

## iTAS<sup>®</sup> servo drive system for automated guided vehicles

individual  
interactive  
intelligent





**Catalogs, CAD files and instruction manuals  
can be found in our download center on**

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



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# GROUP



WITTENSTEIN | alpha

WITTENSTEIN alpha GmbH  
Development and production  
of high-precision servo drