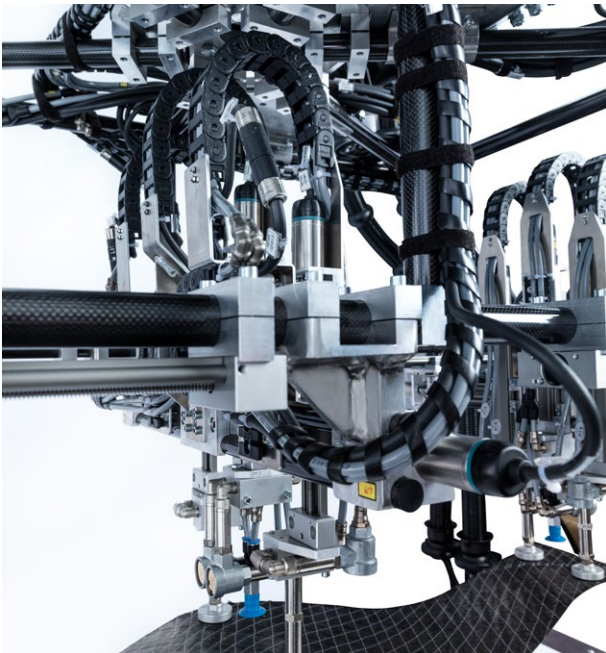
Special feature:

The high current resolution of the servo drive makes it possible to control the mass-inertia-optimized small servomotors dynamically and with high precision. These act directly on the dosing screws, which in turn ensure high, repeatable dosing precision with a filling quantity per pad of just a few grams.

The fact that the motor and the servo drive are supplied from a single source guarantees technically optimal solutions at all times with no interface risks. This includes other applications, such as powder dosing or a drive solution for screwing on sealing caps. Irrespective of the application and the location of the machine, the machine builder and its end customers can rely on global support through the WITTENSTEIN service network.

Applications in practice

Lightweight, flexible, cost-effective – latest-generation gripper technology



“Unlike pneumatic systems, for example, the servo technology enables different linear positions to be approached flexibly without mechanical retooling. This was decisive for the process.”

Michael Schneiderbauer, product development

Customer:

FILL, Gurten, Austria

Industry:

Mechanical and plant engineering

Application:

The gripper array from the Austrian machine and plant manufacturer FILL is an innovative handling system for the automated production of CFRP and GFRP parts. The production technology process innovation had to achieve three main objectives: maximum flexibility during gripping, a significant reduction in the weight of the end effector and cost efficiency during procurement and operation of the handling system. The layer build-up and curing of the CFRP or GFRP parts was to be realized on a single mold. For this purpose, the gripping system must be able to pick up, partially preform and deposit differently dimensioned composite blanks and PU cores.

Solution:

In the new handling unit, FILL uses more than a dozen industrial small servo motors from the cyber® dynamic line in size 32, each equipped with a cyber® simco® line servo drive in protection class IP20. The compact dimensions and low weight of the motors as well as the option to integrate the servo drives in the PROFINET fieldbus environment of the handling system were the decisive factors for the selection of the small servo drive systems.



Compact design.
Light weight.
Easy integration.



Description:

A weight reduction of more than 50% and significant energy savings were achieved by using carbon tubing for the supporting structure and the small servo motors from WITTENSTEIN.

As a complete mechatronic solution, the cyber® simco® servo drive with fieldbus integration capability and PROFINET interface was selected owing to the existing Siemens control system.

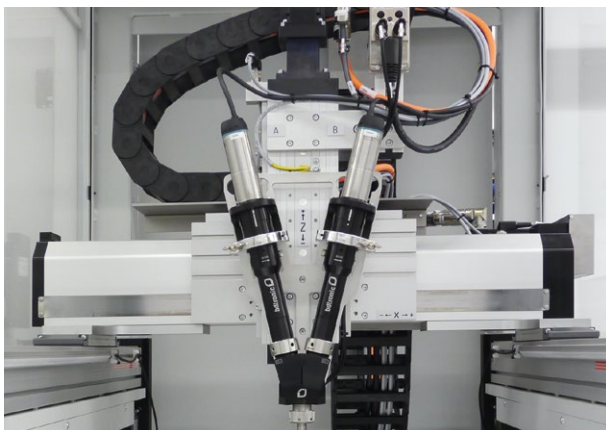
FILL combined this with the small cyber® dynamic line series servo motor. These lightweight and compact servo motors blend in well visually and enable extremely precise movement sequences, which are determined flexibly and independently from one another and can be adapted.

Special feature:

Motor and servo drive from a single source – this was clearly the best technological solution for FILL because the coordinated system components meant that there would be no interface risks. For the machine manufacturer, but also for the integrators and end users, the simple connection to the existing Siemens control system with PROFINET offers numerous benefits: Operation and commissioning is extremely simple and intuitive using the MotionGUI operating software. Diagnoses, optimizations and parametrization of the drive can be performed via a number of functions. Diagnostic routines and event logging are implemented using a real-time clock. This allows both condition monitoring and any maintenance work to be performed easily and in a time-saving manner.

Applications in practice

Process accuracy when positioning and dispensing minute quantities



“The market places ever higher demands on dispensing and repeatability.”

Markus Rieger, Sales Director Germany

Customer:

bdtronic GmbH from Weikersheim, Germany

Industry:

Plant systems and process solutions for dispensing technology and other special applications

Application:

The company was looking for a small servo drive system with special performance features for the processing of reactive casting resins. The requirement was for a complete drive solution guaranteeing the highest dispensing and repeatability with completely different material properties during processing.

Solution:

The performance package consisting of cyber® simco® drive and cyber® dynamic actuator R can reliably cope with the extremely heterogeneous influencing factors.

Description:

The complete solution from WITTENSTEIN optimally exploits the performance potential of the drive solution: The cyber® dynamic line size-40 servo motors work with an integrated planetary gearbox and drive the eccentric screw pumps in such a way that even the smallest quantities in the microliter range can be dispensed with precision. Precise control via the cyber® simco® line servo drive also enables dosing quantities to be regulated individually and quantity tolerances to be minimized. In this way, the dispensing results can be optimized in a reproducible manner – with full process control ensured at all times.

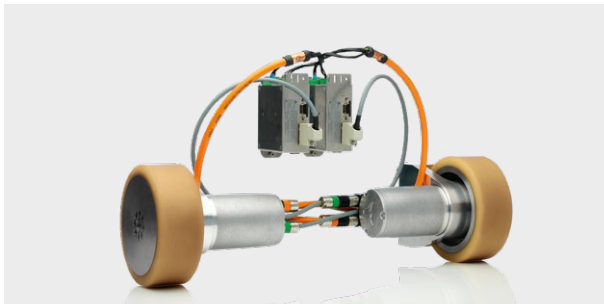
Special feature:

The cyber® simco® servo drive is characterized by very high-resolution current regulation and fast current measurement. This enables the delivery of the tiniest quantities with great accuracy, even in the case of variable linear velocities.

Find more examples
of applications here



Optimal system solution with decentralized control unit



“Consulting from a single source ensures
reliable project planning.”

Joachim Walter, Managing Director at BeeWaTec AG

Customer:

BeeWaTec AG from Pfullingen near Reutlingen, Germany

Industry:

Mini AGV for production and warehouse logistics

Application:

The manufacturer of automated guided vehicles was looking for a tailor-made drive solution for use in a modular mini-vehicle for transporting stacked goods containers.

Solution:

cyber® iTAS® system with TAS 004 plus cyber® simco® drive IP20 and, as a “perfect match”, cyber® dynamic actuator R in size 40 with cyber® simco® drive IP20.

Description:

The individual selection of the motor/gearbox unit in conjunction with the appropriate cyber® simco® drive electronics allows extremely diverse performance ranges to be covered. At BeeWaTec, the servo drive is also used as a decentralized control unit for the handling equipment on the vehicles and is intelligently adapted to the small high-torque drives of the cyber® dynamic line. Procuring both drive solutions from a single source was a decisive argument for BeeWaTec.

Special feature:

A special requirement for the BeeWaTec mini-vehicle is the transportation of overall weights of up to 150 kg, which not only have to be pulled, but also clamped to the vehicle. This is made possible by the innovative solution for the clamping actuator in the vehicle: clamping is controlled decentrally via the servo drive. Digital inputs and outputs connect this to the vehicle computer, meaning there is no need for a complicated fieldbus interface. BeeWaTec created a motion task for the clamping. This is part of the intuitive MotionGUI user interface and is stored in the cyber® simco® drive. The motion task contains all the necessary parameters for the clamping in the form of a list.

cyber[®] simco[®] line

Servo drives



In combination with various servo motors and servo actuators, the cyber[®] simco[®] drive 2 is the ideal solution for fast and precise transportation and positioning tasks. With a continuous power of up to 750 W and a short-term peak output of 1.5 kW, the servo drive is suitable for

high-precision applications, e.g. in the machine-tool, electronics or packaging industries – as a switch cabinet version with protection class IP20 or decentralized version with protection class IP65.

Connectivity

The cyber® simco® drive 2 servo drive is available with a multi-Ethernet interface and allows the user to choose freely between the fieldbus variants EtherCAT, PROFINET, EtherNet/IP CIP Sync and SERCOS III using the same piece of hardware. A variant with CANopen is also available as an option. This feature ensures proven, simple and real-time connectivity to a range of different control environments. The multi-Ethernet version also reduces the usual number of variants and avoids high costs and effort in terms of electrical construction, procurement, item administration as well as commissioning, service and maintenance. You also benefit from an OPC UA interface for platform- and manufacturer-independent data exchange.

Flexibility

The multi-Ethernet variant in the cyber® simco® drive 2 series offers considerable flexibility when selecting the required interfaces. In addition, various performance classes are available and can be selected to suit the application. The flexible programming of motion blocks and the portfolio of IP20 and IP65 variants allow considerable freedom in machine design for control cabinet or decentralized applications.

Dynamics and precision

Dynamics and precision are two further characteristics that set the cyber® simco® drive servo drives apart. Real-time and isochronous Ethernet communication, a high current resolution of 14 bits and a switching frequency of 16 kHz enable extremely precise torque control in complex motion control applications.

Intelligence

cyber® simco® line "thinks" ahead and for you. Integration, commissioning, operability, configuration, communication: With the cyber® simco® line, everything is designed for simplicity, intuition and efficiency. Automatic motor parameterization thanks to the electronic name plate and the integrated PLC functionality are just two examples of this. This saves time and money – and is more than clever.

Safety and robustness

Suitable for industrial use – thanks to the combination of a robust design with integrated safety. The integrated safety function STO (Safe Torque Off) means that all drive variants meet safety requirements to SIL3 / PL e. Moreover, the drive controllers feature a 12 to 60 V_{DC} wide range input on the supply side, which allows them to compensate for any fluctuations in the voltage source. In addition, the servo drives are available with protection class up to IP65 and are therefore also suitable for demanding operating conditions.

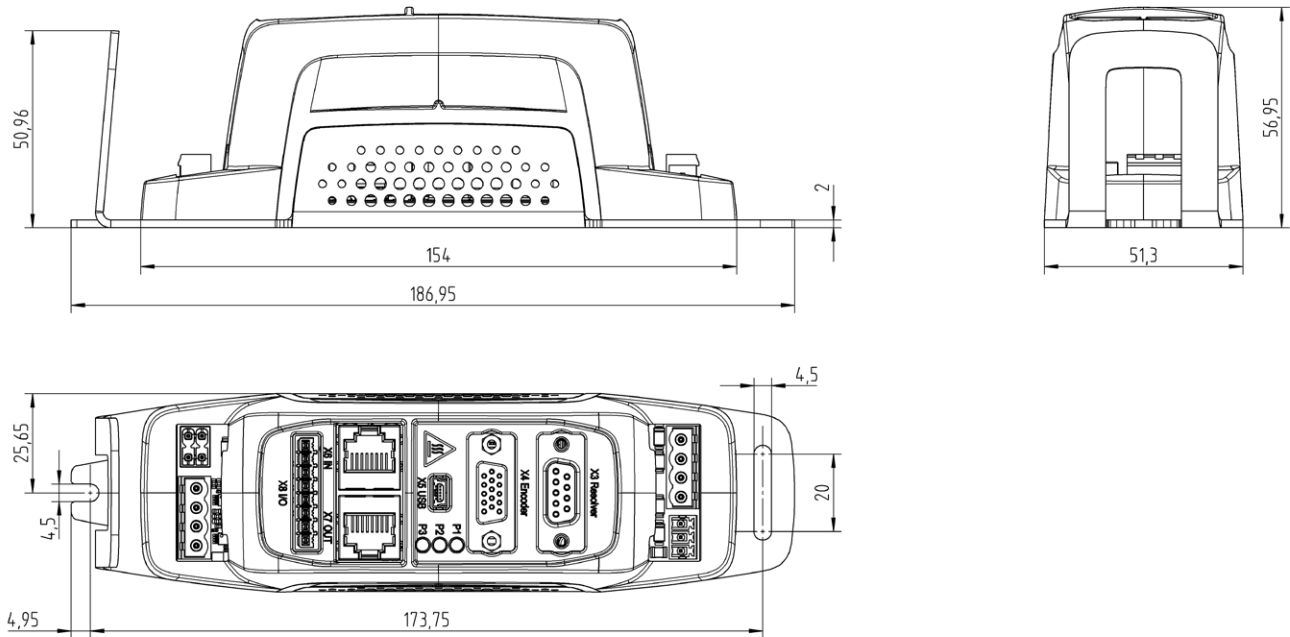
Compactness and simplicity

The cyber® simco® drive 2 servo drives boast an extremely compact design. This series is around 30% more compact than the predecessor version and allows easy pin assignments as the connection elements are arranged at the front. This means that the servo drives can also be stacked in the control cabinet, which saves space and offers solutions for the tightest installation conditions.

cyber[®] simco[®] drive 2

IP20

Performance version		SIM2007	SIM2015
Supply voltage (Power / Logic / STO)	V_{DC}	+12 to 60	
Rated current	A_{eff}	7.5	15
Maximum current	A_{eff}	15	30
Rated power (at 48 V_{DC})	W	375	750
Maximum power (at 48 V_{DC})	W	750	1500
Communication	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen	
Encoder interface	-	EnDat 2.2, BiSS-C, SSI, Resolver, Sin/Cos-Encoder	
Commissioning	-	USB	
Digital inputs	-	4	
Digital outputs	-	2	
Safety function	-	STO according to SIL 3	
Brake control	-	Yes	
Brake chopper	-	Integrated, connection of a braking resistor possible	
Technology functions	-	Motion Task	
Weight	kg	0.36	
Ambient temperature	°C	0 to 45	
Protection class	IP	20	
Approval	-	NRTL, CE, functional safety	



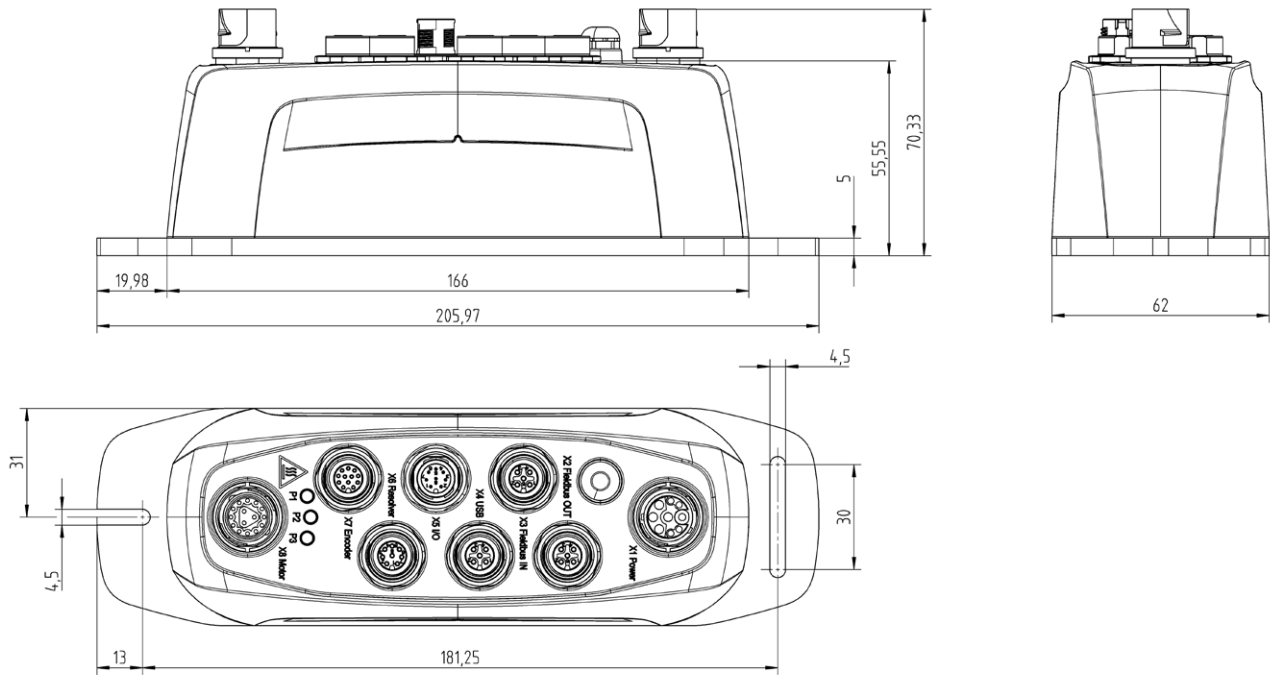
Number	Function	Connector on the device
X1	Power supply	Dinkle 5EHDVC-04PL (is supplied)
X2	Optional auxiliary voltage logic and STO	Dinkle ECH350V-03PL (is supplied)
X3	Resolver- / Sin/Cos-Encoder interface	SUB-D 9-pole socket
X4	Encoder interface	SUB-D 15-pole socket
X5	Diagnostic interface USB	Mini USB-B socket
X6	Fieldbus interface Input	RJ45 socket
X7	Fieldbus interface Output	RJ45 socket
X8	Digital inputs and outputs	Dinkle 0225 (is supplied)
X9	Connection of motor temperature sensor and brake	Dinkle 0159 (is supplied)
X10	Motor (U, V, W, PE)	Dinkle 5EHDVC-04PL coded (is supplied)

Shield clamp available as an accessory (see page 88)

cyber[®] simco[®] drive 2

IP65

Performance version		SIM2007	SIM2015
Supply voltage (Power / Logic / STO)	V_{DC}	+12 to 60	
Rated current	A_{eff}	7.5	15
Maximum current	A_{eff}	15	30
Rated power (at 48 V_{DC})	W	375	750
Maximum power (at 48 V_{DC})	W	750	1500
Communication	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen	
Encoder interface	-	EnDat 2.2, BiSS-C, SSI, Resolver, Sin/Cos-Encoder	
Commissioning	-	USB	
Digital inputs	-	4	
Digital outputs	-	2	
Safety function	-	STO according to SIL 3	
Brake control	-	Yes	
Brake chopper	-	Integrated, connection of a braking resistor possible	
Technology functions	-	Motion Task	
Weight	kg	0.62	
Ambient temperature	°C	0 to 55	
Protection class	IP	65	
Approval	-	NRTL, CE, functional safety	



Number	Function	Connector on the device
X1	Power supply (optional auxiliary voltage logic and STO)	Intercontec, itec 915, 9-pole, connector
X2	Fieldbus interface Output	CAN: M12 5-pole socket A-coded Ethernet-based: M12 4-pole socket D-coded
X3	Fieldbus interface Input	CAN: M12 5-pole connector A-coded Ethernet-based: M12 4-pole socket D-coded
X4	Diagnostic interface USB	M12 4-pole socket A-coded
X5	Digital inputs and outputs	M12 8-pole connector A-coded
X6	Resolver- / Sin/Cos-Encoder interface	M12 8-pole socket, A-coded
X7	Encoder interface	M12 12-pole socket, A-coded
X8	Motor (U, V, W, PE, connection of motor temperature sensor and brake)	Intercontec, itec 915, 15-pole, socket

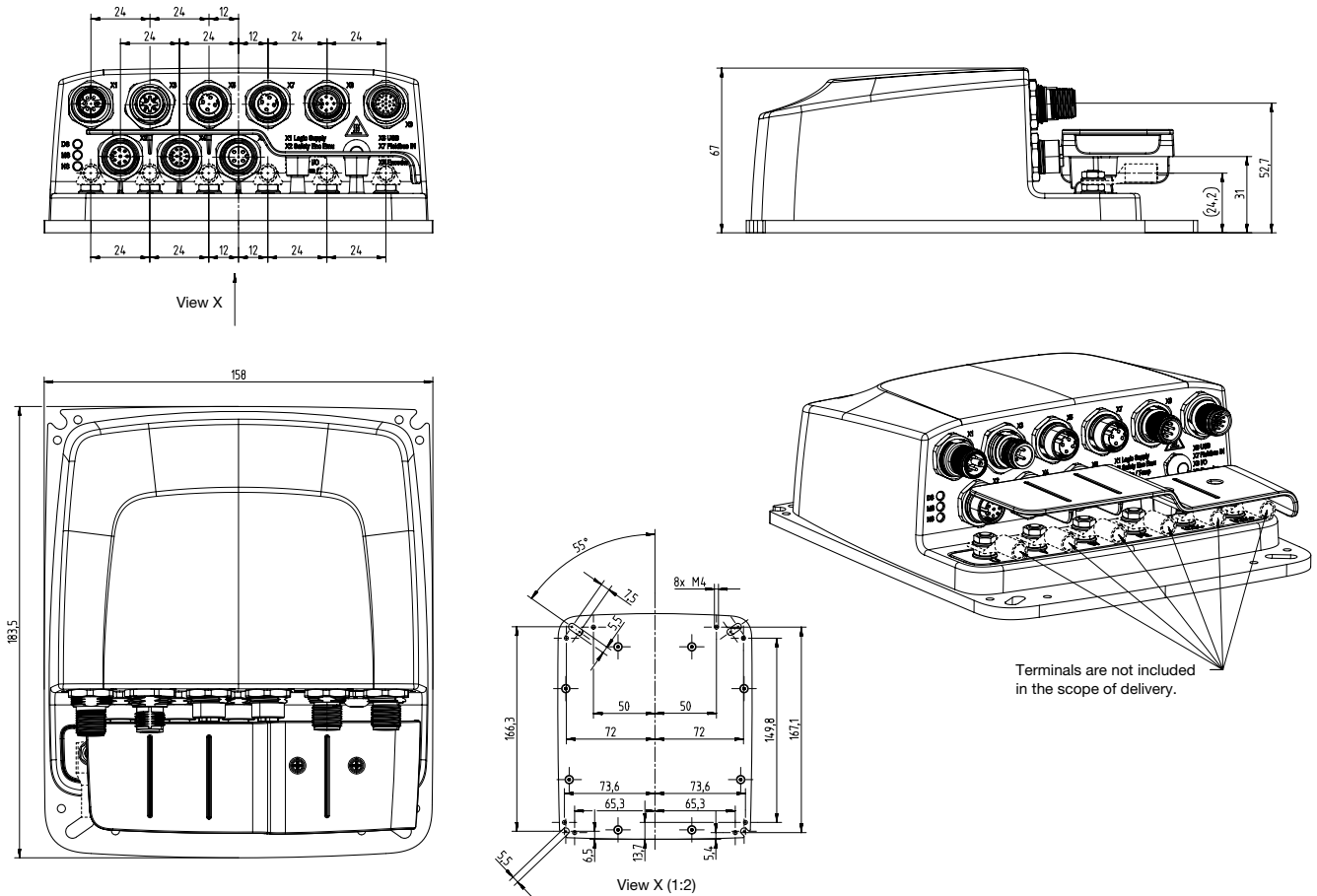
cyber® simco® drive 2

IP65

Performance version		SIM2050	SIM2100
Supply voltage (Power / Logic / STO)	V_{DC}	+12 to +60	
Rated current	A_{eff}	50	100
Maximum current	A_{eff}	100	200
Rated power (at 48 V_{DC})	W	2500	5000
Maximum power (at 48 V_{DC})	W	5000	10,000
Communication	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen	
Encoder interface	-	Without safety card: EnDat 2.2, BiSS-C, SSI, Resolver, Sin/Cos-Encoder, incremental encoder with Hall With safety card: EnDat 2.2 FS	
Commissioning	-	USB	
Digital inputs	-	4	
Digital outputs	-	2	
Safety function	-	Without safety card: STO according to SIL 3 With safety card: safe 1 V_{SS} sine/cosine encoder emulation to SIL 2, SBC to SIL 3	
Brake control	-	Yes	
Brake chopper	-	Not integrated	
Technology functions	-	Motion Task	
Weight	kg	1.52	
Ambient temperature	°C	0 to 45	
Protection class	IP	65	
Approval	-	NRTL, CE, functional safety	

Find out more about the cyber® simco® drive in combination with traction drives for use in automated guided vehicles





Number	Function	Connector on the device
X1	Power supply (logic / STO)	M12 6-pole connector
X2	Safety encoder emulation (only with safety card)	M12 8-pole socket, A-coded
X3	Motor and brake temperature sensor	M12 4-pole connector A-coded
X4	Safety I/O (only with safety card)	M12 12-pole socket, A-coded
X5	Fieldbus interface Output	CAN: M12 5-pole socket A-coded Ethernet-based: M12 4-pole socket D-coded
X6	Diagnostic interface USB	M12 4-pole socket A-coded
X7	Fieldbus interface Input	CAN: M12 5-pole connector A-coded Ethernet-based: M12 4-pole socket D-coded
X8	Digital inputs and outputs	M12 8-pole connector A-coded
X9	Encoder interface	M12 17-pole connector A-coded
	Motor (U, V, W, PE) and power supply (UZK+/UZK-)	Threaded connection M5 / terminal M5 up to 25mm ²

cyber[®] dynamic line

Brushless servo motors



The brushless servo motors in the cyber[®] dynamic line are the professional choice for applications with limited space. Equipped with a high-quality stainless-steel housing and absolute encoder (singleturn or multiturn), this motor series provides maximum reliability and precision.

The motors can be expanded with a holding brake in both Inox and Hygienic Design, a planetary gearbox or ball screws, as required.

+ Industrial grade

With a protection class up to IP69K, the cyber® dynamic line is also suitable for use under adverse conditions. The drag-chain compatible, single-cable solution facilitates integration in machines, while the stainless-steel housing and the high-strength connection of the motor/gearbox combination ensure a high level of safety. In addition, an absolute encoder is integrated as standard. There is also the option to equip the series with a multiturn encoder (for size 32/40) or a holding brake (for size 40).

+ Dynamics

The cyber® dynamic line is characterized by a high dynamic factor (maximum torque M_{\max} /mass inertia J) and performs short movements with frequent speed changes in an optimal manner (e.g. pick & place). This allows higher accelerations to be achieved – together with shorter downtimes and cycle times in the machine. In addition to this potential to increase productivity, the low inertia of the motor can effectively help to save energy and enhance efficiency.

+ Torque density

Thanks to its high copper filling factor, the cyber® dynamic line has a comparatively high torque with a small size. This enables the direct drives to achieve a torque of up to 1 Nm. Thanks to their low weight and compact design, the motors are also ideally suited for use in moving axes. The possibility to downsize the entire drive train leads to measurable cost savings.

+ Simplicity

The motor parameters of the cyber® dynamic line are stored in the cyber® simco® drive and automatically synchronized with the encoder circuit board by the TID when switched on. This electronic name plate ensures that commissioning is simple, fast and reliable.




cyber[®] dynamic motor

Servo motor

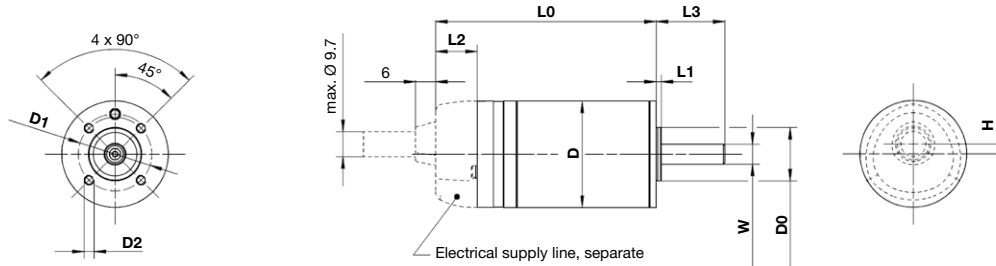
Size			17	22	32	40
DC bus voltage	U_{DC}	V_{DC}	48	48	48	48
Maximum torque	M_{max}	Nm	0.03	0.08	0.33	1.02
Continuous stall torque	M_0	Nm	0.01	0.03	0.14	0.38
Holding torque brake (at 120°C)	M_4	Nm	-	-	-	0.36
No-load speed	n_0	rpm	22,918	14,324	9513	5590
Continuous stall current	I_0	A_{eff}	0.53	0.91	2.60	3.90
Mass moment of inertia	J_1	$kgm^2 \cdot 10^{-8}$	6	12	56	250
Weight*	m	kg	0.11	0.15	0.33	0.54
Ambient temperature	ϑ_U	°C	0 up to +40			
Encoder	-	-	Absolute encoder Singleturn BiSS-C (HI) Absolute encoder Multiturn BiSS-C (HM) for size 32/40 Incremental encoder (HF)			

* Standard version incl. 0.5 m cable and plug

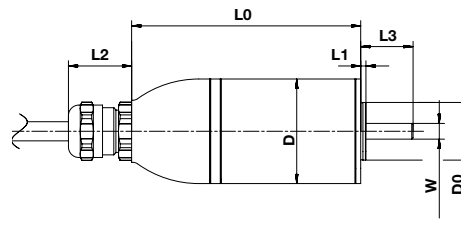
Designs

	Standard Design	Inox Design	Hygienic Design
			
Design	Standard with plastic cap	Standard with PG-cable gland	Hygienic (according to EHEDG guidelines)
Size (outer diameter in mm)	17 / 22 / 32 / 40	17 / 22 / 32 / 40	40
Protection class Shaft Cable outlet	IP20 IP54	IP20 IP66/67	IP67S IP69K
Housing material	Corrosion-resistant stainless steel (V2A) and plastic (PA6)	Corrosion-resistant stainless steel (V2A)	Corrosion-resistant stainless steel (V2A)
Shaft material	Steel	Steel	Corrosion-resistant stainless steel (V2A)
Lubrication	Lubricated for life Standard grease	Lubricated for life Standard grease	Lubricated for life Food grade (NSF/H1)
Certification	CE	CE, UL (cRUus) for size 32/40	CE
Gearbox	Optional	Optional	Optional
Screw drive	Optional	Optional	No

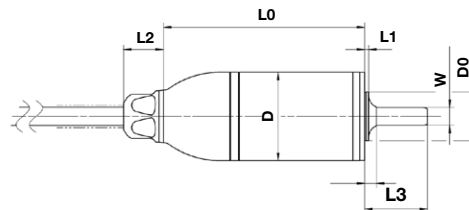
Standard:



Inox Design:



Hygienic Design:



Size	17		22		32		40		
Designs	Standard	Inox	Standard	Inox	Standard	Inox	Standard	Inox	Hygienic
D	17		22		32		40		
D0	10		13		16		22		
D1	12.5		17		22		32		30
D2	M1.6x2.5		M2x3.5		M3x4.5		M3x4.5		M3x4
W	3		4		6		6		8
L0 (without brake)	47	54.4	49.1	57.9	66.1	74.6	80.3	87.4	90.4
L0 (with brake)	-	-	-	-	-	-	-	130.5	133.5
L1	1.2		1.5		1.5		2		
L2	13.3	20	12.4	20	12.5	22	14.5	22	18
L3	10		12		20.6		20		28.5
H	0		0		3		7.5		
Shaft type	Plain shaft								

cyber[®] dynamic actuator R

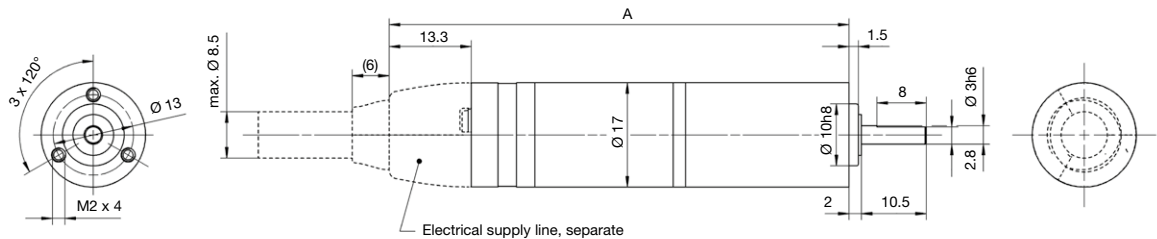
Servo actuator – size 17

No. of stages			1	2			3		
Gear ratio	i	–	4	12	21	28	36	48	64
Maximum torque	M _{max}	Nm	0.10	0.30	0.50	0.60	0.80	1.00	1.37
Continuous stall torque	M ₀	Nm	0.03	0.08	0.14	0.18	0.24	0.27	0.36
Rated torque	M _n	Nm	0.02	0.05	0.10	0.11	0.14	0.15	0.21
No-load speed	n _{max}	rpm	2500	833	476	357	287	208	156
Permanently permitted speed	n _{max, S1}	rpm	1500	500	286	214	167	125	94
Continuous stall current	I ₀	A _{eff}	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Weight*	m	kg	0.14	0.15			0.15		
Torsional backlash	j _t	arcmin	20	35			50		
Max. axial force**	F _{AMax}	N	10						
Max. radial force**	F _{max}	N	30						
Lubrication	-	-	Lubricated for life (standard grease)						
Protection class Shaft Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	20 54 66/67						
Shaft type	-	-	D-cut shaft						

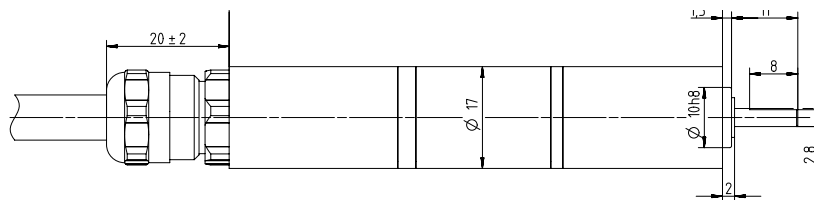
* Standard version incl. 0.5 m cable and connector

** Refers to center of the output shaft

Standard:



Inox Design:



Gear ratio	Length A [mm]	Length A [mm] (Inox Design)
Single-stage, i4	64.5	71.9
Two-stage, i12/21/28	69.5	76.9
Three-stage, i36/48/64	74.5	81.9

cyber[®] dynamic actuator R

Servo actuator – size 22



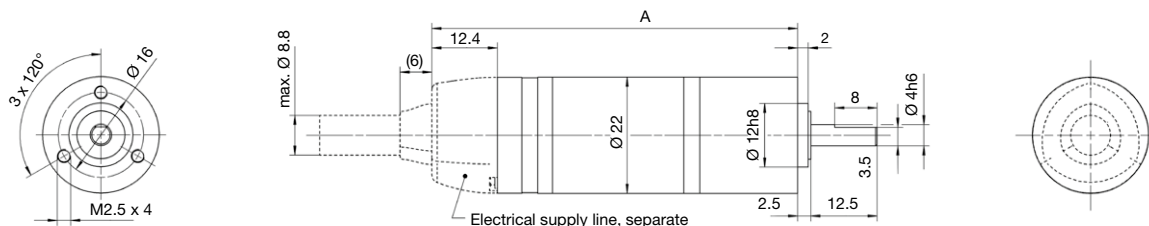
cyber motor

No. of stages			1	2			3
Gear ratio	i	–	4	16	20	28	64
Maximum torque	M _{max}	Nm	0.20	1.00	1.00	1.00	1.50
Continuous stall torque	M ₀	Nm	0.10	0.41	0.50	0.50	1.43
Rated torque	M _n	Nm	0.10	0.38	0.48	0.50	1.29
No-load speed	n _{max}	rpm	2500	625	500	357	156
Permanently permitted speed	n _{max, S1}	rpm	1500	375	300	214	94
Continuous stall current	I ₀	A _{eff}	0.77	0.85	0.83	0.63	0.76
Weight*	m	kg	0.20	0.21			0.22
Torsional backlash	j _t	arcmin	20	35			50
Max. axial force**	F _{AMax}	N	24				
Max. radial force**	F _{max}	N	30				
Lubrication	-	-	Lubricated for life (standard grease)				
Protection class Shaft Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	20 54 66/67				
Shaft type	-	-	D-cut shaft				

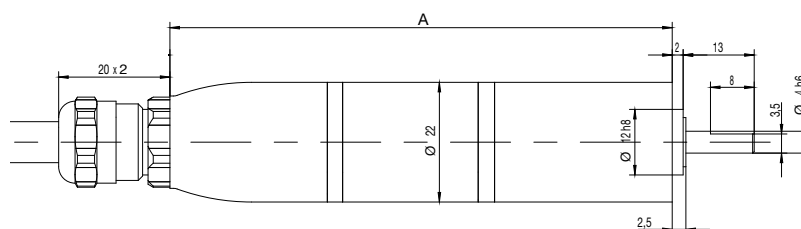
* Standard version incl. 0.5 m cable and connector

** Refers to center of the output shaft

Standard:



Inox Design:



Gear ratio	Length A [mm]	Length A [mm] (Inox Design)
Single-stage, i4	69.1	77.9
Two-stage, i16/20/28	76.1	84.9
Three-stage, i64	83.1	91.9

cyber[®] dynamic actuator R

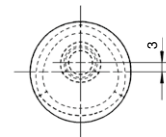
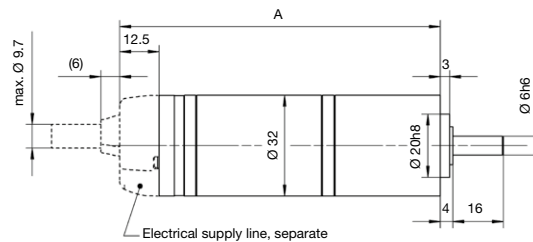
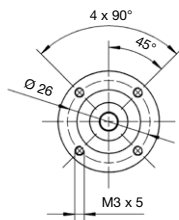
Servo actuator – size 32

No. of stages			1	2			3		
Gear ratio	i	–	4	16	20.8	25	64	72	100
Maximum torque	M _{max}	Nm	0.8	4.0	4.0	4.0	6.0	6.0	6.0
Continuous stall torque	M ₀	Nm	0.4	1.5	2.0	2.0	6.0	6.0	6.0
Rated torque	M _n	Nm	0.4	1.3	1.7	2.0	5.0	5.6	6.0
No-load speed	n _{max}	rpm	2000	500	385	320	125	111	80
Permanently permitted speed	n _{max, S1}	rpm	1250	312	240	200	78	69	50
Continuous stall current	I ₀	A _{eff}	1.9	2.0	2.0	1.7	2.0	1.8	1.4
Weight*	m	kg	0.47	0.51			0.56		
Torsional backlash	j _t	arcmin	20	35			50		
Max. axial force**	F _{AMax}	N	65						
Max. radial force**	F _{max}	N	80						
Lubrication	-	-	Lubricated for life (standard grease)						
Protection class Shaft Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	20 54 66/67						
Shaft type	-	-	Plain shaft						

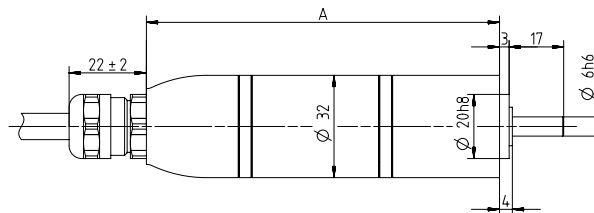
* Standard version incl. 0.5 m cable and connector

** Refers to center of the output shaft

Standard:



Inox Design:



Gear ratio	Length A [mm]	Length A[mm] (Inox Design)
Single-stage, i4	92.6	101.1
Two-stage, i16/20.8/25	101.6	110.1
Three-stage, i64/72/100	110.6	119.1

cyber[®] dynamic actuator R

Servo actuator – size 40 (GCP)



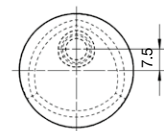
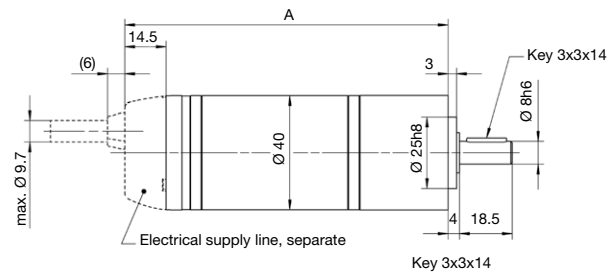
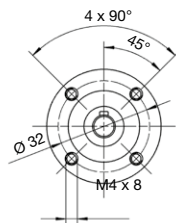
cyber motor

No. of stages			1	2				3		
Gear ratio	i	–	4	12.25	20	25	30.67	49	64	100
Maximum torque	M _{max}	Nm	1.4	8.0	8.0	8.0	8.0	12.0	12.0	12.0
Continuous stall torque	M ₀	Nm	0.7	3.2	4.0	4.0	4.0	11.5	12.0	12.0
Holding torque brake (at 120°C)	M ₄	Nm	1.6	4.8	7.8	9.8	12.0	19.2	25.1	39.2
Rated torque	M _n	Nm	0.7	2.4	4.0	4.0	4.0	7.5	9.8	12.0
No-load speed	n _{max}	rpm	1397	456	279	224	182	114	87	56
Permanently permitted speed	n _{max, S1}	rpm	1250	408	250	200	163	102	78	50
Continuous stall current	I ₀	A _{eff}	2.0	2.9	2.3	1.9	1.6	2.9	2.5	1.8
Weight* (without brake)	m	kg	0.8	0.89				0.95		
Torsional backlash	j _t	arcmin	20	35				50		
Max. axial force**	F _{AMax}	N	120							
Max. radial force**	F _{max}	N	150							
Lubrication	-	-	Lubricated for life (standard grease)							
Protection class Shaft Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	20 54 66/67							
Shaft type	-	-	Feather keyway							

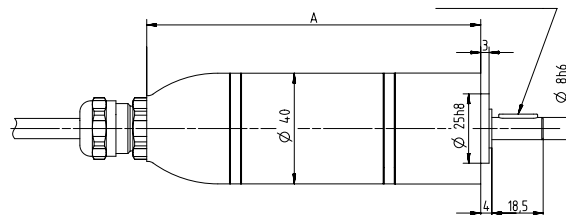
* Standard version incl. 0.5 m cable and connector

** Refers to center of the output shaft

Standard:



Inox Design:



Gear ratio	Length A [mm]	Length A [mm] (Inox Design)	Additional length brake [mm]
Single-stage, i4	113.3	120.4	43.1
Two-stage, i12.25/20/25/30.67	125.8	132.9	43.1
Three-stage, i49/64/100	138.3	145.4	43.1

cyber[®] dynamic actuator R

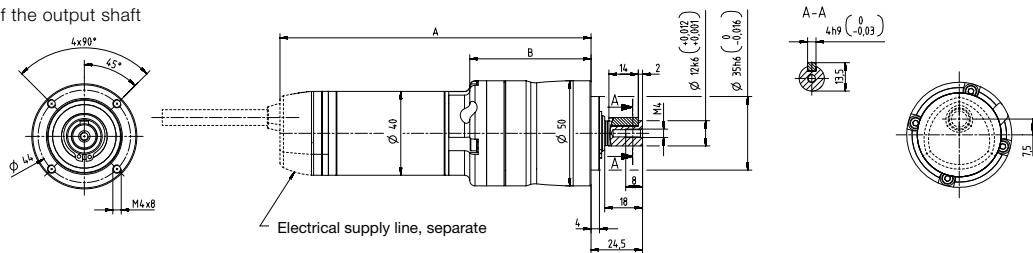
Servo actuator – size 40 (NP)

No. of stages			1		2
Gear ratio	i	–	5	10	25
Maximum torque	M_{max}	Nm	4.9	9.9	22.0
Continuous stall torque	M_0	Nm	1.6	3.4	6.5
Holding torque brake (at 120°C)	M_4	Nm	2.2	4.1	10.5
No-load speed	n_{max}	rpm	1118	559	224
Permanently permitted speed	$n_{max, S1}$	rpm	800	460	160
Rated current	I_n	A_{eff}	3.7	3.7	3.0
Maximum current	I_{max}	A_{eff}	11.4	11.4	10.0
Maximum torsional backlash	j_t	arcmin	≤ 10		≤ 13
Max. axial force**	F_{Amax}	N	700		
Max. radial force**	F_{rmax}	N	800		
Weight* (without brake)	m	kg	1.1	1.1	1.3
Lubrication	-	-	Lubricated for life (standard grease) Optional: Food grade (NSF/H1) – Reduction of the output torques by 20 %		
Protection class Shaft Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	64 54 66/67		
Shaft type	-	-	Feather keyway		

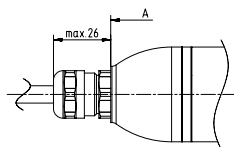
* Standard version incl. 0.5 m cable and connector

** Refers to center of the output shaft

Standard:



Inox Design:



Gear ratio	Length A [mm]	Length A [mm] (Inox Design)	Additional length brake [mm]
Single-stage, i5, 10	148	155.1	43.1
Two-stage, i25	163.5	170.6	43.1

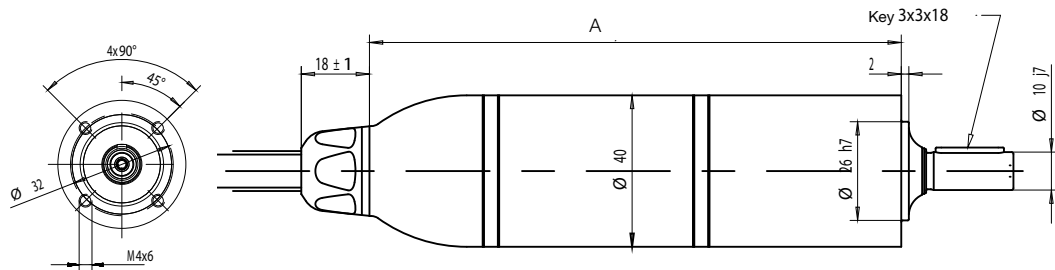
cyber[®] dynamic actuator R

Servo actuator – Hygienic Design

No. of stages			1		2	
Gear ratio	i	–	4	5	16	50
Maximum torque	M _{max}	Nm	3.87	4.84	8.40	9.20
Continuous stall torque	M ₀	Nm	1.07	1.33	4.20	4.60
Holding torque brake (at 120°C)	M ₄	Nm	1.60	2.10	6.60	20.50
Rated torque	M _n	Nm	0.87	1.09	3.48	4.60
No-load speed	n _{max}	rpm	2000	1600	500	160
Permanently permitted speed	n _{max, S1}	rpm	1000	800	250	80
Continuous stall current	I ₀	A _{eff}	3.17	3.17	3.13	1.39
Weight* (without brake)	m	kg	0.92		1.13	
Torsional backlash	j _t	arcmin	20		25	
Max. axial force**	F _{AMax}	N	230			
Max. radial force**	F _{max}	N	200			
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)			
Protection class Shaft connector Cable outlet	-	IP	67S 69K			
Shaft type	-	-	Feather keyway			

* Standard version incl. 0.5 m cable and connector

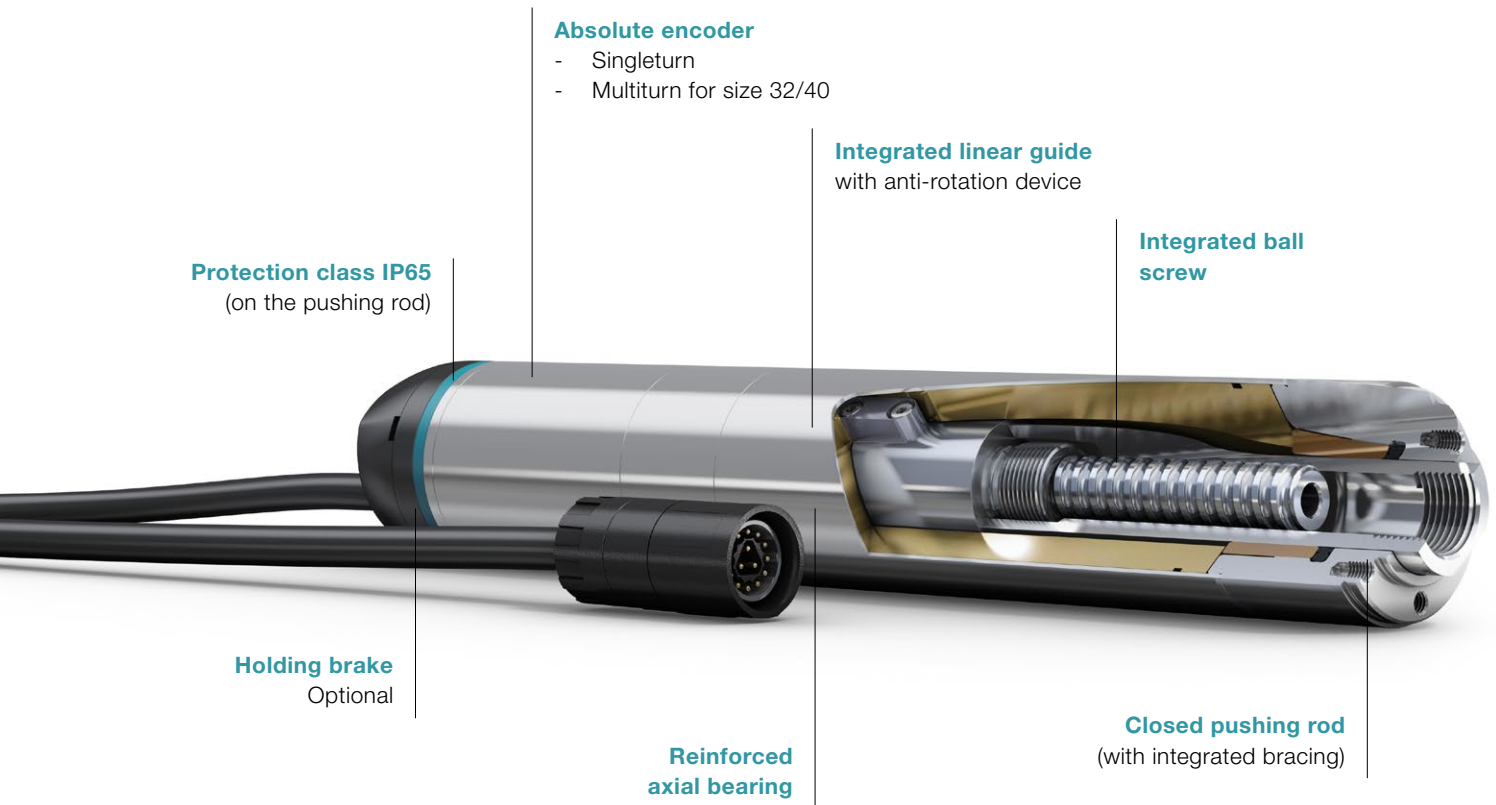
** Refers to center of the output shaft



Gear ratio	Length A [mm]	Additional length brake [mm]
Single-stage, i4/5	124.6	43.1
Two-stage, i16/50	140.1	43.1

cyber[®] dynamic line

Linear actuators



The industrial servo motors in the cyber[®] dynamic line with integrated ball screw are the ideal solution for dynamic positioning processes. As servo motors with an integrated ball screw, they represent an energy-efficient and maintenance-free alternative to pneumatic cylinders.

The version with a closed pushing rod, integrated linear guide and anti-rotation device forms a highly compact unit. The motors can be expanded with a holding brake (size 40) in Inox and Hygienic Design.

Industrial grade

On the linear actuators in the cyber® dynamic line, the screw drive is fully integrated in the actuator housing – the servo motor, ball screw drive, linear guide and encoder system form a closed, highly integrated and ready-to-install unit. All sizes also feature an absolute encoder and single-cable technology that is suitable for drag chains and EMC-compliant. These properties make the drives perfect for use in industrial environments.

Power density and dynamics

The small servo motors with integrated ball screw boast impressively high power density and dynamics. Each of the four sizes has two different screw pitches, thus catering optimally for both force-optimized and dynamic-optimized applications. In addition, the linear actuators have a compact design, which means that the mass inertia is significantly lower than for servo motors with a mounted ball screw, for example.

Maintenance-free

The linear actuators feature a food-grade lubrication system and are thus maintenance-free. The closed pushing rod with integrated bracing prevents the ball screw from becoming contaminated. In addition, the ball screw drive in conjunction with the reinforced bearing enables a force to be applied in both the pull and push directions.

Process reliability

In contrast to pneumatic cylinders, the linear actuators enable precise and flexibly controllable positioning processes in every application without having to retool the machine. This makes them particularly suitable for applications with frequent format changes. The servo technology, which is inherently better controllable, and the simple integration into the higher-level control system enable reproducible processes, which can also be represented both by displacement and by force.

cyber[®] dynamic actuator L

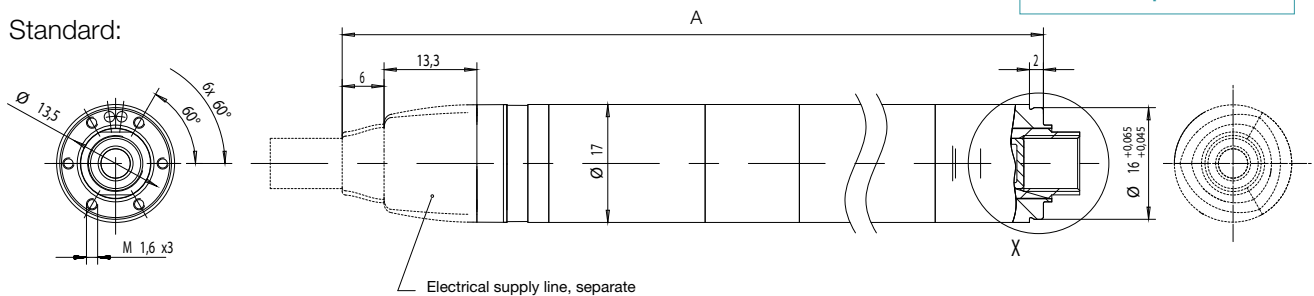
Linear actuator – size 17

			17	
Screw pitch	p_{SP}	mm	1	3
Maximum push force	F_{AMax}	kN	0.2	0.07
Continuous stall force	F_0	kN	0.05	0.02
Max. speed (without external load)	v_0	mm/s	100	300
Positioning accuracy	-	mm	up to 0.05	
Repeatability	-	mm	0.01	
Axial play	-	mm	0.05	
Reverse play	-	mm	0.1	0.2
Maximum stroke	s	mm	30/120	
Weight (depending on stroke length)*	m	kg	0.23/0.33	
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)	
Protection class				
Pushing rod	-	IP	65	
Cable outlet (Standard Design)	-		54	
Cable outlet (Inox Design)	-		66/67	

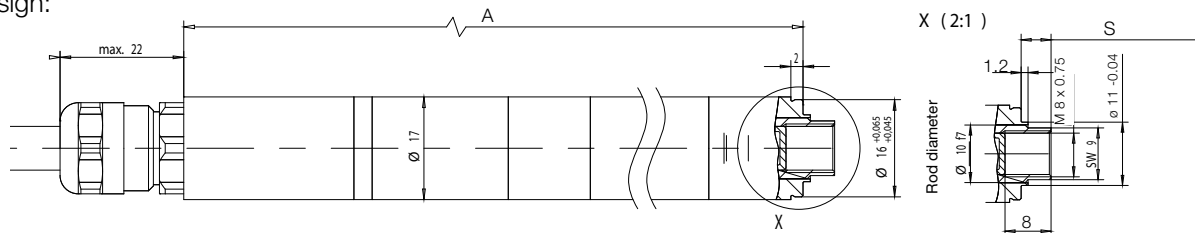
* Standard version incl. 0.5 m cable and plug

Key area is not aligned
with the bolt pattern

Standard:



Inox Design:



Length A [mm]	Length A [mm] (Inox Design)	Stroke S [mm]
140	147.4	5.2 – 35.2 (=30 mm)
230	237.4	5.2 – 125.2 (=120 mm)

cyber[®] dynamic actuator L

Linear actuator – size 22



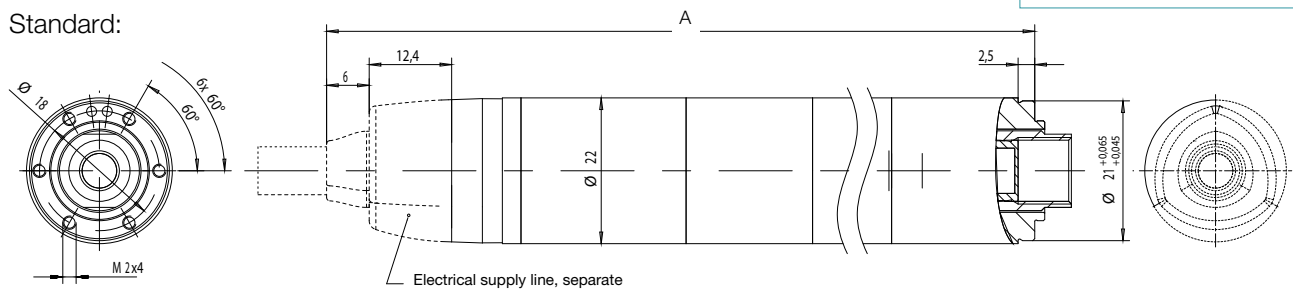
cyber motor

			22	
Screw pitch	p_{SP}	mm	1	6
Maximum push force	F_{AMax}	kN	0.4	0.07
Continuous stall force	F_0	kN	0.16	0.03
Max. speed (without external load)	v_0	mm/s	100	600
Positioning accuracy	-	mm	up to 0.05	
Repeatability	-	mm	0.01	
Axial play	-	mm	0.05	
Reverse play	-	mm	0.1	0.2
Maximum stroke	s	mm	35/140	
Weight (depending on stroke length)*	m	kg	0.39/0.62	
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)	
Protection class	-	-		
Pushing rod	-	IP	65	
Cable outlet (Standard Design)	-		54	
Cable outlet (Inox Design)	-		66/67	

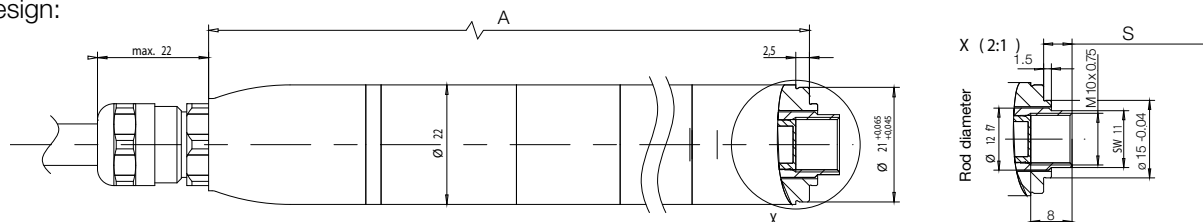
* Standard version incl. 0.5 m cable and plug

Key area is not aligned
with the bolt pattern

Standard:



Inox Design:



Length A [mm]	Length A [mm] (Inox Design)	Stroke S [mm]
164.5	172.9	5.5 – 40.5 (=35 mm)
269.5	277.9	5.5 – 145.5 (=140 mm)

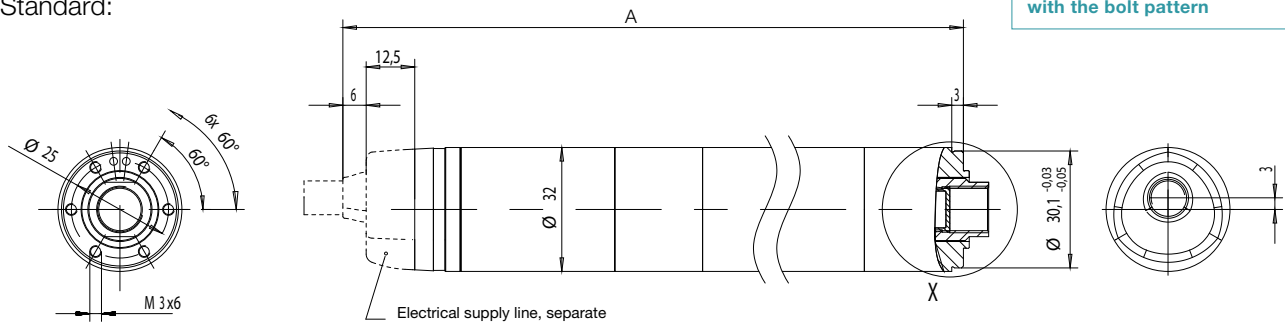
cyber[®] dynamic actuator L

Linear actuator – size 32

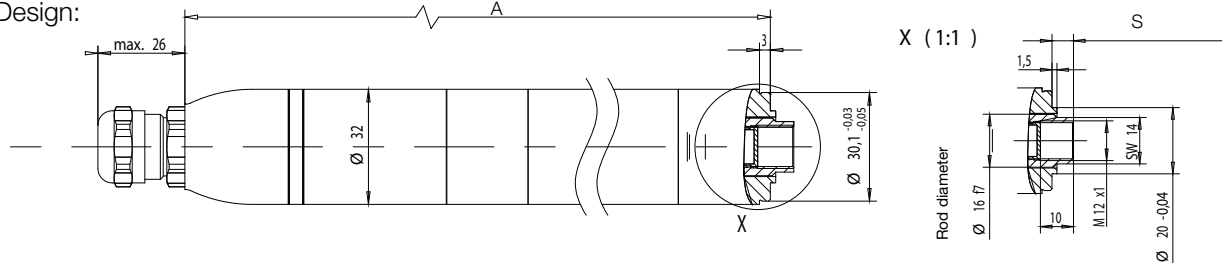
			32	
Screw pitch	p_{SP}	mm	2	8
Maximum push force	F_{AMax}	kN	0.94	0.2
Continuous stall force	F_0	kN	0.35	0.09
Max. speed (without external load)	v_0	mm/s	200	800
Positioning accuracy	-	mm	up to 0.05	
Repeatability	-	mm	0.01	
Axial play	-	mm	0.05	
Reverse play	-	mm	0.1	0.2
Maximum stroke	s	mm	40/160	
Weight (depending on stroke length)*	m	kg	1.0/1.6	
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)	
Protection class				
Pushing rod	-	IP	65	
Cable outlet (Standard Design)	-		54	
Cable outlet (Inox Design)	-		66/67	

* Standard version incl. 0.5 m cable and plug

Standard:



Inox Design:



Length A [mm]	Length A [mm] (Inox Design)	Stroke S [mm]
199.1	205.6	6.5 – 46.5 (=40 mm)
319.1	325.6	6.5 – 166.5 (=160 mm)

cyber[®] dynamic actuator L

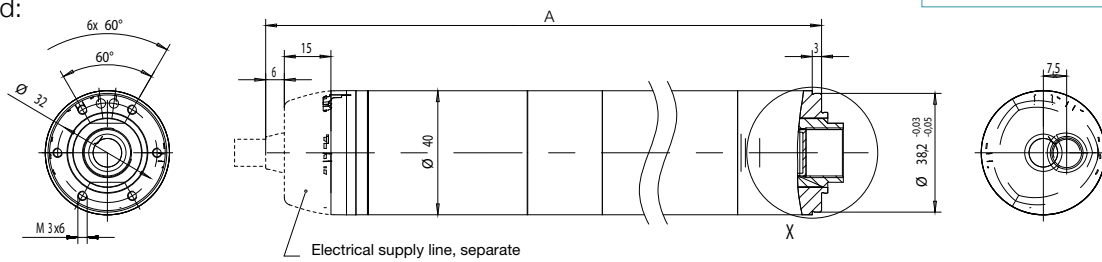
Linear actuator – size 40

			40					
Screw pitch	p_{SP}	mm	3			10		
Maximum push force	F_{AMax}	kN	1.92	1.92	1.28	0.58	0.58	0.58
Continuous stall force	F_0	kN	0.64	0.64	0.64	0.17	0.17	0.19
Holding force brake (at 120°C)	F_4	kN	0.83	0.83	0.83	0.25	0.25	0.25
Max. speed (without external load)	v_0	mm/s	279	279	140	932	932	467
Positioning accuracy	-	mm	up to 0.05					
Repeatability	-	mm	0.01					
Axial play	-	mm	0.05					
Reverse play	-	mm	0.1			0.2		
Maximum stroke	s	mm	50	200	300	50	200	300
Weight (without brake/ depending on stroke length)*	m	kg	1.8	3.2	3.0	1.8	3.2	3.0
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)					
Protection class Pushing rod Cable outlet (Standard Design) Cable outlet (Inox Design)	-	IP	65 54 66/67					

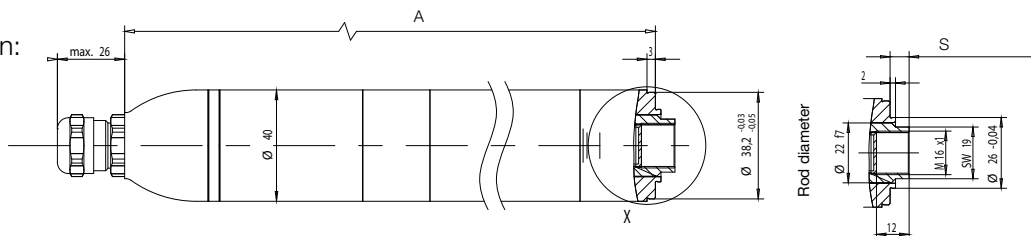
* Standard version incl. 0.5 m cable and plug

Key area is not aligned
with the bolt pattern

Standard:



Inox Design:



Length A [mm]	Length A [mm] (Inox Design)	Stroke S [mm]	Additional length brake [mm]
239.3	246.4	7 – 57 (=50 mm)	43.1
389.3	396.4	7 – 207 (=200 mm)	43.1
489.3	496.4	7 – 307 (=300 mm)	43.1

Holding brake

A compact permanent magnet brake is fitted to secure the motor shaft when disconnected from the power. Its particular features include no torsional backlash, no residual torque when the brake is released and unlimited duty cycles at zero speed.

Size		40
Holding torque static at 120 °C	Nm	0.36
Supply voltage	V _{DC}	24
Current at rated voltage and 20 °C	A _{DC}	0.42
Closing-time	ms	13
Opening-time	ms	27
Weight	kg	0.18

The holding brakes used in the drives are subject to various influencing factors, e.g. the oxidation of abrasion particles, the flattening of friction surfaces in the case of frequent brake action in the same position, or wear-dependent changes to the air gap. This may result in a reduction of the available holding torque. The specified holding torques therefore apply to the ideal state upon delivery under optimal conditions without detrimental influences. For critical applications, we recommend sizing for an adequately large holding torque to take account of these factors.

Depending on the configured gear ratio, the brake used in the drives can generate a dynamic brake torque at the output in the event of an emergency stop that exceeds the permissible maximum torque $M_{\text{max act}}$ of the gearbox. In this case, care must be taken in the application to prevent the maximum torque from being exceeded in this way, otherwise the gearbox could be damaged. For the linear drives, the same behavior results from external forces.

Note: The holding brake is available for the cyber[®] dynamic system and for the cyber[®] dynamic line in size 40 in connection with an absolute encoder (HI/HM) and Inox/Hygienic Design. Variants with an incremental encoder (HF) or in the Standard Design cannot be equipped with a holding brake.

Encoder

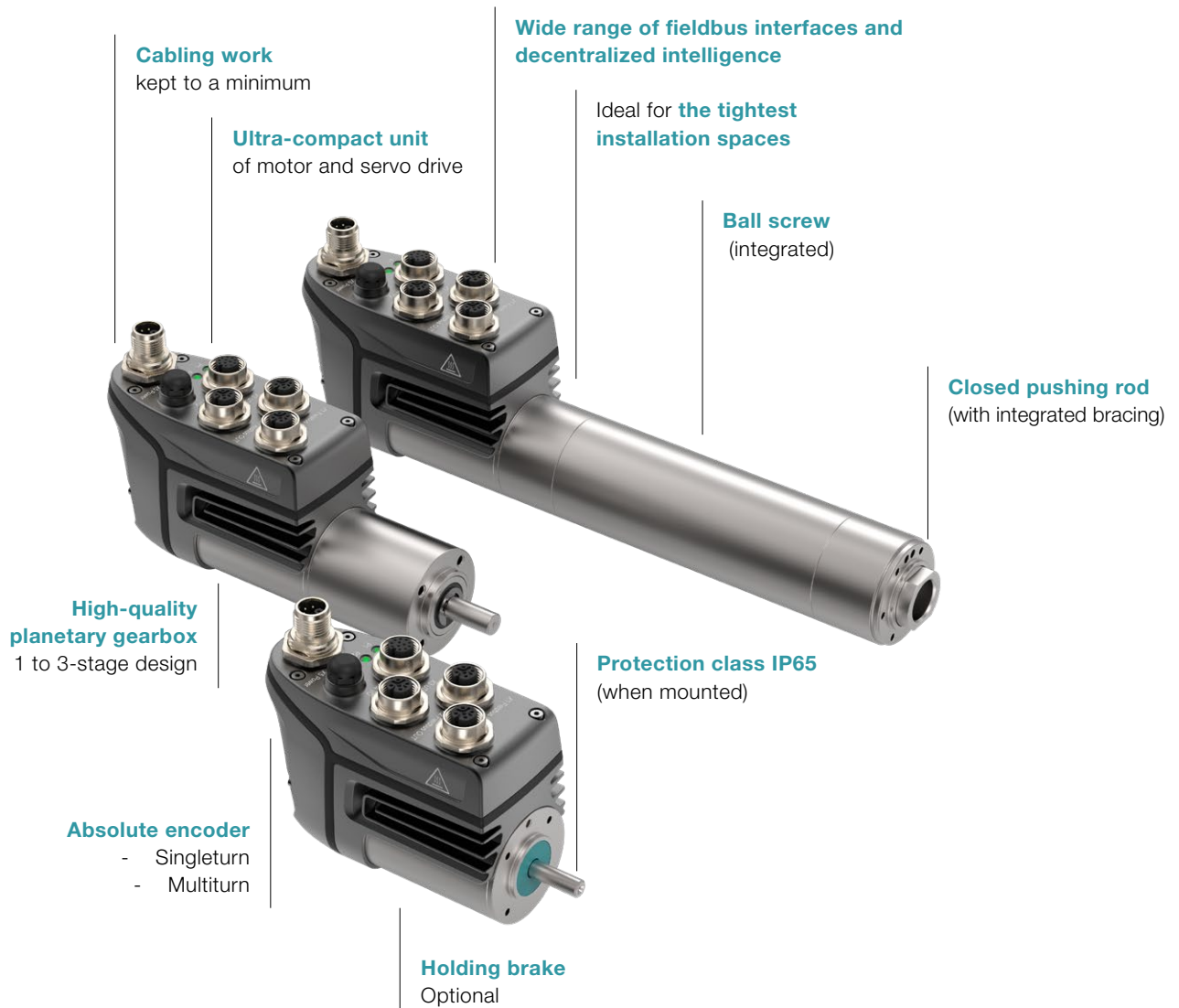
A selection of encoder systems is available for positioning and speed measurement:

- BiSS-C, singleturn absolute encoder (HI): suitable for universal use
- BiSS-C, multiturn absolute encoder (HM): available for the cyber® dynamic system and the cyber® dynamic line in size 32/40 and Inox/Hygienic Design
- Incremental encoder (HF): available for cyber® dynamic line

Encoder	HI	HM	HF
Interface	BiSS interface C-mode	BiSS interface C-mode	TTL
Power supply	5 V ± 10%		
Operating power consumption (no load)	50 mA	150 mA	50 mA
Max. power consumption (no load)	275 mW	825 mW	275 mW
Resolution	4096 positions per revolution	4096 positions per revolution (12 bit) / 65,536 revolutions (16 bit)	1024 increments per revolution
System accuracy	± 1°		
Repeatability	± 0.2°		

cyber[®] dynamic system

Servo motors and actuators



With its multi-Ethernet interface, the industrial cyber[®] dynamic system (CDS) compact drive system ensures maximum connectivity and features decentralized intelligence. The low inertia of the motor and the high current resolution also ensure highly dynamic and precise movements. The system is the professional choice for decentralized applications in demanding environmental conditions with limited installation

space. The CDS is also equipped with the integrated safety function STO (Safe Torque Off) and meets safety requirements in accordance with SIL3/PL e.

You can choose to equip the system with different encoder variants as well as planetary gearboxes, a ball screw drive and a holding brake.

+ Connectivity

The cyber® dynamic system (CDS) is available with an multi-Ethernet and allows the user to choose freely between the fieldbus variants EtherCAT, PROFINET, EtherNet/IP CIP Sync and SERCOS III using the same piece of hardware. A variant with CANopen is also available as an option. This feature ensures proven, simple and real-time connectivity to a range of different control environments. The multi-Ethernet version also reduces the usual number of variants. In addition, an electronic name plate makes automatic motor parameterization possible. Rapid commissioning and connection to the PLC is also possible. You also benefit from an OPC UA interface for platform- and manufacturer-independent data exchange.

+ Dynamics

The low inertia of the CDS motors ensures maximum acceleration and contributes to high dynamics. The real-time and isochronous Ethernet communication supports this. The cyber® dynamic system also offers a decentralized PLC functionality for independent positioning operations, which also relieves the load on the automation system. In addition, synchronous and dynamic drive profiles can be implemented with the CDS.

+ Flexibility

The modular principle of the small servo drive system enables optimum solutions for a wide range of applications. These include the optimum integration of absolute encoders, such as singleturn or multiturn encoders, a holding brake as well as planetary gearboxes (GCP or NP) or a ball screw drive. This gives you a new level of freedom in your machine design.

+ Compactness

A 40 mm motor together with a special housing version of the servo drive forms an ultra-compact unit that fits into the tightest of installation spaces and eliminates the need for cabling work with the exception of the power supply and fieldbus communication – without compromising on suitability for industrial use, connectivity, dynamics and precision. As a decentralized solution, the CDS thus saves valuable space in the control cabinet.

+ Precision

The motor-integrated variant cyber® dynamic system is equipped with an absolute encoder with an encoder resolution of 12 bits. The high current resolution of 14 bits ensures high-precision torque control. This allows short cycle times to be achieved for highly dynamic and precise applications.

+ Robustness and safety

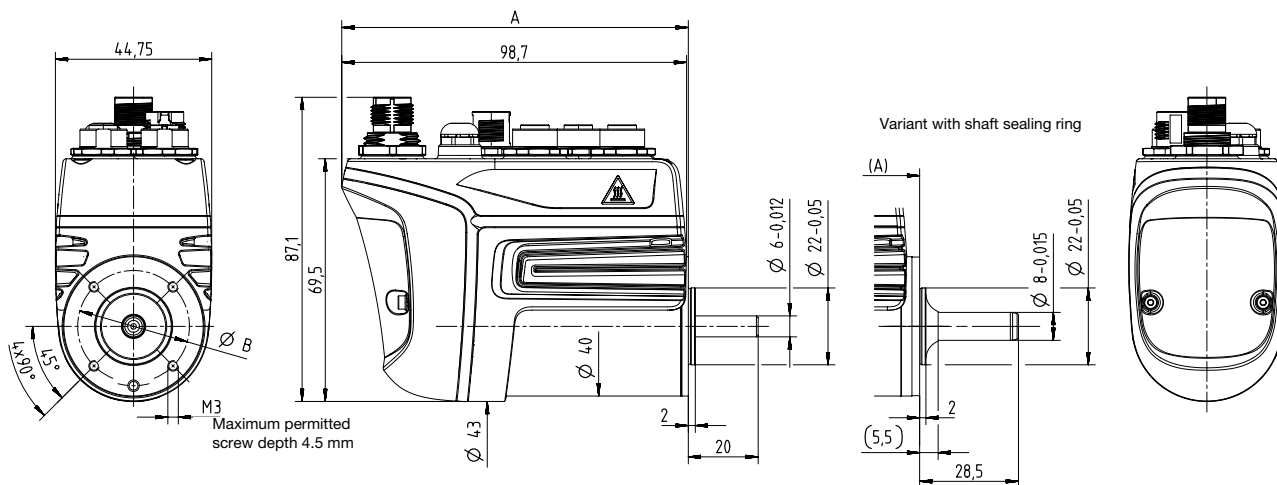
Suitable for industrial use – thanks to the combination of a robust design with integrated safety. The integrated safety function STO (Safe Torque Off) means that the cyber® dynamic system meets safety requirements to SIL3/PL e. Moreover, the CDS features a 12 to 60 V_{DC} wide-range input on the supply side, which allows it to compensate for any fluctuations in the voltage source. There is also the motor-integrated vision with protection class IP65, which is suitable for decentralized use in demanding environmental conditions with limited installation space.

cyber[®] dynamic system

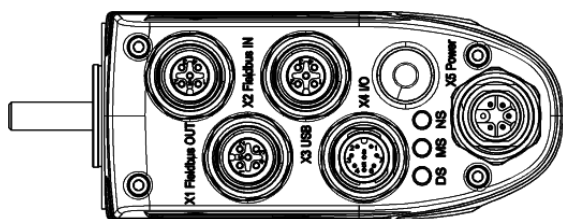
Servo motor

Size			40
Supply voltage (Power / Logic / STO)	U_{DC}	V_{DC}	+12 to 60
Maximum torque	M_{max}	Nm	1.02
Continuous stall torque	M_0	Nm	0.32
Holding torque brake (at 120°C)	M_4	Nm	0.36
No-load speed	n_0	rpm	5087
Rated current	I_n	A_{eff}	2.9
Maximum current	I_{max}	A_{eff}	11.5
Rated power	P_n	W	137
Maximum power	P_{max}	W	329
Communication	-	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen
Commissioning	-	-	USB
Digital inputs	-	-	4
Digital outputs	-	-	2
Safety function	-	-	STO (Safe Torque Off) according to SIL 3 / PL e
Brake chopper	-	-	Not integrated
Technology functions	-	-	Motion Task
Encoder	-	-	Absolute encoder Singleturn BiSS-C (HI) Absolute encoder Multiturn BiSS-C (HM)
Max. axial force*	F_{AMax}	N	0
Max. radial force*	F_{rmax}	N	150
Weight (without brake)	m	kg	0.63
Ambient temperature	ϑ_U	°C	0 up to +40
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)
Protection class Housing Shaft feedthrough Incl. shaft sealing ring	-	IP	65 20 65 (optional)
Mass moment of inertia	J_1	kgm ²	2.5E ⁻⁰⁶
Approval	-	-	NRTL, CE, functional safety

* Refers to center of the output shaft



	Length A [mm]	Diameter B [mm]	Additional length brake [mm]
CDSR	99.2	32	43.1
CDSR with shaft sealing ring	102.4	30	43.1



Number	Function	Connector on the device
X1	Fieldbus interface Output	CAN: M12 5-pole socket A-coded Ethernet-based: M12 4-pole socket D-coded
X2	Fieldbus interface Input	CAN: M12 5-pole connector A-coded Ethernet-based: M12 4-pole socket D-coded
X3	Diagnostic interface USB	M12 4-pole socket A-coded
X4	Digital inputs and outputs	M12 8-pole connector A-coded
X5	Power supply	M12 6-pole connector M-Power

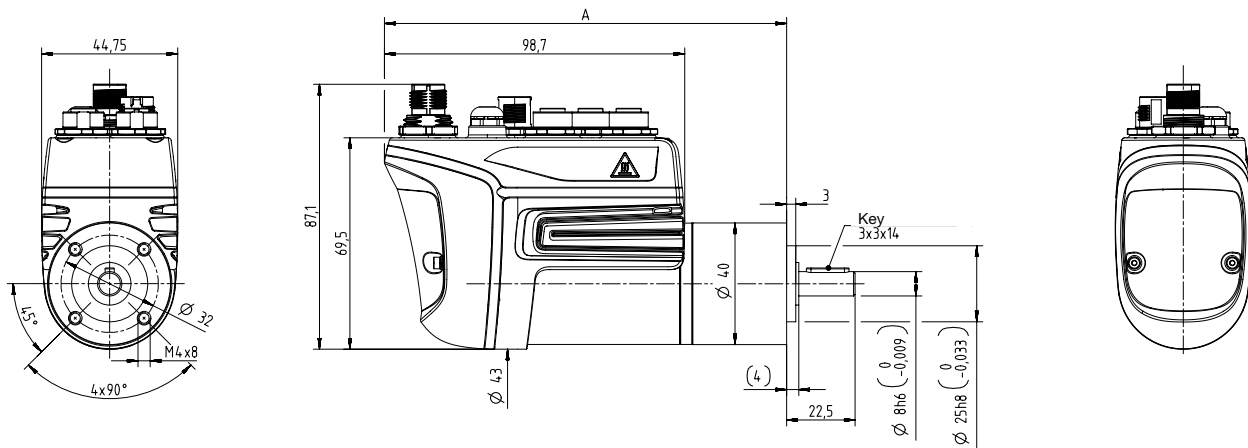
cyber[®] dynamic system

Servo actuator – GCP

No. of stages			1	2				3		
Gear ratio	i	-	4	12.25	20	25	30.67	49	64	100
Supply voltage (Power / Logic / STO)	U _{DC}	V _{DC}	+12 to 60							
Maximum torque	M _{max}	Nm	1.4	8.0	8.0	8.0	8.0	12.0	12.0	12.0
Continuous stall torque	M ₀	Nm	0.7	2.8	4.0	4.0	4.0	9.9	12.0	12.0
Holding torque brake (at 120°C)	M ₄	Nm	1.6	4.8	7.8	9.8	12.0	19.2	25.1	39.2
No-load speed	n ₀	rpm	1272	415	254	203	166	104	79	51
Permanently permitted speed	n _{max, S1}	rpm	1250	408	250	200	163	102	78	50
Rated current	I _n	A _{eff}	2.0	2.0	2.0	2.0	1.7	1.9	1.9	1.8
Maximum current	I _{max}	A _{eff}	3.9	7.3	4.4	3.6	2.9	3.1	2.5	1.8
Rated power	P _n	W	82	82	82	81	66	59	59	51
Maximum power	P _{max}	W	164	262	183	152	127	119	93	61
Communication	-	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen							
Commissioning	-	-	USB							
Digital inputs	-	-	4							
Digital outputs	-	-	2							
Safety function	-	-	STO according to SIL 3							
Brake chopper	-	-	Not integrated							
Technology functions	-	-	Motion Task							
Encoder	-	-	Absolute encoder Singleturn BiSS-C (HI) Absolute encoder Multiturn BiSS-C (HM)							
Max. torsional backlash	j _t	arcmin	≤ 20	≤ 35				≤ 50		
Max. axial force*	F _{AMax}	N	120							
Max. radial force*	F _{rmax}	N	150							
Weight (without brake)	m	kg	0.9	1.0				1.1		
Ambient temperature	ϑ _U	°C	0 up to +40							

No. of stages			1	2				3		
Gear ratio	i	-	4	12.25	20	25	30.67	49	64	100
Lubrication	-	-	Lubricated for life (standard grease)							
Protection class	-	IP	65							
Housing			54							
Shaft										
Mass moment of inertia	J_1	kgm ²	4.03E ⁻⁰⁵	3.76E ⁻⁰⁴	1.00E ⁻⁰³	1.56E ⁻⁰³	2.35E ⁻⁰³	6.00E ⁻⁰³	1.02E ⁻⁰²	2.50E ⁻⁰²
Approval	-	-	NRTL, CE, functional safety							

* Refers to center of the output shaft



	Length A [mm]	Additional length brake [mm]
Single-stage, i4	132.2	43.1
Two-stage, i12.25/20/25/30.67	144.7	43.1
Three-stage, i49/64/100	157.2	43.1

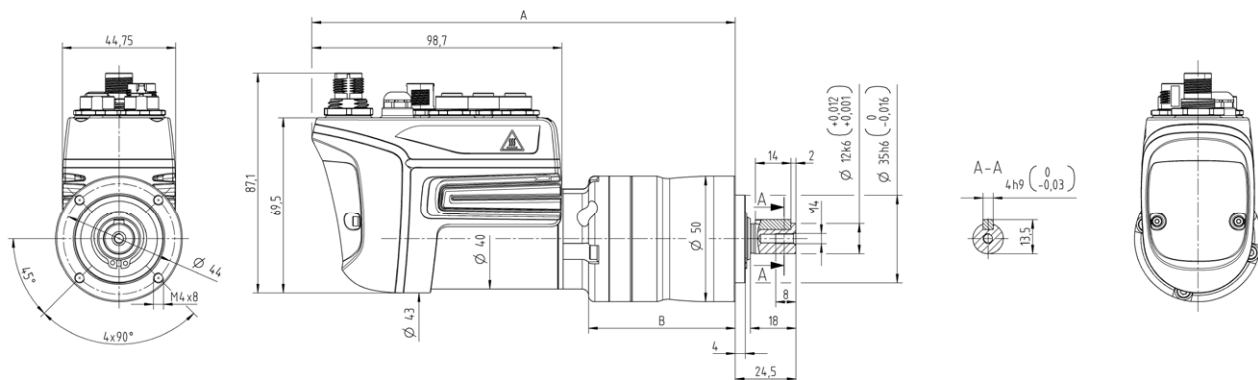
cyber[®] dynamic system

Servo actuator – NP

No. of stages			1		2
Gear ratio	i	-	5	10	25
Supply voltage (Power / Logic / STO)	U _{DC}	V _{DC}	+12 to 60		
Maximum torque	M _{max}	Nm	4.9	9.9	22.0
Continuous stall torque	M ₀	Nm	1.3	2.8	6.5
Holding torque brake (at 120°C)	M ₄	Nm	2.2	4.1	10.5
No-load speed	n ₀	rpm	1017	509	203
Permanently permitted speed	n _{max, S1}	rpm	800	460	160
Rated current	I _n	A _{eff}	2.7	2.6	2.7
Maximum current	I _{max}	A _{eff}	11.4	11.4	10.0
Rated power	P _n	W	95	112	97
Maximum power	P _{max}	W	317	321	306
Communication	-	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen		
Commissioning	-	-	USB		
Digital inputs	-	-	4		
Digital outputs	-	-	2		
Safety function	-	-	STO according to SIL 3		
Brake chopper	-	-	Not integrated		
Technology functions	-	-	Motion Task		
Encoder	-	-	Absolute encoder Singleturn BiSS-C (HI) Absolute encoder Multiturn BiSS-C (HM)		
Max. torsional backlash	j _t	arcmin	≤ 10		≤ 13
Torsional rigidity	C _{t21}	Nm/ arcmin	1.2	0.85	1.2
Max. axial force*	F _{AMax}	N	700		
Max. radial force*	F _{rmax}	N	800		
Max. tilting moment	M _{Kmax}	Nm	23		
Weight (without brake)	m	kg	1.3	1.3	1.5
Ambient temperature	θ _U	°C	0 up to +40		

No. of stages			1	2
Lubrication	-	-	Lubricated for life (standard grease) Optional: Food grade (NSF/H1) – Reduction of the output torques by 20%	
Protection class Housing Shaft	-	IP	65 64	
Mass moment of inertia	J_1	kgm ²	6.55E ⁻⁰⁵	1.57E ⁻⁰³
Approval	-	-	NRTL, CE, functional safety	

* Refers to center of the output shaft



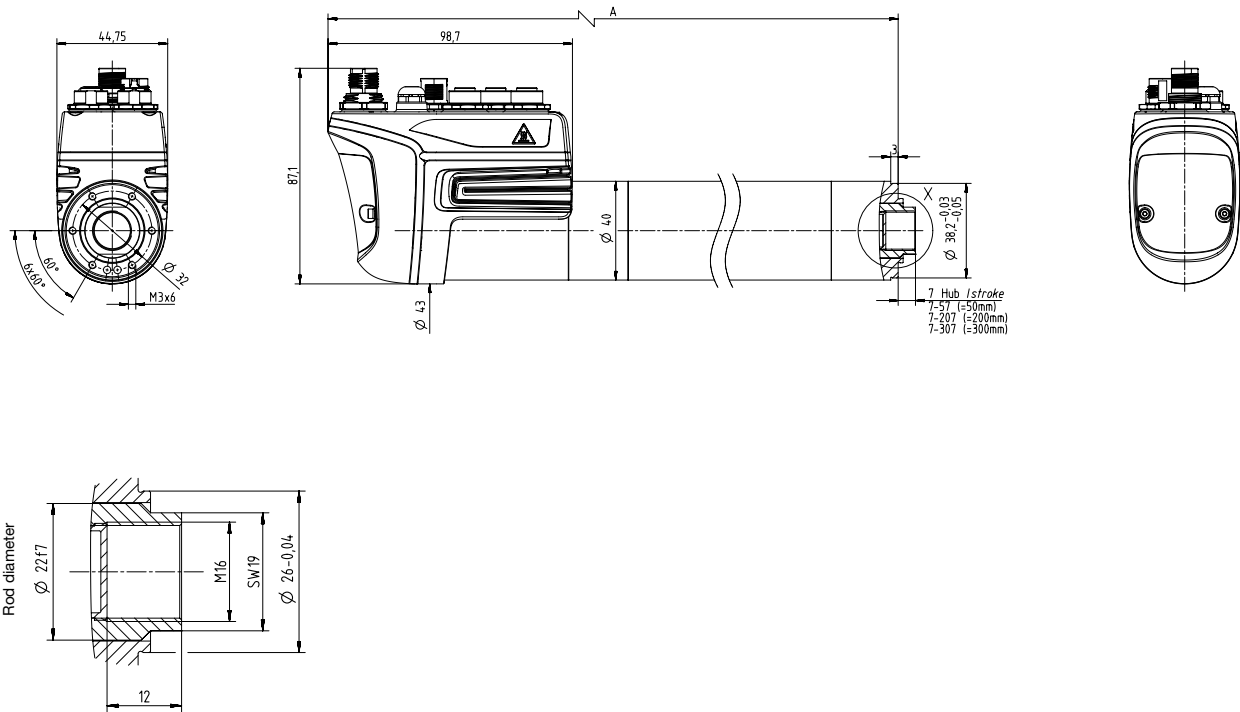
	Length A [mm]	Length B [mm]	Additional length brake [mm]
Single-stage, i5, 10	167.1	57.9	43.1
Two-stage, i25	182.6	73.4	43.1

cyber[®] dynamic system

Linear actuator

Size			40					
Screw pitch	p_{sp}	mm	3			10		
Maximum stroke	s	mm	50	200	300	50	200	300
Supply voltage (Power / Logic / STO)	U_{DC}	V_{DC}	+12 to 60					
Maximum push force	$F_{A_{Max}}$	kN	1.92	1.28	0.58	0.58		
Continuous stall force	F_0	kN	0.55	0.55	0.16	0.16		
Holding force brake (at 120°C)	F_4	kN	0.83			0.25		
Max. speed (without external load)	v_0	mm/s	254	140	848	467		
Rated current	I_n	A_{eff}	2.4	2.7	2.4	2.7		
Maximum current	I_{max}	A_{eff}	11.4	7.2	11.4	11.4		
Rated power	P_n	W	106	70	106	70		
Maximum power	P_{max}	W	296	179	296	268		
Communication	-	-	EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III, CANopen					
Commissioning	-	-	USB					
Digital inputs	-	-	4					
Digital outputs	-	-	2					
Safety function	-	-	STO according to SIL 3					
Brake chopper	-	-	Not integrated					
Technology functions	-	-	Motion Task					
Encoder	-	-	Absolute encoder Singleturn BiSS-C (HI) Absolute encoder Multiturn BiSS-C (HM)					
Positioning accuracy	-	mm	up to 0.05					
Repeatability	-	mm	0.01					
Weight (without brake)	m	kg	2.0	3.3	3.1	2.0	3.3	3.1
Ambient temperature	ϑ_U	°C	0 up to +40					
Lubrication	-	-	Lubricated for life Food grade (NSF/H1)					
Protection class Housing Pushing rod	-	IP	65 65					
Approval	-	-	NRTL, CE, functional safety					

Key area is not aligned with the bolt pattern



Stroke S [mm]	Length A [mm]	Additional length brake [mm]
50	258.2	43.1
200	408.2	43.1
300	508.2	43.1

Holding brake

A compact permanent magnet brake is fitted to secure the motor shaft when disconnected from the power. Its particular features include no torsional backlash, no residual torque when the brake is released and unlimited duty cycles at zero speed.

Size		40
Holding torque static at 120 °C	Nm	0.36
Supply voltage	V _{DC}	24
Current at rated voltage and 20 °C	A _{DC}	0.42
Closing-time	ms	13
Opening-time	ms	27
Weight	kg	0.18

The holding brakes used in the drives are subject to various influencing factors, e.g. the oxidation of abrasion particles, the flattening of friction surfaces in the case of frequent brake action in the same position, or wear-dependent changes to the air gap. This may result in a reduction of the available holding torque. The specified holding torques therefore apply to the ideal state upon delivery under optimal conditions without detrimental influences. For critical applications, we recommend sizing for an adequately large holding torque to take account of these factors.

Depending on the configured gear ratio, the brake used in the drives can generate a dynamic brake torque at the output in the event of an emergency stop that exceeds the permissible maximum torque $M_{\text{max act}}$ of the gearbox. In this case, care must be taken in the application to prevent the maximum torque from being exceeded in this way, otherwise the gearbox could be damaged. For the linear drives, the same behavior results from external forces.

Note: The holding brake is available for the cyber[®] dynamic system and for the cyber[®] dynamic line in size 40 in connection with an absolute encoder (HI/HM) and Inox/Hygienic Design. Variants with an incremental encoder (HF) or in the Standard Design cannot be equipped with a holding brake.

Encoder

A selection of encoder systems is available for positioning and speed measurement:

- BiSS-C, singleturn absolute encoder (HI): suitable for universal use
- BiSS-C, multiturn absolute encoder (HM): available for the cyber® dynamic system and the cyber® dynamic line in size 32/40 and Inox/Hygienic Design
- Incremental encoder (HF): available for cyber® dynamic line

Encoder	HI	HM	HF
Interface	BiSS interface C-mode	BiSS interface C-mode	TTL
Power supply	5 V ± 10%		
Operating power consumption (no load)	50 mA	150 mA	50 mA
Max. power consumption (no load)	275 mW	825 mW	275 mW
Resolution	4096 positions per revolution	4096 positions per revolution (12 bit) / 65,536 revolutions (16 bit)	1024 increments per revolution
System accuracy	± 1°		
Repeatability	± 0.2°		

cyber[®] power supply

DIN rail power supply units

High efficiency
(up to 95% efficiency)

Robust wide range input
and negligible input inrush current

1- and 3-phase Designs

Simple mounting
thanks to quick-connect clamps



Long service life

Optimized overload behavior
(short-term overload capacity of 150%)

Compact design

The DIN rail power supplies of the cyber[®] power supply range complement the small servo drive system. An innovative circuit design and high-quality components mean that the power supply units have efficiencies of over 95% and thus reduce heat

generation in the overall system. A coordinated overload range in connection with our servo drives also enables optimum utilization of the available power.



Efficiency

An innovative circuit design and the use of high-quality components mean that the power supply units have an efficiency level of up to 95%. This results in low power losses and thus less heat generation in the overall system.



Simplicity

The power supply units are very quick and simple to install thanks to their DIN rail design. The devices are plugged onto the DIN rail and then wired. All connectors for this purpose are located on the front of the device.



Reliability

The power supply units are developed according to the cool design principle. This means that the service-life-relevant components, such as electrolytic capacitors, are positioned in the coolest parts of the device. In combination with the robust circuit design, the wide-range input and the excellent efficiencies, this results in high reliability and a long service life for the devices. In addition, the power supply units feature optimized overload behavior, which, in conjunction with our servo drives, enables optimum utilization of the available power.



Compactness

The power supply units are extremely compact thanks to their high efficiency. This is because the less heat that is generated in the power supply unit, the more compact the devices can be constructed. This saves considerable space in the control cabinet.

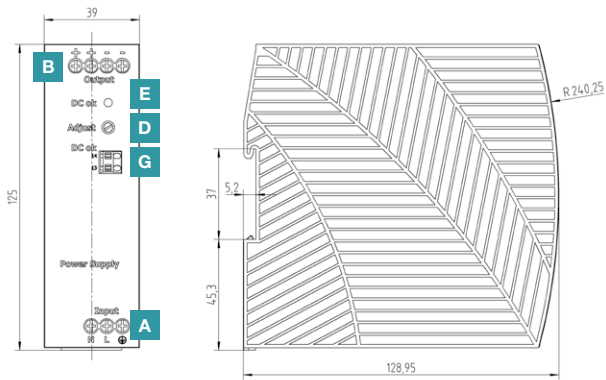
cyber[®] power supply

DIN rail power supply units

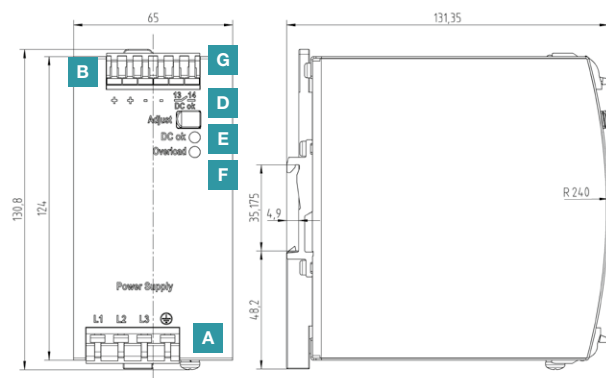
Performance version		CPS1005E	CPS2010D	CPS2010E	CPS2020D	CPS2020E
Input voltage	V _{AC}	100–120 / 200–240	3 x 380–480	100–240	3 x 380–480	100–240
Input current	A	1.72 / 1.05 at 120 / 230 V _{AC}	0.79 / 0.65 at 3x400 / 3x480 V _{AC}	4.56 / 2.48 at 120 / 230 V _{AC}	1.58 / 1.3 at 3x400 / 3x480 V _{AC}	8.6 / 4.5 at 120 / 230 V _{AC}
Mains frequency	Hz	50–60				
Efficiency	%	91.2 / 92.3 at 120 / 230 V _{AC}	95.4 / 95.0 at 3x400 / 3x480 V _{AC}	92.8 / 94.3 at 120 / 230 V _{AC}	95.4 / 95.2 at 3x400 / 3x480 V _{AC}	93.9 / 95.0 at 120 / 230 V _{AC}
Power losses	W	11.6 / 10.0 at 120 / 230 V _{AC}	23.1 / 25.3 at 3x400 / 3x480 V _{AC}	37.2 / 29.0 at 120 / 230 V _{AC}	46.3 / 48.4 at 3x400 / 3x480 V _{AC}	62.4 / 50.5 at 120 / 230 V _{AC}
Input inrush current	A	22.0 / 33.0 at 120 / 230 V _{AC}	3.0 / 3.0 at 3x400 / 3x480 V _{AC}	9.0 / 7.0 at 120 / 230 V _{AC}	4.5 / 4.5 at 3x400 / 3x480 V _{AC}	17.0 / 11.0 at 120 / 230 V _{AC}
Output voltage	V _{DC}	24	48	48	48	48
Output voltage (adjustment range)	V _{DC}	24–28	48–55	48–55	48–54	48–54
Output current (continuous operation)	A	5–4.3	10–8.7	10–8.7	20–17.8	20–17.8
Output current (short-term, up to 5s)	A	5–4.3	15–13	15–13.1	30–26.7	30–26.7
Output power (continuous operation)	W	120	480	480	960	960
Output power (short-term, up to 5s)	W	120	720	720	1440	1440
Weight	kg	0.37	0.87	1.2	1.5	1.9
Ambient temperature	°C	-10 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70
Protection class	IP	20				
Approval	-	CE				

Number	Function	Connector on the device
A	Input terminals	Screw terminals or spring-clamp terminals
B	Output terminals	Screw terminals or spring-clamp terminals (two pins per pole)
C	Selector switch	–
D	Output voltage potentiometer	–
E	DC-OK LED	–
F	Overload LED	–
G	DC-OK relay contact	Push-in terminals or spring-clamp terminals
H	Remote control input	Spring-clamp terminals

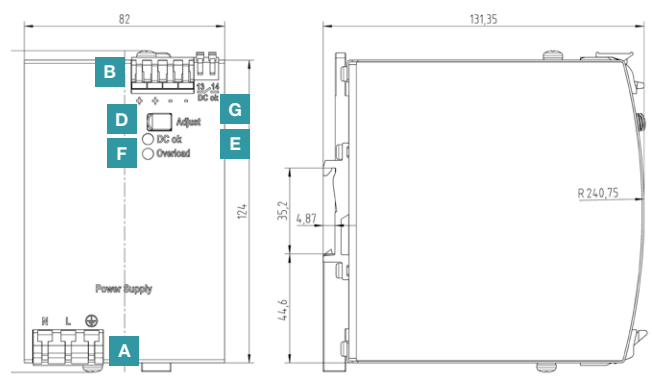
CPS1005E



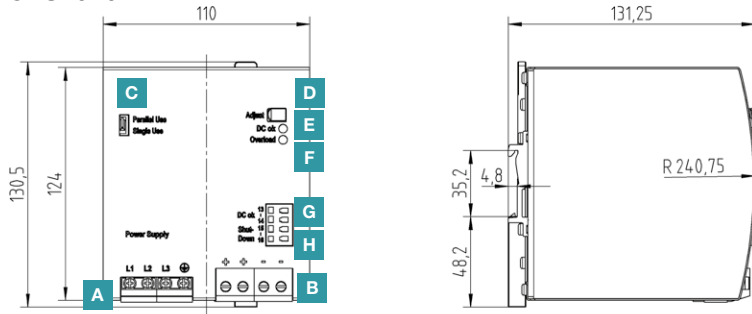
CPS2010D



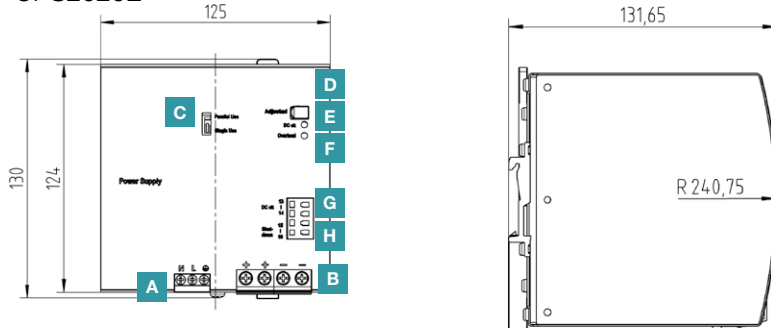
CPS2010E



CPS2020D



CPS2020E



cyber[®] distribution box

Distribution module

1 power supply input

(Rated current 30 A /
maximum current 45 A)

6 power supply outputs

(Rated current 15 A /
maximum current 30 A)



Simple installation in the machine
without additional enclosure thanks to
protection class IP65

2 inputs and 2 outputs for
Ethernet communication

The cyber[®] distribution box distribution module enables simplified wiring of decentralized drive systems in the voltage range from 12 to 60 V_{DC}. It has 6 power supply outputs for connecting decentralized servo drives of the type cyber[®] simco[®] drive 2 and cyber[®] dynamic system or other distribution modules. The high IP65 protection class means that the distributor module

can be integrated directly into the machine layout. This significantly reduces the cable lengths and the wiring effort, since only two cables need to be routed from the control cabinet to the machine or from the supply module for the power supply and fieldbus communication.



Flexibility

The distribution module facilitates the effortless and cost-efficient cabling of up to six axes in decentralized machines with a large number of distributed servo axes. Additional axes can also be connected, as further distribution modules can be connected as an alternative to drives. In addition, the cyber® distribution box provides two I/O ports for the Ethernet-based fieldbus connection and thus ensures user-friendly connectivity. If several distribution modules are cascaded, the fieldbus can be looped through via daisy chain.



Compactness

Protection class IP65 means that the distribution module can be easily integrated directly into the machine layout without additional encapsulation. This frees up space in the control cabinet, minimizes the cooling requirements and reduces the cable lengths and the wiring work required.



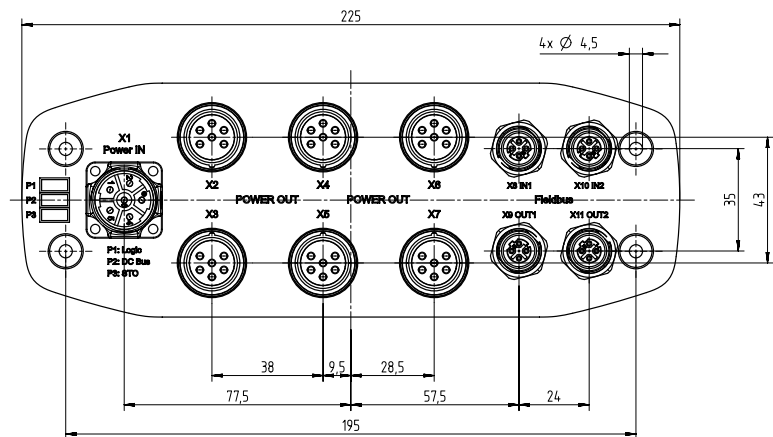
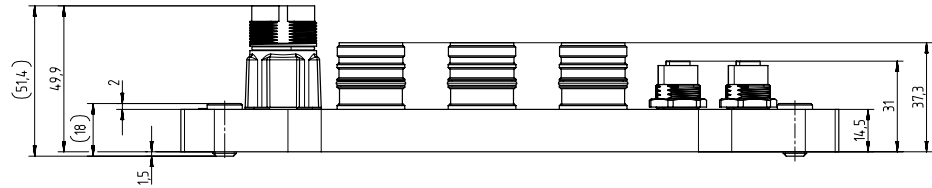
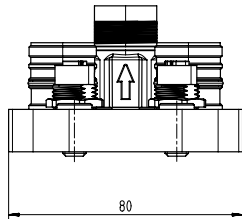
Simplicity

The distribution module enables simplified wiring of decentralized drive systems. This makes the cyber® distribution box the perfect solution for implementing complex machines with a simple topology structure. Since the module can be cascaded, a simple topology structure can be achieved even in demanding machine architectures.

cyber[®] distribution box

Distribution module

Performance version		CDB2015D
Power supply input		1
Supply voltage	V_{DC}	+ 12 to 60
Input current (continuous operation)	A_{eff}	30
Input current (short-term operation, up to 5s)	A_{eff}	45
Power supply output		6
Output current (continuous operation)	A_{eff}	15
Output current (short-term, up to 5s)	A_{eff}	30
Fieldbus interface input and output		2 / 2
Communication		Ethernet-based (EtherCat, PROFINET RT/IRT, EtherNet/IP CIP Sync, Sercos III)
Weight	kg	0.75
Ambient temperature	°C	0 to 55
Protection class	IP	65
Approval		NRTL, CE



Number	Function	Connector on the device
X1	Power supply input	M23, 6-pole connector
X2–X7	Power supply output	M23, 6-pole socket
X8 / X10	Fieldbus interface Input	M12, 4-pole socket D-coded
X9 / X11	Fieldbus interface Output	M12, 4-pole socket D-coded

Cables

Overview



Pre-configured lengths

The following pre-configured cables are available for rapid commissioning of your drive system:

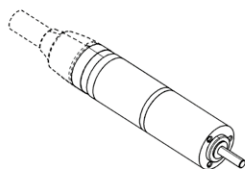
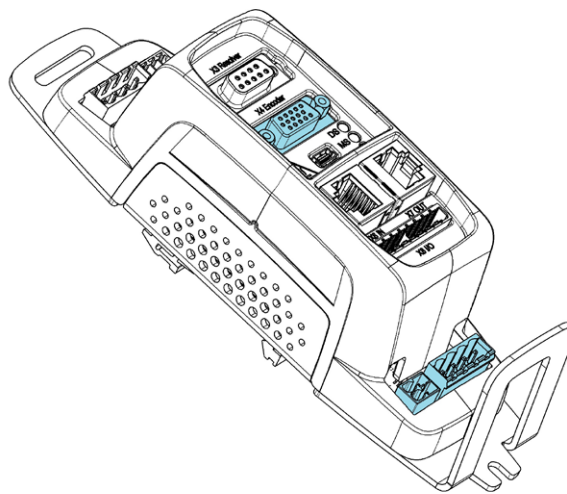
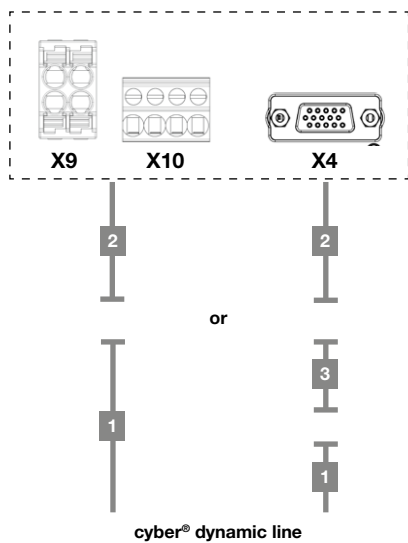
- Cables for [power supply](#)
- [Fieldbus cables](#) for CANopen and EtherNet/IP communication
- Cables for [commissioning](#)
- Cables for [digital inputs and outputs](#)
- [Motor connection cables](#) for connecting to the servo drive.

Further cable lengths are available upon request.

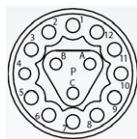
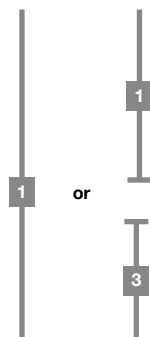
Motor connection cables

No.	Type of cable	Description	Interfaces		Standard lengths / m
			Motor	Servo drive	
cyber® dynamic line					
1	Motor connection cable	S/L-Cable XXXHx-XXXX-BMSx-x/3	Direct cable outlet	itec, series 915	0.5; 3
2a	Adapter cable for IP20 (without brake wires)	S/L-Cable XXXHI-XXXX-BJS0-6/3	itec, series 915	Sub-D connector 15-pole	0.5; 3; 5; 10; 15; 20
2b	Adapter cable for IP20 (with brake wires)	S/L-Cable XXXHI-XXXX-BJS1-11/3	itec, series 915	Sub-D connector 15-pole	0.5; 3; 5; 10; 15; 20
3a	Extension cable (without brake wires)	S/L-Cable XXXHx-XXXX-BVS0-11/3	itec, series 915	itec, series 915	0.5; 3; 5; 10; 15; 20
3b	Extension cable (with brake wires)	S/L-Cable XXXHx-XXXX-BVS1-11/3	itec, series 915	itec, series 915	0.5; 3; 5; 10; 15; 20

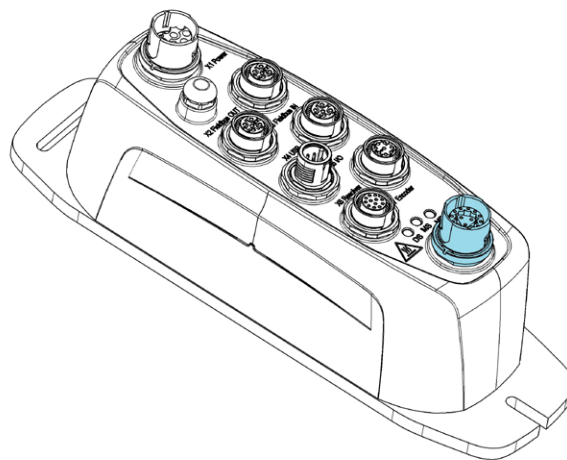
Overview of motor connection options



cyber[®] dynamic line



X8



Cables

cyber[®] dynamic line

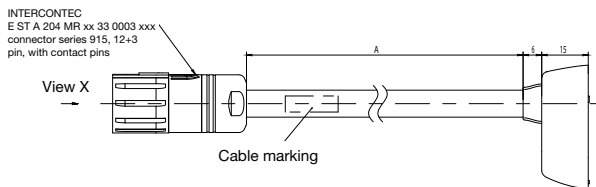
Technical details:

- Outer sheath material: PUR
- Min. bending radius (static): $\geq 3 \times D$
- Min. bending radius (dynamic): $\geq 10 \times D$
- Temperature range: -20°C to +80°C

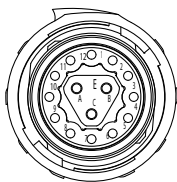
- Approval: UL AWM Style 20233, 80°C, 300 V
- Double-shielded
- Suitable for drag chains (1,000,000 cycles)

Motor connection cable (no. 1)

Encoder: HI / HM



View X (3:1)

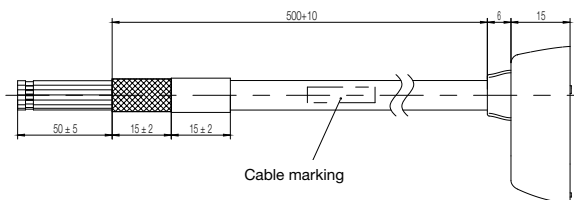


The slots that are not contacted are filled with empty pins.

	Pin assignment (without brake)	Pin assignment (with brake)
Mot.Ph. U	A	A
Mot.Ph. V	B	B
Mot.Ph. W	C	C
GND	1	1
5 V	2	2
MA+ / Clock+	3	3
MA- / Clock-	4	4
SLO+ / Data+	5	5
SLO- / Data-	6	6
Brake +	-	11
Brake -	-	12

Motor size	Cable diameter in mm (without brake)	Cable diameter in mm (with brake)
17	7.2	-
22	7.6	-
32	8.7	-
40	8.7	9.7

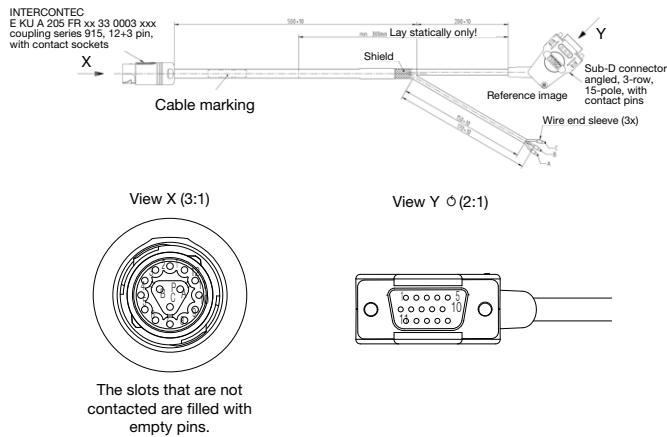
Encoder: HF



Motor size	Outer diameter of cable in mm
17	8.5
22	8.8
32	9.7
40	9.7

	Color coding	Shield
Mot.Ph. U	Red	Outer shield
Mot.Ph. V	White	
Mot.Ph. W	Black	
Hall A	Brown	
Hall B	Orange	
Hall C	Yellow	
GND	Blue	Inner shield
5 V	Red	
A+	Pink	
A-	Green	
B+	Gray	
B-	Yellow	
Z+	White	
Z-	Brown	

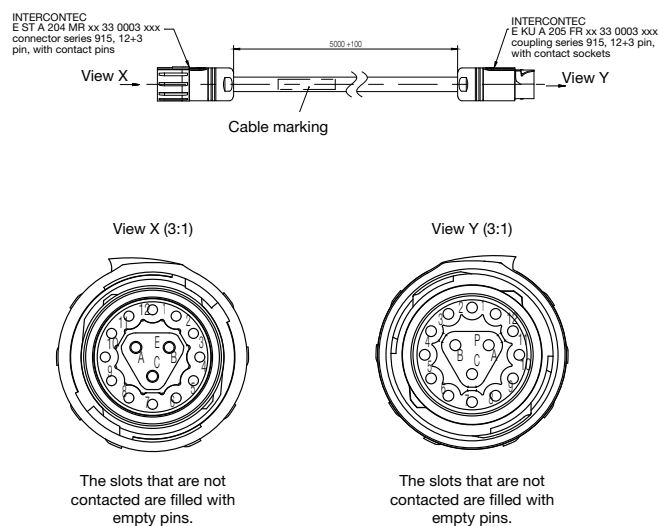
Adapter cable for cyber[®] simco[®] drive IP20 (no. 2)



Cable diameter (without brake): 8.7 mm
Cable diameter (with brake): 9.7 mm

	Pin assignment (motor side)	Pin assignment / color coding (controller side)
Mot.Ph. U	A	Red
Mot.Ph. V	B	White
Mot.Ph. W	C	Black
GND	1	1
5 V	2	2
MA+ / Clock+	3	3
MA- / Clock-	4	4
SLO+ / Data+	5	5
SLO- / Data-	6	6
Brake +	11	Yellow
Brake -	12	Orange

Extension cable (no. 3)



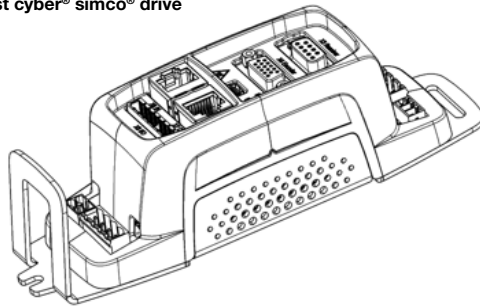
Outer diameter of cable: 9.7 mm

	Pin assignment (without brake)	Pin assignment (with brake)
Mot.Ph. U	A	A
Mot.Ph. V	B	B
Mot.Ph. W	C	C
Hall A	9	-
Hall B	10	-
Hall C	11	-
GND	1	1
5 V	2	2
MA+ / Clock+ / A+	3	3
MA- / Clock- / A-	4	4
SLO+ / Data+ / B+	5	5
SLO- / Data- / B-	6	6
Z+	7	-
Z-	8	-
Brake +	-	11
Brake -	-	12

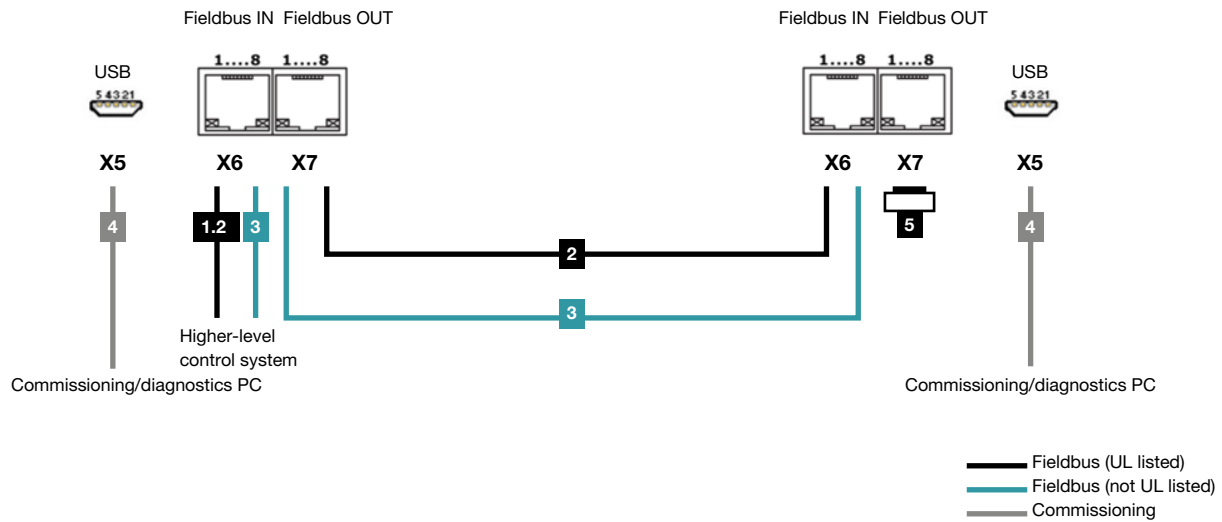
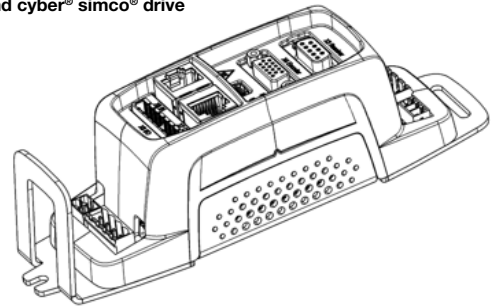
Cables

cyber® simco® line

1st cyber® simco® drive



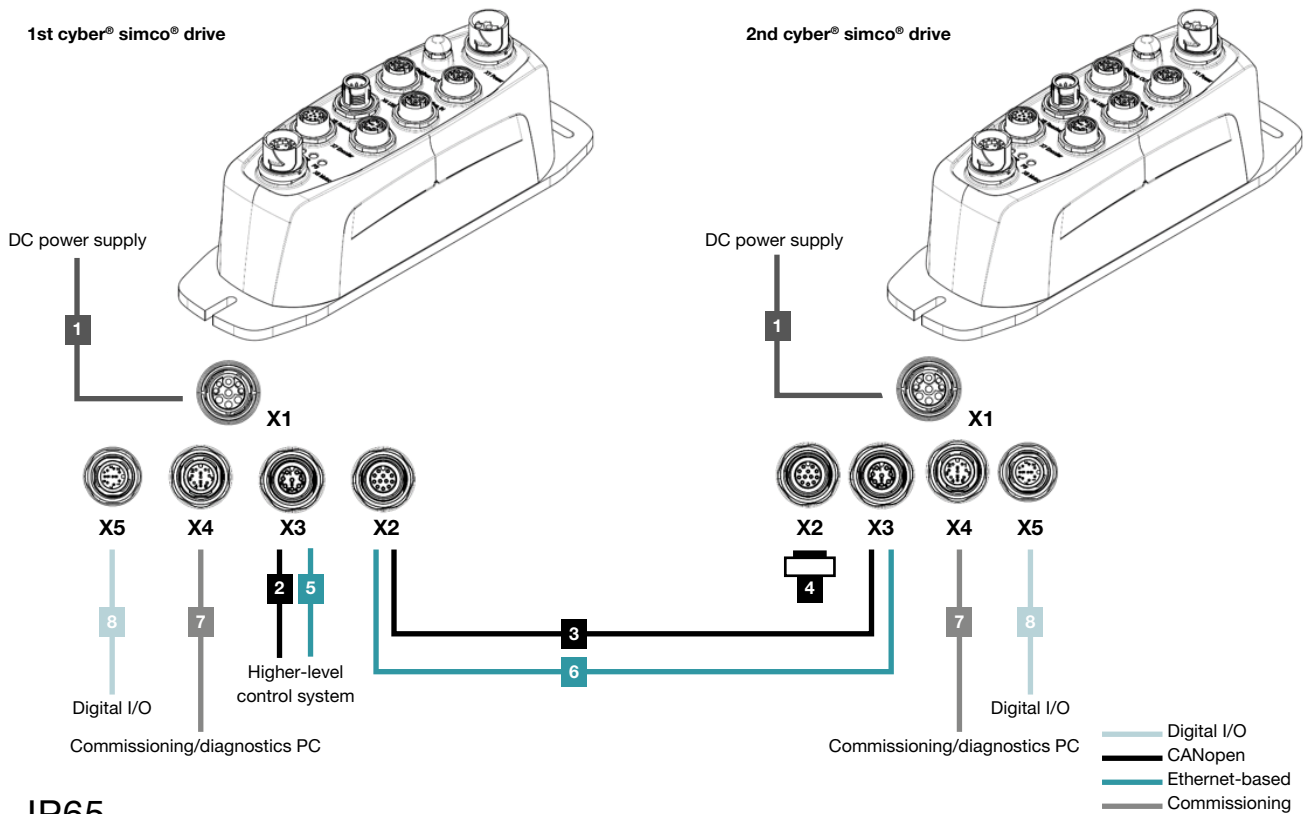
2nd cyber® simco® drive



IP20

No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			1st simco® drive	PLC/PC/2nd simco® drive		
Fieldbus control cabinet / Suitable for drag chains (UL)						
1	Fieldbus cable	CAB-BUS-CAN-RJ45-FL-LXXXX	RJ45 connector	Flying leads	Network connection to PLC; plug can be assembled	1.5; 5 m
2	Fieldbus cable	CAB-BUS-UN2-RJ45-RJ45-LXXXX	RJ45 connector	RJ45 connector	Network connection to PLC; second simco® drive	0.3; 1; 2; 3 m
Control cabinet fieldbus (non-UL)						
3	Fieldbus cable	CAB-BUS-UN1-RJ45-RJ45-LXXXX	RJ45 connector	RJ45 connector	Network connection to PLC; second simco® drive	0.3; 1; 2; 3 m
Commissioning						
4	USB connection cable	CASIGN-USB/A-M/USB/B-L0300	Mini USB B	USB A connector	Connection cable for diagnostic purposes, commissioning with MotionGUI 2	3 m
Miscellaneous						
5	Terminating resistor CANopen	CAB-BUS-CAN-RJ45-TERMINAT	-	RJ45 connector	Only necessary for CAN communication	-

XXXX = cable length in cm (example: 5 m = 0500)



IP65

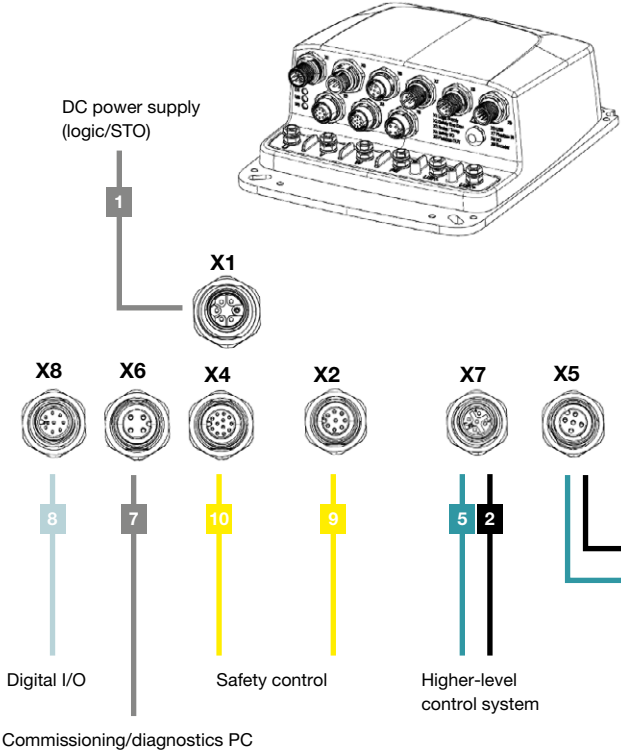
No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			1st simco® drive	PLC/PC/2nd simco® drive		
Power supply						
1	Power supply cable	CAB-POW-E-S915-FL__-LXXXX	y tec 915	Flying leads	DC - Power supply cable	1; 2; 5; 10; 15 m
Fieldbus CANopen						
2	Fieldbus cable PLC	CAB-BUS-CAN-M12M-FL__-LXXXX	M12 socket 5-pole A-coded	Flying leads	Network connection to PLC; plug can be assembled	1; 2; 5; 10; 15 m
3	Fieldbus cable extension	CASIGN-CAN-M12FSA-M12MSA-LXXXX	M12 connector 5-pole A-coded	M12 socket 5-pole A-coded	Network connection between simco® drives	1; 2; 5; 10; 15 m
4	Terminating resistor CANopen	CAB-BUS-CAN-M12M-TERMINAT	-	M12 connector 5-pole A-coded	Only necessary for CAN communication	-
Industrial Ethernet (EtherCAT / PROFINET / EtherNet/IP / Sercos III)						
5	Network cable PLC	TCC 002-025-XXXR-PUR	M12 connector 4-pole D-coded	RJ45 connector	Network connection to PLC	1; 2; 5; 10; 15 m
6	Network cable extension	TCC 002-026-XXXR-PUR	M12 connector 4-pole D-coded	M12 connector 4-pole D-coded	Network connection between simco® drives	1; 2; 5; 10; 15 m
Commissioning						
7	USB connection cable	CASIGN M12-4p USB-A 2.0m PVC	M12 connector 4-pole A-coded (straight)	USB A connector	Connection cable for diagnostic purposes, commissioning with MotionGUI 2	2 m
Digital in- and outputs						
8	Cable for Digital IO	CASIGN-I/O-M12FSA-M12FSA-L0500	M12 socket 8-pole A-coded (straight)	M12 socket 8-pole A-coded (straight)	Connection cable to I/O box	5 m

XXXX = cable length in cm (example: 5 m = 0500)
 XXX = cable length in dm (example: 5 m = 050)

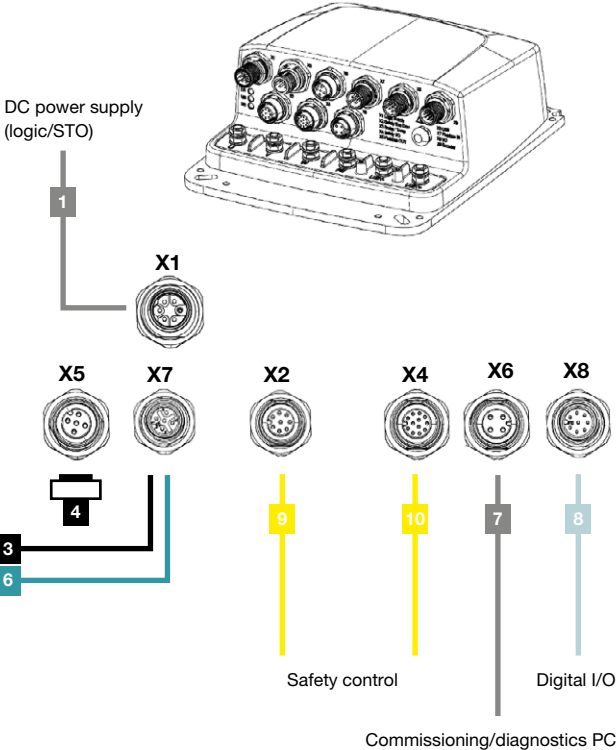
Cables

cyber[®] simco[®] line

1st cyber[®] simco[®] drive



2nd cyber[®] simco[®] drive



IP65

No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			1st simco® drive	PLC/PC/2nd simco® drive		
Power supply (power/STO)						
1	Power supply cable	CAPOWE-M12FSM-FL__-LXXXX	M12 socket 6-pole (straight)	Flying leads	DC - Power supply cable	1.5; 3; 5; 10 m
Fieldbus CANopen						
2	Fieldbus cable PLC	CAB-BUS-CAN-M12M-FL__-LXXXX	M12 socket 5-pole A-coded (straight)	Flying leads	Network connection to PLC; plug can be assembled	1; 2; 5; 10; 15 m
3	Fieldbus cable extension	CASIGN-CAN-M12FSA-M12MSA-LXXXX	M12 connector 5-pole A-coded (straight)	M12 socket 5-pole A-coded (straight)	Network connection between simco® drives	1; 2; 5; 10; 15 m
4	Terminating resistor CANopen	CAB-BUS-CAN-M12M-TERMINAT	-	M12 connector 5-pole A-coded	Only necessary for CAN communication	-
Industrial Ethernet (EtherCAT / PROFINET / EtherNet/IP / Sercos III)						
5	Network cable PLC	TCC 002-025-XXXR-PUR	M12 connector 4-pole D-coded (straight)	RJ45 connector	Network connection to PLC	1; 2; 5; 10; 15 m
6	Network cable extension	TCC 002-026-XXXR-PUR	M12 connector 4-pole D-coded (straight)	M12 connector 4-pole D-coded (straight)	Network connection between simco® drives	1; 2; 5; 10; 15 m
Commissioning						
7	USB connection cable	CASIGN M12-4p USB-A 2.0m PVC	M12 plug 4-pole A-coded (straight)	USB A connector	Connection cable for diagnostic purposes, commissioning with MotionGUI 2	2 m
Digital in- and outputs						
8	Cable for Digital IO	CASIGN-I/O-M12FSA-M12FSA-L0500	M12 socket 8-pole A-coded (straight)	M12 socket 8-pole A-coded (straight)	Connection cable to I/O box	5 m
Safety encoder emulation						
9	Cable for safety encoder emulation	CASIGN-SAC-8P-M12MS-PUR-L1500	M12 plug 8-pole A-coded (straight)	Flying leads	Connection to safety control; connector can be assembled	1.5 m
Safety I/O						
10	Cable for safety I/O	CASIGN-SAC-12P-M12MS-PUR-L1500	M12 plug 12-pole A-coded (straight)	Flying leads	Connection to safety control; connector can be assembled	1.5 m
Encoder						
11	Cable for encoder interface	CASIGN-SAC-17P-M12FS-PUR-LXXXX	M12 socket 17-pole A-coded (straight)	Flying leads	Encoder cable to motor; connector can be assembled	1; 3 m
Temperature sensor / brake						
12	Cable for motor/brake temperature sensor	CASIGN-TempBr-M12FSA-FL_-L0100	M12 socket 4-pole A-coded (straight)	Flying leads	Temp. sensor / brake cable to motor; connector can be assembled	1 m

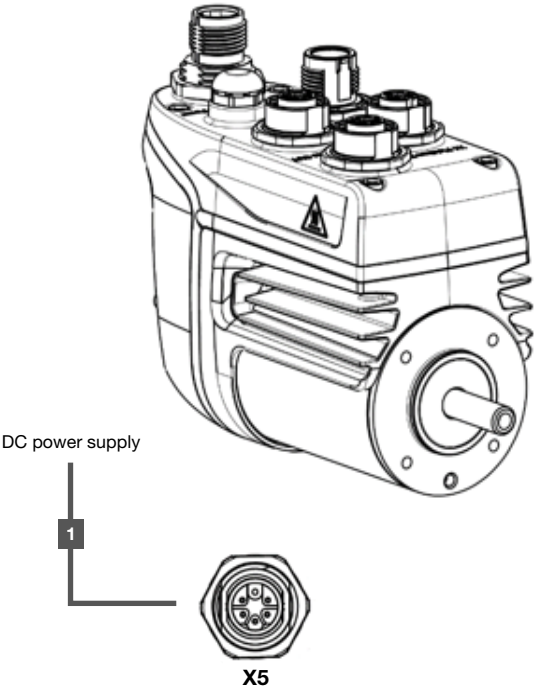
XXXX = cable length in cm (example: 5 m = 0500)

XXX = cable length in dm (example: 5 m = 050)

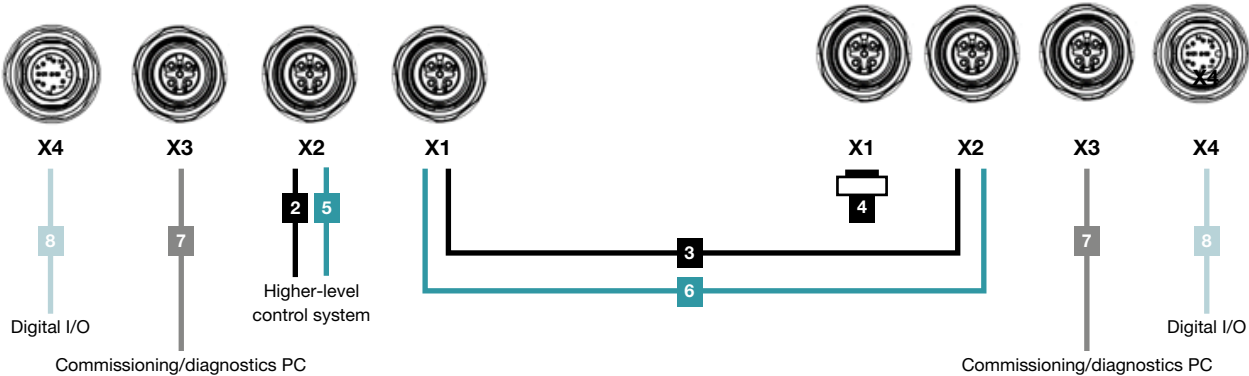
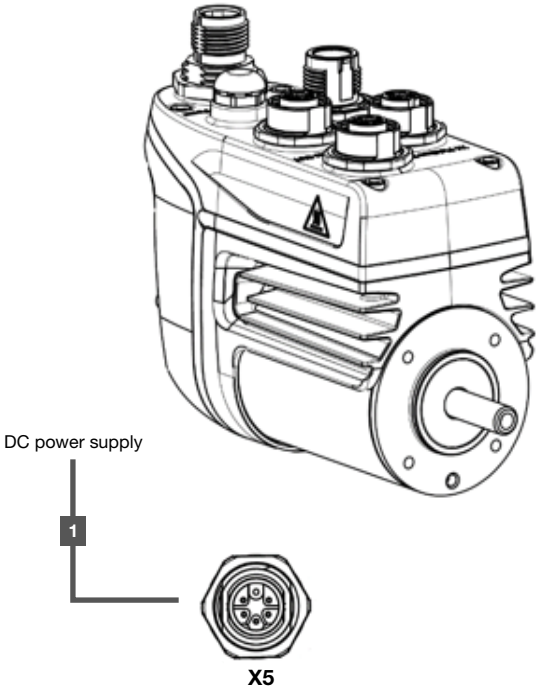
Cables

cyber[®] dynamic system

1st cyber[®] dynamic system



2nd cyber[®] dynamic system



- Digital I/O
- CANopen
- Ethernet-based
- Commissioning

No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			1st cyber® dynamic system	PLC/PC/ 2nd cyber® dynamic system		
Power supply						
1a	Power supply cable	CAPOWE-M12FSM-FL__-LXXXX	M12 socket 6-pole (straight)	Flying leads	DC - Power supply cable	1.5; 3; 5; 10 m
1b	Power supply cable	CAPOWE-M12FRM-FL__LXXXX	M12 socket 6-pole (angled)	Flying leads	DC - Power supply cable	1.5; 3; 5; 10 m
Fieldbus CANopen						
2a	Fieldbus cable PLC	CAB-BUS-CAN-M12M-FL__-LXXXX	M12 socket 5-pole A-coded (straight)	Flying leads	Network connection to PLC; plug can be assembled	1; 2; 5; 10; 15 m
2b	Fieldbus cable PLC	CASIGN-CAN-M12MRA-FL__-LXXXX	M12 socket 5-pole A-coded (angled)	Flying leads	Network connection to PLC; plug can be assembled	1; 2; 5; 10; 15 m
3a	Fieldbus cable extension	CASIGN-CAN-M12FSA-M12MSA-LXXXX	M12 connector 5-pole A-coded (straight)	M12 socket 5-pole A-coded (straight)	Network connection between simco® drives	1; 2; 5; 10; 15 m
3b	Fieldbus cable extension	CASIGN-CAN-M12FRA-M12MRA-LXXXX	M12 connector 5-pole A-coded (angled)	M12 socket 5-pole A-coded (angled)	Network connection between simco® drives	1; 2; 5; 10; 15 m
4	Terminating resistor CANopen	CAB-BUS-CAN-M12M-TERMINAT	-	M12 connector 5-pole A-coded	Only necessary for CAN communication	-
Industrial Ethernet (EtherCAT / PROFINET / EtherNet/IP / Sercos III)						
5a	Network cable PLC	TCC 002-025-XXXR-PUR	M12 connector 4-pole D-coded	RJ45 connector	Network connection to PLC	1; 2; 5; 10; 15 m
5b	Network cable PLC	CASIGN-CAT-M12MRD-RJ45-LXXXX	M12 connector 4-pole D-coded (angled)	RJ45 connector	Network connection to PLC	1; 2; 5; 10; 15 m
6a	Network cable extension	TCC 002-026-XXXR-PUR	M12 connector 4-pole D-coded (straight)	M12 connector 4-pole D-coded ((straight)	Network connection between simco® drives	1; 2; 5; 10; 15 m
6b	Network cable extension	CASIGN-CAT-M12MRD-M12MRD-LXXXX	M12 connector 4-pole D-coded (angled)	M12 connector 4-pole D-coded (angled)	Network connection between simco® drives	1; 2; 5; 10; 15 m
Commissioning						
7a	USB connection cable	CASIGN M12-4p USB-A 2.0m PVC	M12 connector 4-pole A-coded (straight)	USB A connector	Connection cable for diagnostic purposes, commissioning with MotionGUI 2	2 m
7b	USB connection cable	CASIGN ang. M12-4p USB-A 2.0m	M12 connector 4-pole A-coded (angled)	USB A connector	Connection cable for diagnostic purposes, commissioning with MotionGUI 2	2 m
Digital in- and outputs						
8a	Cable for Digital IO	CASIGN-I/O-M12FSA-M12FSA-L0500	M12 socket 8-pole A-coded (straight)	M12 socket 8-pole A-coded (straight)	Connection cable to I/O box	5 m
8b	Cable for digital IO	CASIGN-I/O-M12FSA-M12FSA-L0500	M12 socket 8-pole A-coded (angled)	M12 socket 8-pole A-coded (straight)	Connection cable to I/O box	5 m

XXXX = cable length in cm (example: 5 m = 0500)

XXX = cable length in dm (example: 5 m = 050)

Cables

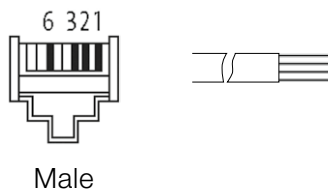
cyber[®] simco[®] line & cyber[®] dynamic system

IP20

Technical details:

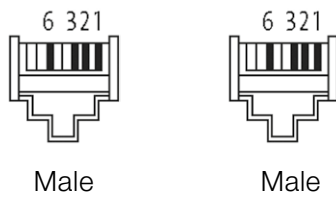
	Fieldbus cable IP20 (No. 1, 2)	Fieldbus cable IP20 (No. 3)	USB connection cable IP20 (No. 4)
Suitable for drag chains	Max. 3 million cycles	No	No
Approval	UL (AWM-Style 20233/11602), CSA; CE	CE	CE
Outer sheath material	PUR	FRNC	PVC
Shielding	Yes	Yes	Yes
Temperature range (static)	-40 to +80°C	0 to +50°C	-30 to +80°C
Temperature range (dynamic)	-30 to +70°C	-20 to +60°C	-5 to +70°C
Min. bending radius (static)	5 × outer-Ø	7.5 × outer-Ø	-
Min. bending radius (dynamic)	12 × outer-Ø	10 × outer-Ø	-
Outer diameter	6.7 mm ±5%	5 mm ±5%	3.5 mm ± 0.2
Transmission parameter	CAT 5, Class D (ISO/IEC 11801:2002), (EN 50173-1)		-
Transmission rate	up to 100 Mbit/s Full Duplex		-

Fieldbus cable (No. 1)



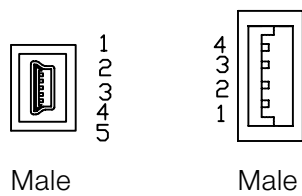
	RJ45 plug, straight pin assignment	Flying leads color coding
TD+	1	Yellow
TD-	2	Orange
RD+	3	White
RD-	6	Blue

Fieldbus cable (No. 2 and 3)



	RJ45 plug, straight pin assignment	RJ45 plug, straight pin assignment
TD+	1	1
TD-	2	2
RD+	3	3
RD-	6	6

USB connection cable (No. 4)



	Mini USB-B connector pin assignment	USB-A connector pin assignment
VCC	1	1
D-	2	2
D+	3	3
GND	4	4

Cables

cyber[®] simco[®] line & cyber[®] dynamic system

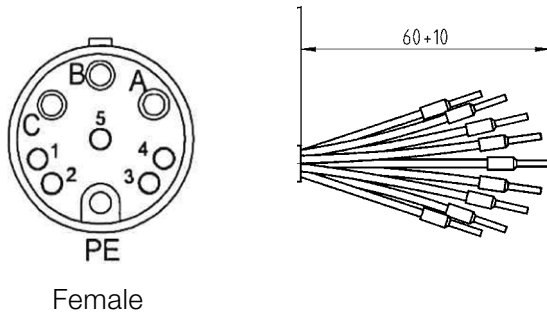
IP65

Technical details:

	cyber [®] simco [®] drive power supply cable (no. 1)	cyber [®] dynamic system power supply cable (no. 1)	Fieldbus cable IP65 (No. 2, 3)	Network cable (No. 5, 6)	USB connection cable IP65 (No. 7)
Suitable for drag chains	Max. 5 million cycles	Max. 2 million cycles	Max. 5 million cycles	Max. 3 million cycles	No
Approval	CE	UL listed (E468743)	UL (AWM style 20233/10578), CSA; CE	UL (AWM-Style 20233/11602), CSA; CE	CE
Outer sheath material	PUR	PUR	PUR	PUR	PVC
Shielding	Yes	Yes	Yes	Yes	Yes
Temperature range (static)	-40 to +80°C	-25 to +80°C	-40 to +80°C	-40 to +80°C	-30 to +80°C
Temperature range (dynamic)	-30 to +80°C	-25 to +80°C	-30 to +70°C	-30 to +70°C	-5 to +70°C
Min. bending radius (static)	4 × outer-Ø	5 × outer-Ø	6 × outer-Ø	5 × outer-Ø	-
Min. bending radius (dynamic)	7.5 × outer-Ø	10 × outer-Ø	10 × outer-Ø	12 × outer-Ø	-
Outer diameter	12.2 mm	10.4 mm ±0.3 mm	6.9 mm ±5%	6.7 mm ±5%	4.6 mm ± 5%
Transmission parameter	-	-	-	CAT 5, Class D (ISO/IEC 11801:2002), (EN 50173-1)	-
Transmission rate	-	-	-	up to 100 Mbit/s Full Duplex	-

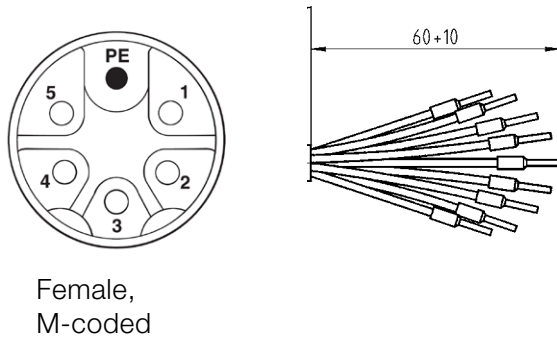
	Cable for Digital IO IP65 (No. 8)	Cable for safety encoder emulation (No. 9)	Cable for safety I/O (No. 10)	Cable for encoder interface (No. 11)	Cable for motor and brake temperature sensor (No. 12)
Suitable for drag chains	Max. 10 million cycles	Max. 4 million cycles	Max. 4 million cycles	Max. 1 million cycles	No
Approval	CE	CE, UL, CSA, EAC	CE, UL, EAC	CE, UL, CSA	CE, UL, CSA, EAC
Outer sheath material	PUR	PUR	PUR	PUR	PVC
Shielding	No	Yes	No	Yes	Yes
Temperature range (static)	-25 to +80°C	-25 to +80°C	-40 to +80°C	-40 to +80°C	-30 to +80°C
Temperature range (dynamic)	-25 to +80°C	-5 to +80°C	-20 to +80°C	-25 to +80°C	-5 to +80°C
Min. bending radius (static)	5 × outer-Ø	5 × outer-Ø	5 × outer-Ø	8 × outer Ø	10 × outer-Ø
Min. bending radius (dynamic)	10 × outer-Ø	10 × outer-Ø	10 × outer-Ø	12 × outer Ø	-
Outer diameter	5.8 mm ±5%	5.9 mm ± 0.2 mm	7.2 mm	8.5 mm ± 0.25 mm	5.3 mm ± 5%
Transmission parameter	-	-	-	-	-
Transmission rate	-	-	-	-	-

cyber® simco® drive power supply cable (no. 1)



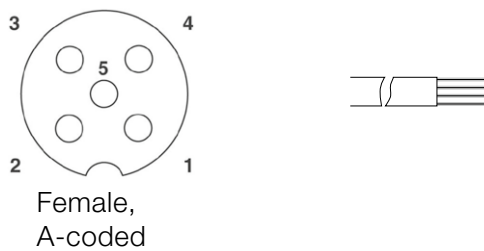
	INTERCONTEC connector, 9-pole pin assignment	Flying leads labeling
DCBUS+	A	A
DCBUS-	B	B
CHOPPER	C	C
PE	PE	PE
Logic+	1	1
N.C.	2	2
STO	3	3
N.C.	4	4
STO GND	5	5

cyber® dynamic system power supply cable (no. 1)



	M12 socket, straight pin assignment	Flying leads labeling
DCBUS+	1	BK1
DCBUS-	2	BK2
Logic+	3	BK3
STO	4	BK4
STO GND	5	BK5
FE	6	GN/YE

CANopen fieldbus cable (no. 2)

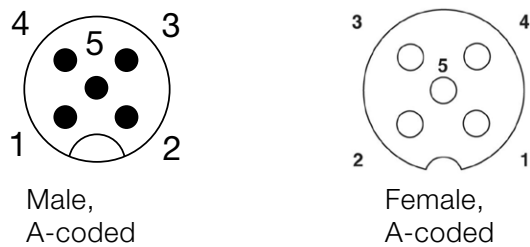


	M12 plug, straight pin assignment	Flying leads color coding
Shield	1	-
+	2	Red
-	3	Black
CAN-H	4	White
CAN-L	5	Blue

Cables

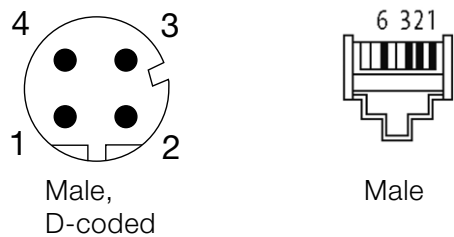
cyber[®] simco[®] line & cyber[®] dynamic system

CANopen fieldbus cable (no. 3)



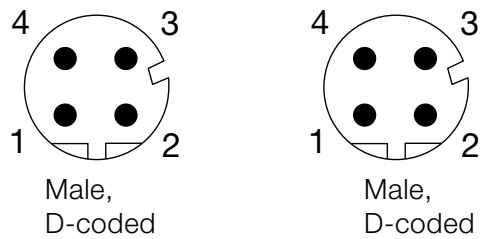
	M12 plug, straight pin assignment	M12 plug, straight pin assignment
Shield	1	1
+	2	2
-	3	3
CAN-H	4	4
CAN-L	5	5

Ethernet network cable (no. 5)



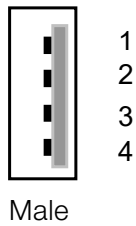
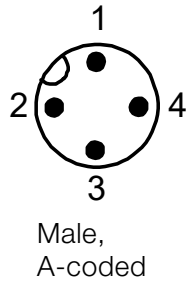
	M12 plug, straight pin assignment	RJ45 plug, straight pin assignment
TD+	1	1
TD-	3	2
RD+	2	3
RD-	4	6

Ethernet network cable (no. 6)



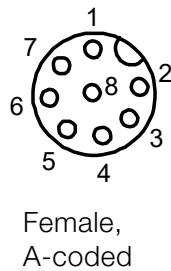
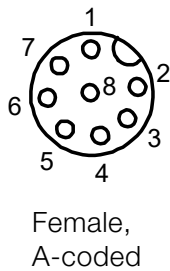
	M12 plug, straight pin assignment	M12 plug, straight pin assignment
TD+	1	1
TD-	3	3
RD+	2	2
RD-	4	4

USB connection cable (no. 7)



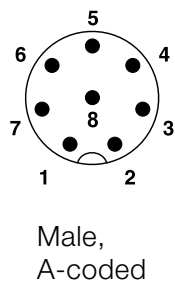
	M12 plug, straight pin assignment	USB-A connector pin assignment
VCC	1	1
D-	2	2
D+	3	3
GND	4	4

Cable for Digital IO (no. 8)



	M12 socket, straight pin assignment	M12 socket, straight pin assignment
DIN 2	1	1
DIN 4	2	2
DOUT 1	3	3
DOUT 2	4	4
VCC24	5	5
DIN 1	6	6
GND	7	7
DIN 3	8	8

Cable for safety encoder emulation (no. 9)

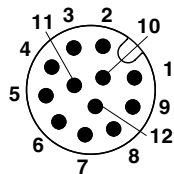


	M12 plug, straight pin assignment	Flying leads color coding
GND	1	White
SIN+	2	Brown
SIN-	3	Green
COS+	4	Yellow
COS-	5	Gray
N.C.	6	Pink
N.C.	7	Blue
N.C.	8	Red

Cables

cyber[®] simco[®] line & cyber[®] dynamic system

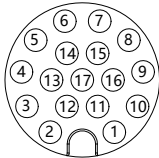
Cable for safety I/O (no. 10)



Male,
A-coded

	M12 plug, straight pin assignment	Flying leads color coding
STO_A	1	Brown
STO_B	2	Blue
N.C.	3	White
N.C.	4	Green
N.C.	5	Pink
N.C.	6	Yellow
RESET	7	Black
GND	8	Gray
VCC24	9	Red
DOUT1	10	Violet
DOUT2	11	Gray/pink
N.C.	12	Red/blue

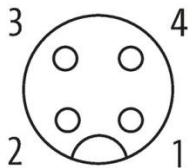
Cable for encoder interface (no. 11)



Female,
A-coded

	M12 plug, straight pin assignment	Flying leads color coding
GND RESOLVER REF-	1	Brown
5V3 RESOLVER REF+	2	Blue
CLOCK+ INC. A+	3	White
CLOCK- INC. A-	4	Green
DATA+ INC. B+	5	Pink
DATA- INC. B-	6	Yellow
SIN/COS A+ RESOLVER COS+	7	Black
SIN/COS A- RESOLVER COS-	8	Gray
SIN/COS B+ REOLVER SIN+	9	Red
SIN/COS B- REOLVER SIN-	10	Violet
SIN/COS Z+ INC. Z+	11	Gray/pink
SIN/COS Z- INC. Z-	12	Red/blue
HALL U	13	White/green
HALL V	14	Brown/green
HALL W	15	White/yellow
N.C.	16	N.C.
N.C.	17	N.C.

Cable for motor and brake temperature sensor (no. 12)



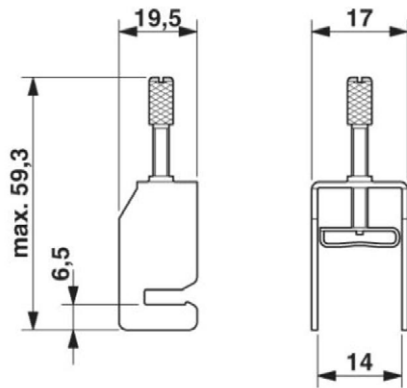
Female,
A-coded

	M12 plug, straight pin assignment	Flying leads color coding
Brake+	1	Brown
Brake-	2	White
Temp_Mot+	3	Black
Temp_Mot-	4	Blue

Shield connection clamp IP20

- Shield clamp for shield diameter 3-14 mm
- Connection of the outer shield of the motor cable by means of a screw cap

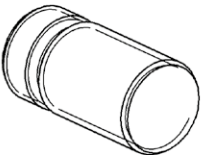
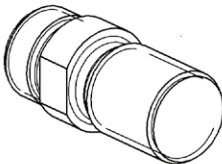
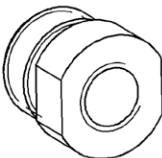
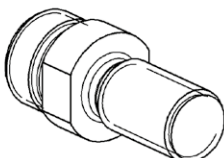
- When ordering a control unit from the cyber® simco® line in IP20 with a shield clamp, the servo drive is supplied with the shield clamp fitted
- Order designation: shield connection clamp SK 14



Attachment parts on the actuator rod

Four different attachment parts are available for the actuator rod for the linear actuators of the cyber® dynamic line in size 40 and the cyber® dynamic system.

Order designation: cyber® dynamic attachment part Tip X

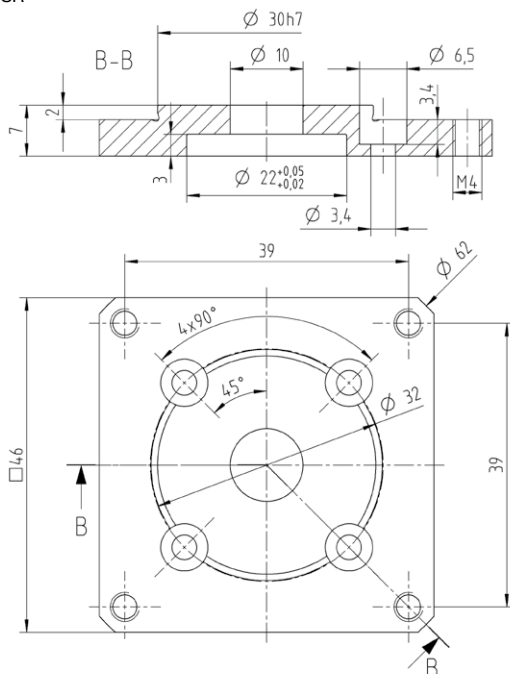
A	B	C	D
Outer thread M16 x 1.5	Outer thread M16 x 1.5 with double D profile	Inner thread M10 x 1.25 with double D profile	Outer thread M12 x 1.25 with double D profile
			

Attachment adapters

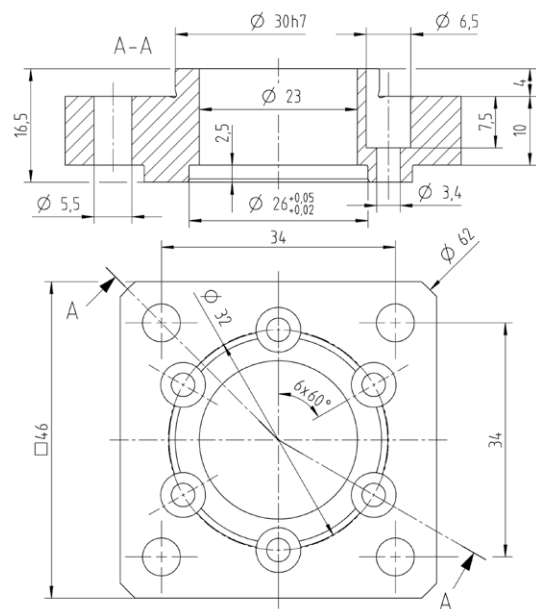
Attachment adapters are available for the cyber® dynamic system to implement a compatible solution with our Ternary drive system.

Order designation: CDSR adapter or CDSL adapter

CDSR



CDSL



Information

Ordering codes

cyber® simco® line 2

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8																			
S	I	M	2	0	1	5	D	-	F	C	S	-	C	A	0	0	-	0	0	0	0	-	B	0	0	0	0																			
Series 3 characters (pos. 1-3)			Rated output current 3 characters (pos. 5-7): 007 = 7.5 A _{eff} 015 = 15 A _{eff} 050 = 50 A _{eff} 100 = 100 A _{eff}				Fieldbus interface 2 characters (pos. 14-15) CA = CANopen ET = Ethernet-based				Overload factor 1 character (pos. 12): S = 2x, internal				Cooling 1 character (pos. 11): C = convection				Housing version 1 character (pos. 10): C = control cabinet version, IP20 (SIM2007 / SIM2015 only) F = decentralized version, IP65				Power supply 1 character (pos. 8): D = DC voltage				Connection technology 2 characters (pos. 17-18): 00 = standard				Safety version 2 characters (pos. 19-20): 00 = STO to SIL3 / PL e 01 = STO, SBC, SP (EnDatFS), encoder emulation (SIM2050 / SIM2100 only)				Motor encoder feedback system 2 characters (pos. 21-22): 00 = EnDat 2.2 / BiSS-C / SSI / Resolver / Sin/Cos-Encoder (if SIM2007 / SIM2007) 01 = EnDat 2.2 / BiSS-C / SSI / Resolver / Sin/Cos-Encoder / incremental encoder + Hall (if SIM2050 / SIM2100)				Special version 4 characters (pos. 25-28): 0000 = standard xxxx = sequential number, special version				Device generation 1 character (pos. 24): B = 2nd generation			

cyber® dynamic motor R

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
M	R	S	R	0	1	6	B	-	0	1	0	C	-	2	C	0	B	S	-	H	I	0	G	S	N	-	N	N	N	
Series 4 characters (pos. 1-4) MRSR = cyber® dynamic motor				Size (Outer diameter of laminated core in mm) 3 characters (pos. 5-7) 016 = size 17 021 = size 22 030 = size 32 038 = size 40			Lamination 1 character (pos. 8) B = lamination	Overall length (Length of the active part of the motor) 3 characters (pos. 10-12) 010 = 10 mm (if size 016 or 021) 020 = 20 mm (if size 030) 030 = 30 mm (if size 038)			Cooling 1 character (pos. 13) C = convection	Voltage constant 3 characters (pos. 15-17) See specific characteristic curve			Voltage 1 character (pos. 18) B = DC bus voltage to 60 V _{DC}			Electrical connection 1 character (pos. 19) S = Standard Design (electrical connection dependent on motor connection cable) U = Inox/Hygienic Design with Intercontec plug F = Inox / Hygienic Design with open cable ends			Encoder 2 characters (pos. 21-22) HI = singleturn, BiSS-C HM = multiturn, BiSS-C HF = incremental		Brake 1 character (pos. 23) 0 = without 1 = with		Shaft version 1 character (pos. 24) G = smooth shaft		Temperature sensor 1 character (pos. 26) N = without		Designs 1 character (pos. 25) S = standard (if Standard/Inox Design) L = food-grade (if Hygienic Design)	

Information

Ordering codes

cyber® dynamic actuator R

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0																														
A	R	S	Q	0	1	6	B	-	0	1	0	C	-	8	C	1	B	S	-	H	I	0	D	S	N	-	X	U	N																														
Series 4 characters (pos. 1-4) ARSQ = cyber® dynamic actuator R				Size (Outer diameter of laminated core in mm) 3 characters (pos. 5-7) 016 = size 17 021 = size 22 030 = size 32 038 = size 40				Lamination 1 character (pos. 8) B = lamination				Overall length (Length of the active part of the motor) 3 characters (pos. 10-12) 010 = 10 mm (if size 016 or 021) 020 = 20 mm (if size 030) 030 = 30 mm (if size 038)				Cooling 1 character (pos. 13) C = convection				Voltage constant 3 characters (pos. 15-17) See specific characteristic curve				Voltage 1 character (pos. 18) B = DC bus voltage to 60 V _{DC}				Electrical connection 1 character (pos. 19) S = Standard Design (electrical connection dependent on motor connection cable) U = Inox/Hygienic Design with Intercontec plug F = Inox / Hygienic Design with open cable ends				Encoder 2 characters (pos. 21-22) HI = singleturn, BiSS-C HM = multiturn, BiSS-C HF = incremental				Temperature sensor 1 character (pos. 26) N = without				Brake 1 character (pos. 23) 0 = without 1 = with				Shaft version 1 character (pos. 24) G = smooth shaft (if size 030) P = smooth shaft with key (if size 038) D = D-cut shaft (if size 016 / 021)				Gearbox ratio 1 character (pos. 28) X = see p. 93				Gearbox type and backlash 1 character (pos. 29) U = planetary gearbox with standard backlash				Gearbox alignment 1 character (pos. 30) N = symmetrical			

cyber® dynamic actuator R – gearbox ratio

Size	17	22	32	40 (GCP)	40 (CP)	40 (NP)
A	64	4	4	4	-	-
B	4	16	-	12.25	-	-
C	12	28	-	20	-	-
D	21	64	25	25	-	-
E	28	-	-	64	-	-
F	36	-	64	-	-	-
G	48	-	-	-	-	-
H	-	20	-	-	-	-
L	-	-	16	-	-	-
M	-	-	20.8	-	-	-
P	-	-	72	30.67	-	-
R	-	-	100	-	-	-

Size	17	22	32	40 (GCP)	40 (CP)	40 (NP)
Y	-	-	-	100	-	-
Z	-	-	-	49	-	-
AQ	-	-	-	-	5	-
BQ	-	-	-	-	4	-
CQ	-	-	-	-	50	-
DQ	-	-	-	-	16	-
FQ	-	-	-	-	-	10
GQ	-	-	-	-	-	25
JQ						5

Information

Ordering codes

cyber® dynamic actuator L

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
A	L	S	R	0	1	6	B	-	0	1	0	C	-	1	2	7	B	S	-	H	I	0	S	S	N	-	X	B	N	
Series 4 characters (pos. 1-4) ALSR = cyber® dynamic actuator L				Size (Outer diameter of laminated core in mm) 3 characters (pos. 5-7) 016 = size 17 021 = size 22 030 = size 32 038 = size 40			Lamination 1 character (pos. 8) B = lamination	Overall length (Length of the active part of the motor) 3 characters (pos. 10-12) 010 = 10 mm (if size 016 or 021) 020 = 20 mm (if size 030) 030 = 30 mm (if size 038)			Cooling 1 character (pos. 13) C = convection	Voltage constant 3 characters (pos. 15-17) See specific characteristic curve			Voltage 1 character (pos. 18) B = DC bus voltage to 60 V _{DC}		Electrical connection 1 character (pos. 19) S = Standard Design (electrical connection dependent on motor connection cable) U = Inox/Hygienic Design with Intercontec plug F = Inox / Hygienic Design with open cable ends		Encoder 2 characters (pos. 21-22) HI = singleturn, BiSS-C HM = multiturn, BiSS-C HF = incremental		Brake 1 character (pos. 23) 0 = without 1 = with	Shaft version 1 character (pos. 24) S = pushing rod		Designs 1 character (pos. 25) S = standard (if Standard/Inox Design) L = food-grade (if Hygienic Design)		Stroke length 1 character (pos. 28) X = see additional table		Linear guide and anti-rotation device 1 character (pos. 29) B = with linear guide and anti-rotation device		Force sensor 1 character (pos. 30) N = without

Stroke length

Size	17	22	32	40
C	30 mm	35 mm	40 mm	-
D	-	-	-	300 mm
E	120 mm	140 mm	160 mm	200 mm
F	-	-	-	50 mm

cyber® dynamic line cables

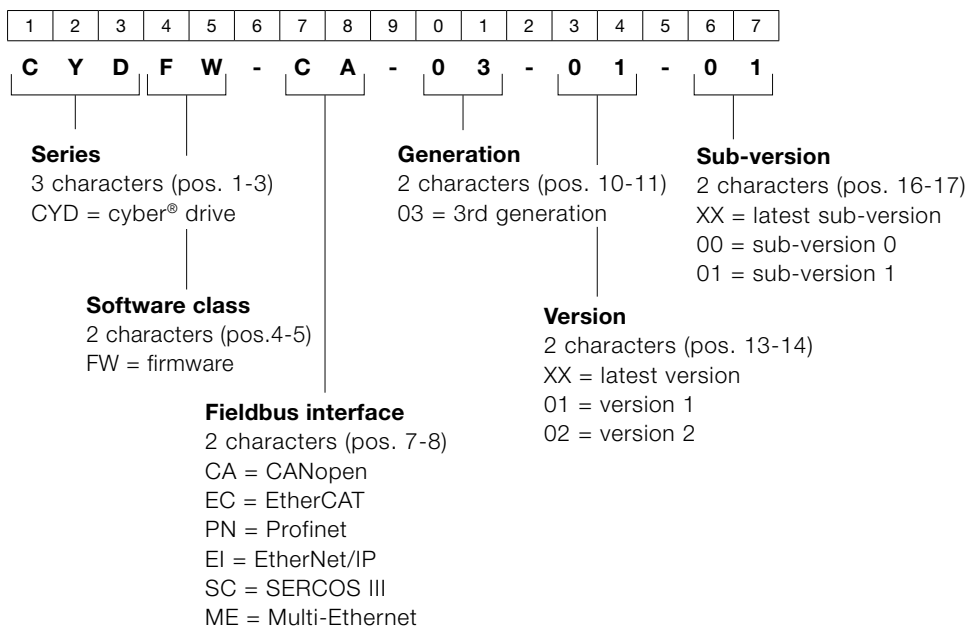
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0		
S / L - K A B E L									-	0 1 6			H I		-	0 5 0 0				-	B	F	S	0	-	1 1		/	3		
Series 9 characters (pos. 1-9) S/L CABLE = cyber® dynamic line cable																	Cable length in mm 4 characters (pos. 17-20)														

Information
Ordering codes

cyber[®] dynamic system

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0												
C	D	S	L	-	0	4	0	C	H	I	1	-	K	0	1	0	A	-	0	L	0	-	E	T	N	-	A	0	0		
Series 3 characters (pos. 1-3) CDS = cyber® dynamic system								Encoder 2 characters (pos. 10-11) HI = singleturn, BiSS-C HM = multiturn, BiSS-C								Stroke length 1 character (pos. 18) 0 = without A = 50 mm D = 200 mm F = 300 mm								Communication interface 2 characters (pos. 24-25) CA = CANopen ET = Ethernet-based fieldbus							
Actuator version 1 character (pos. 4) R = rotary actuator without gearbox G = rotary actuator with gearbox L = linear actuator												Brake 1 character (pos. 12) 0 = without 1 = with								Sealing ring 1 character (pos. 20) 0 = without 1 = with				Sensor technology 1 character (pos. 26) N = without							
				Size 3 characters (pos. 6-8) 040 = 40 mm																				Device generation 1 character (pos. 28) A = 1st generation							
				Overall length 1 character (pos. 9) C = 30 mm																				Special 2 characters (pos. 29-30) 00 = without							
												Gearbox type / ball screw type 1 character (pos. 14) 0 = without gearbox (if actuator version R) G = gearbox GCP (if actuator version G) N = gearbox NP (if actuator version G) K = ball screw type KGT (if actuator version L)																			
																Gearbox ratio / screw pitch 1 character (pos. 15) 000 = without 005 = gearbox ratio 5 (if actuator version G) 010 = gearbox ratio 10 (if actuator version G) 025 = gearbox ratio 25 (if actuator version G) 003 = screw pitch 3 (if actuator version L) 010 = screw pitch 10 (if actuator version L)															
																								Shaft version 1 character (pos. 22) 0 = without L = pushing rod (if actuator version L) G = smooth shaft (if actuator version R) P = smooth shaft with key (if actuator version G)							

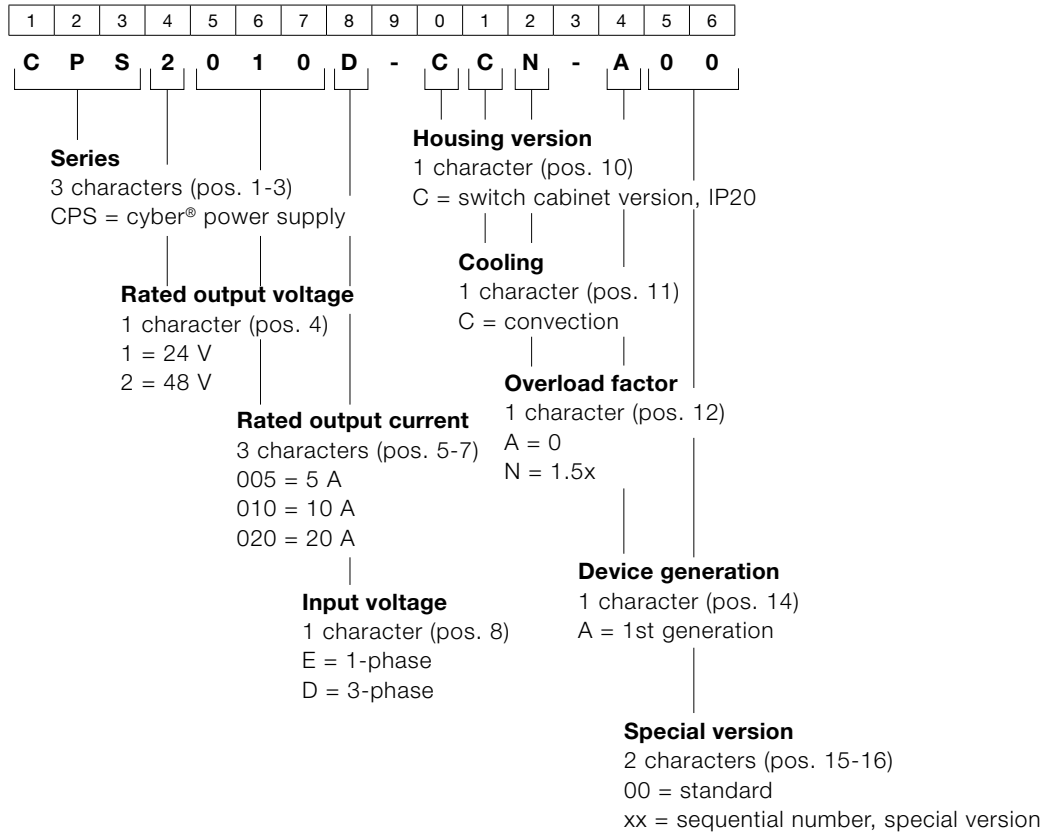
cyber® simco® line / cyber® dynamic system software



Information

Ordering codes

cyber® power supply



cyber® distribution box

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
C	D	B	2	0	1	5	D	-	F	C	S	-	E	T	6	4	-	A	0	0			
Series 3 characters (pos. 1-3) CDB = cyber® distribution box			DC bus voltage 1 character (pos. 4) 2 = 48 V		Rated output current 3 characters (pos. 5-7) 015 = 15 A			Power supply 1 character (pos. 8) D = DC voltage		Housing version 1 character (pos. 10) F = IP65		Overload factor 1 character (pos. 12) S = 2x		Fieldbus interface 2 characters (pos. 14-15) ET = Ethernet-based		Cooling 1 character (pos. 11) C = convection		Device generation 1 character (pos. 19) A = 1st generation		Special version 2 characters (pos. 20-21) 00 = standard		Connection technology 2 characters (pos. 16-17) 64 = 6 power supply / 4 fieldbus outputs	

Information

Service concept

PRE-SALES

Planning



Investment



Consulting expertise

- Optimum solutions thanks to professional application calculations and drive sizing
- Customized solutions and maximum innovation

Customer training und webinars

- Tailored content and specific training programs
- Recordings of WITTENSTEIN webinars to enable familiarization with products and solutions

CAD POINT

- Technical data sheets and 3D data – find the right information with just a few clicks

cymex®

Optimization of your drive train

- cymex® – the tried-and-tested software for drive system optimization
- cymex® enables straightforward dimensioning and evaluation of the complete drive train (application + transformation + motor + gearbox)
- Support and extensive design experience

Our services at a glance



AFTER-SALES

Usage



Re-investment



Professional support for the best possible start

- Assistance with installation and commissioning
- Individual training in commissioning
- Operating manuals with information regarding commissioning and installation
- Optimum integration of the system in your application

WITTENSTEIN Service Portal

- Support throughout the entire life cycle of your WITTENSTEIN product
- Instant access to product information
- Quick assembly and commissioning
- Play IIoT with Smart Services

Find out more about the
WITTENSTEIN Service Portal



Maintenance

- Proactive measures to minimize failure risks
- Personal and prompt handling of your time-critical repair requirements
- Tailored repairs combining highest levels of quality and care

Application-specific retrofitting

- Professional retrofitting of mechanical drive systems
- Reliable compatibility testing of existing solutions

Support hotline

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Email: info@wittenstein-cyber-motor.de

Service hotline

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Technical support

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Information

Drive selection and sizing

WITTENSTEIN Sizing Tools – several ways to reach your objectives



Our software portfolio helps you choose the right drive

You can conveniently download dimension sheets and CAD/CAE data, select the best product quickly and easily or design complex kinematic sequences in detail – our software solutions offer various methods of selecting the best, most reliable drive on all axes.

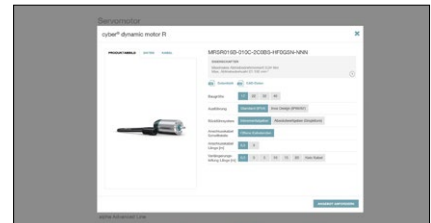


CAD Point

– Your smart catalog

- Performance data, dimension sheets and CAD data for all gearboxes
- Comprehensive documentation for your selection
- Available online, no login required

www.wittenstein-cad-point.de

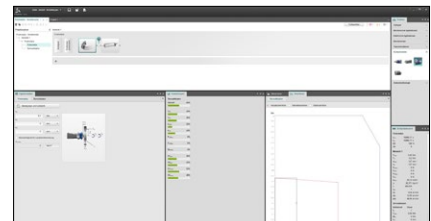


cymex®5

– Calculate on the best

- Detailed calculation of complete drive trains
- Precise simulation of motion and load variables
- Downloadable software for complex designs

www.wittenstein-cymex.de



Additional tools



CADENAS

Digital product catalog

- 2D, 3D CAD and CAE models as well as dimension and data sheets for all products
- Multi-CAD/CAE: support for approximately 150 native and neutral formats
- Integration in the CAD POINT WITTENSTEIN solution
- For simplicity, speed and choice in the design process

<https://wittenstein.partcommunity.com>



EPLAN

Data portal catalog

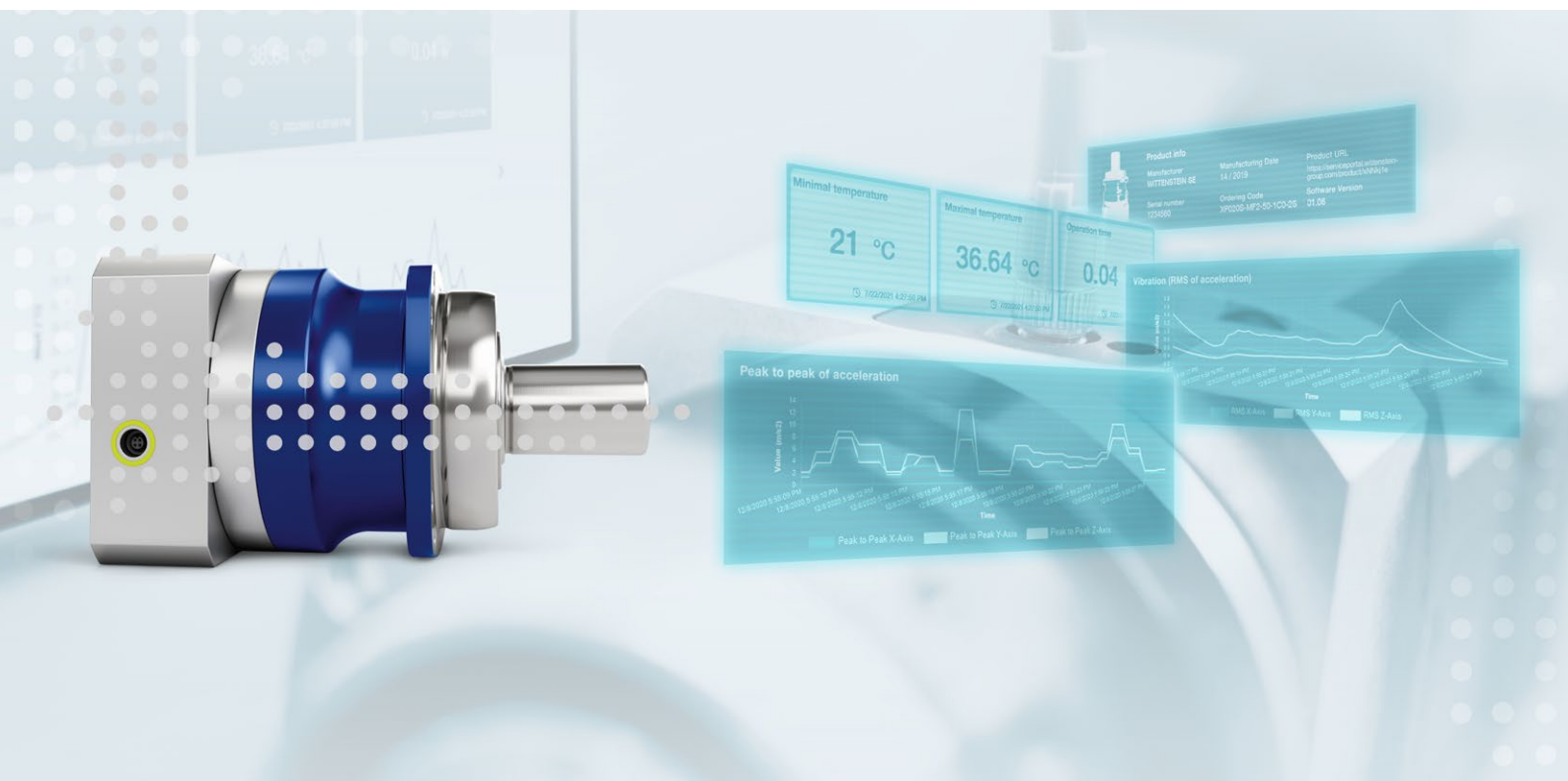
- For reduced project planning work in your electrical design
- Extensive product availability in the EPLAN catalog

<https://dataportal.eplan.com>

WITTENSTEIN Service Portal



The web-based WITTENSTEIN Service Portal supports you throughout the entire life cycle of your WITTENSTEIN product – from installation and commissioning to servicing and/or drive replacement. Here you will find relevant and up-to-date information about your product including explanations, technical data, tutorial videos on assembly and commissioning, documentation, firmware files and the necessary contact details for support. The WITTENSTEIN Service Portal also makes it quick and easy to request replacement products and register returns for inspection or repair.



Fast

You will receive clear information about your product without any need to wait or conduct extensive research.

Simple access

You can access the WITTENSTEIN Service Portal via a desktop PC or mobile device and benefit from the intuitive navigation.

Up to date

You can rest assured that all data, documentation and software is always up to date.

Personal

For further support, you can get in touch directly with the relevant contact person.

Traceable

You can access both the delivered version of the firmware and the latest version.

International

The Service Portal is available in six languages (EN, DE, ES, IT, FR, TR).

Ambient temperature

Describes the temperature of the air for the operation of servo actuators according to DIN EN 60204-1.

Axial play

The axial play describes the hysteresis at the pushing rod during a passive change of direction from the outside (pull-push at thrust tube). This is inherent in the design and includes the axial play of the rolling elements in the ball screw drive and bearing. The value specified is a worst-case value, which is usually significantly better in reality. It should be noted that the value can change slightly over the course of the service life due to mechanical wear.

Ball screw

A ball screw converts rotary motion into linear motion. This is done by rolling balls in the running grooves between a threaded spindle and a threaded nut.

BiSS-C

Protocol for transmitting absolute values and parameters, developed by ICHaus. The name BiSS stands for "bidirectional/serial/synchronous."

cymex®

cymex® is the calculation software developed by our company for sizing complete drive trains. The software enables the precise simulation of motion and load variables. The software is available to download from our website (www.wittenstein-cymex.de). We can also provide training to enable you to make full use of all the possibilities provided by the software.

Efficiency (η)

The efficiency [%] η is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100%.

$$\eta = P_{\text{off}} / P_{\text{on}} = (P_{\text{on}} - P_{\text{loss}}) / P_{\text{on}}$$

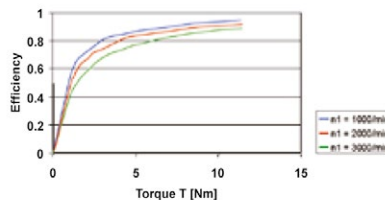


Figure: Example efficiency curve for a planetary gearbox as a function of the torque efficiency

WITTENSTEIN always indicates the efficiency of a gearbox/servo actuator during operation at full load. If the input power or torque is lower, the efficiency rating is also lower due to the constant no-load torque. Power losses do not increase as a result. A lower efficiency is also to be expected at high speeds.

Encoder

The encoder is an important part of the servo system and determines the current speed and position for control purposes. Different measuring methods are used for this purpose: electromagnetic induction (resolver) or optical sensing of an encoder disc (absolute encoder).

Engaging time

Time from switching off the current until 90% of the rated torque of the holding brake is reached.

Holding brake

The holding brake serves to lock an axis when stationary. Unlike a service brake, it is not used to reduce the speed, except in emergency stop situations. The number of possible emergency stops can be calculated based on the speed and moved mass.

Insulation class

The insulation class of the motor defines the maximum operating temperatures of the insulation materials used.

Mass moment of inertia (J)

The mass moment of inertia J [kgm²] is a measure of the effort applied by an object to maintain its momentary condition (at rest or moving).

Motion Task

Can be used in the form of an extended motion block table in the control unit for individual modification and flexible programming of the application.

Operating voltage

The motor windings are designed for a specific operating voltage. The operating voltage (DC bus voltage) corresponds to the rectified peak value of the supply voltage from the grid.

Pin assignment

Defines the assignment of the individual pins in the mounting socket. The supply voltages for the motor and brake, the temperature signal and the motor encoder signals are transferred via these pins.

Positioning accuracy

The positioning accuracy describes how precisely any position can be approached from any direction. The dimension indicates the size of the deviation of the actual position from the target position in the direction of movement. The positioning accuracy is the sum of all mechanical inaccuracies and the resolution of the encoder system. The value specified is a worst-case value, which is usually significantly better in reality. It should be noted that the value can change slightly over the course of the service life due to mechanical wear.

Release time

Time from switching on the current until 10% of the rated torque of the holding brake is reached.

Repeatability

The repeatability describes how precisely an identical position can be approached from the same direction with identical parameters. The dimension indicates the size of the deviation of the actual position from the target position in the direction of movement. The repeatability is largely based on the resolution of the encoder system. The value specified is a worst-case value, which is usually significantly better in reality. It should be noted that the value can change slightly over the course of the service life due to mechanical wear.

Reverse play

The reverse play describes the hysteresis at the pushing rod during an active change in direction of rotation of the motor. This is inherent in the design and includes all axial and radial play in the ball screw drive, bearing and anti-rotation device. The value specified is a worst-case value, which is usually significantly better in reality. It should be noted that the value can change slightly over the course of the service life due to mechanical wear.

SIL

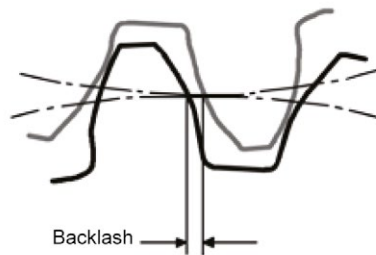
Stands for the safety integrity level from the area of functional safety and is referred to as safety level or safety integrity level in accordance with the IEC 61508/IEC61511 standard. There are 4 levels: up to level 2, the manufacturers can make the hazard assessments on their own authority; from level 3 upward, this must be carried out by an independent, accredited body.

Tilting moment (M_{2K})

The tilting moment M_{2K} is a result of the axial and lateral forces applied and their respective force application points in relation to the inner radial bearing on the output side.

Torsional backlash (j_t)

Torsional backlash j_t [arcmin] describes the maximum angle of torsion of the output shaft in relation to the input. In simple terms, the torsional backlash describes the gap between two tooth flanks.



Motor curve

Term	Symbol	Unit	Explanation
Continuous torque	M_{S1}	Nm	Continuous torque of the motor.
Continuous power	P_{S1}	W	Continuous power of the motor.
DC bus voltage	U_{DC}	V	Voltage at DC bus.
Torque constant	k_m	Nm/A	Torque constant calculated from torque and the RMS current. $k_m = \frac{M}{I}$
Voltage constant	k_e	Vs	Voltage constant calculated from the peak value of the voltage induced between the two phases and the speed n at an externally driven motor: $k_e = \frac{\hat{U}_{tt}}{2 p n}$
Motor constant	k_{mot}	Nm/ \sqrt{W}	Factor of efficiency calculated from torque and power losses. $k_{mot} = \sqrt{\frac{2}{3}} \times \frac{k_m}{\sqrt{R_{tt}}}$
Ambient temperature	ϑ_u	°C	Maximum allowed ambient temperature (with liquid cooling maximum inlet temperature of the cooling liquid) without derating.
Maximum winding temperature	ϑ_{max}	°C	Maximum allowed winding temperature.
Heat transfer resistance	R_{th}	K/W	Heat transfer resistance not to be exceeded for discharge of thermal losses.
Maximum power	P_{max}	W	Maximum power in short time operation.
Maximum torque	M_{max}	Nm	Maximum torque at maximum current I_{max} .
Maximum current	I_{max}	A	Maximum current rms-value.
Continuous stall torque	M_0	Nm	Continuous torque at standstill of the motor.
Continuous stall current	I_0	A	Continuous current (rms value) which leads to the allowed heating of the winding.
No-load speed	n_0	rpm	Maximum speed that is reached load-free without field-weakening when operated with U_{DC} .
Rated power	P_n	W	Continuous permissible power at speed n_n .
Rated torque	M_n	Nm	Continuous permissible torque at speed n_n .
Rated current	I_n	A	Continuous permissible current (effective value) at speed n_n .
Rated speed	n_n	rpm	Speed up to which M_n is continuously specified.
Holding torque brake	M_4	Nm	Holding torque brake static (at 120°C)

Term	Symbol	Unit	Explanation
Motor terminal resistance	R_{tt}	Ω	Resistance between two terminals at 20°C.
Motor terminal inductance	L_{tt}	mH	Inductance between two terminals at 20°C.
Electrical time constant	t_e	ms	Electrical time constant: $t_e = L_{tt} / R_{tt}$
Number of pole pairs	p		Number of pole pairs of the motor.
Inertia of motor	J	kgm ²	Inertia of the motor without brake.
Mass of motor	m	kg	Mass of the motor without brake.

All values specified are subject to specific fluctuations, as the materials used have tolerances both in their properties and in their dimensions. The specified values are mean values, and deviations of $\pm 10\%$ are permissible for torques, currents, inductances, resistances and speeds. In the case of inductance, an angle-dependent fluctuation can also occur.

Actuator curve (rotary)

Term	Symbol	Unit	Explanation
Continuous torque	M_{S1}	Nm	Continuous torque of the actuator.
Continuous power	P_{S1}	W	Continuous power of the actuator.
DC bus voltage	U_{DC}	V	Voltage at DC bus.
Torque constant	$k_{m \text{ act}}$	Nm/A	Torque constant calculated from torque and the RMS current. $k_m = \frac{M}{I}$
Voltage constant	$k_{e \text{ act}}$	Vs	Voltage constant calculated from peak value of the induced voltage between two terminals and rotation speed for the external driven actuator: $k_e = \frac{\hat{U}_{tt}}{2 p n}$
Actuator constant	k_{act}	Nm/ \sqrt{W}	Factor of efficiency calculated from torque and power losses. $k_{mot} = \sqrt{\frac{2}{3}} \times \frac{k_m}{\sqrt{R_{tt}}}$
Ambient temperature	ϑ_u	°C	Maximum allowed ambient temperature (with liquid cooling maximum inlet temperature of the cooling liquid) without derating.
Maximum winding temperature	J_{max}	°C	Maximum allowed winding temperature.
Heat transfer resistance	R_{th}	K/W	Heat transfer resistance not to be exceeded for discharge of thermal losses.
Maximum power	$P_{max \text{ act}}$	W	Maximum power in short time operation.
Maximum torque	$M_{max \text{ act}}$	Nm	Maximum torque at maximum current I_{max} .
Maximum current	I_{max}	A	Maximum current rms-value.
Continuous stall torque	$M_{0 \text{ act}}$	Nm	Continuous torque at standstill of the actuator.
Continuous stall current	I_0	A	Continuous current (rms value) which leads to the allowed heating of the winding.
No-load speed	$n_{0 \text{ act}}$	rpm	Maximum speed that is reached load-free without field-weakening when operated with U_{DC} .
Rated power	$P_{n \text{ act}}$	W	Continuous permissible power at speed $n_{n \text{ act}}$.
Rated torque	$M_{n \text{ act}}$	Nm	Continuous permissible torque at speed $n_{n \text{ act}}$.
Rated current	I_n	A	Continuously permissible current (effective value) at speed $n_{n \text{ act}}$.
Rated speed	$n_{n \text{ act}}$	rpm	Speed up to which $M_{n \text{ act}}$ is continuously specified.
Holding torque brake	M_4	Nm	Holding torque brake static (at 120°C)
Motor terminal resistance	R_{tt}	Ω	Resistance between two terminals at 20°C.
Motor terminal inductance	L_{tt}	mH	Inductance between two terminals at 20°C.

Term	Symbol	Unit	Explanation
Electrical time constant	t_e	ms	Electrical time constant: $t_e = L_t / R_t$
Number of pole pairs	p		Number of pole pairs of the motor.
Inertia actuator	J_{act}	kgm ²	Mass moment of inertia of the actuator without brake in relation to the application side.
Mass of actuator	m_{act}	kg	Mass of the actuator.
Gear ratio	iG		Ratio of the gear.
Gear efficiency	ηG	%	Efficiency of the gear.
Mechanical speed limit S1	$n_{limit,S1}$	rpm	Maximum speed for continuous operation due to mechanical limits.
Max. mechanical speed limit	$n_{limit,Max}$	rpm	Maximum speed for maximum operation due to mechanical limits.

All values specified are subject to specific fluctuations, as the materials used have tolerances both in their properties and in their dimensions. The specified values are mean values, and deviations of $\pm 10\%$ are permissible for torques, currents and speeds.

The actuator curve is calculated with a constant ball screw and gearbox efficiency (if available).

When entering mechanical load limits, the usable operating range is restricted. Areas of the maximum characteristic curves determined by the motor that are no longer permissible are shown as dashed lines in the diagram.

Actuator curve (linear)

Term	Symbol	Unit	Explanation
Continuous force	F_{S1}	kN	Continuous force of the actuator.
Continuous power	P_{S1}	W	Continuous power of the actuator.
DC bus voltage	U_{DC}	V	Voltage at DC bus.
Force constant	k_{m_act}	kN/A	Force constant calculated from force and RMS value of the current. $k_{m_act} = \frac{F_{act}}{I}$
Voltage constant	k_{e_act}	Vs/mm	Voltage constant calculated from peak value of the induced voltage between two terminals and speed v for the external driven actuator: $k_{e_act} = \frac{\hat{U}_{tt}}{v_{act}}$
Actuator constant	k_{act}	–	Factor of efficiency calculated from force and power losses. $k_{act} = \sqrt{\frac{2}{3}} \times \frac{k_{m_act}}{\sqrt{R_{tt}}}$
Maximum power	P_{max_act}	W	Maximum power in short time operation.
Maximum push force	F_{max_act}	kN	Maximum push force with maximum current I_{max_act} .
Maximum current	I_{max_act}	A	Maximum current (rms-value), limited by mechanical load limits.
Continuous stall force	F_{0_act}	kN	Continuous force at standstill of the actuator.
Continuous stall current	I_0	A	Continuous current (rms value) which leads to the allowed heating of the winding.
No-load speed	v_{0_act}	mm/s	Maximum linear velocity that is reached load-free without field-weakening when operated with U_{DC} .
Rated power	P_{n_act}	W	Continuously permissible power at speed v_{n_act} .
Rated torque	F_{n_act}	kN	Continuously permissible force at speed v_{n_act} .
Rated current	I_n	A	Continuously permissible current (effective value) at speed v_{n_act} .
Rated speed	v_{n_act}	mm/s	Speed up to which F_{n_act} is continuously specified.
Holding force brake	F_4	kN	Holding force brake static (at 120°C)
Mass of actuator	m_{act}	kg	Mass of the actuator.
Spindle pitch	p_s	mm	Pitch of the spindle (distance per revolution).
Inertia actuator	J_{act}	kgm ²	Mass moment of inertia of the complete actuator.

Term	Symbol	Unit	Explanation
Spindle efficiency	η_s	%	Efficiency of the spindle.
Gear efficiency	η_g	–	Efficiency of the gear.
Mech. speed limiter	v_{limit}	mm/s	Maximum permissible speed due to mechanical limits.
Mech. force limiter	F_{limit}	kN	Maximum permissible force due to mechanical limits.

All values specified are subject to specific fluctuations, as the materials used have tolerances both in their properties and in their dimensions. The specified values are mean values, and deviations of $\pm 10\%$ are permissible for torques, currents and speeds.

The linear actuator characteristic curve is calculated with a constant ball screw and gearbox efficiency (if available). The characteristic curve does not say anything about what linear velocities can actually be achieved, taking into account the ball screw stroke in the application and the environmental/load conditions.

When entering mechanical load limits, the usable operating range is restricted. Areas of the maximum characteristic curves determined by the motor that are no longer permissible are shown as dashed lines in the diagram.



cyber motor

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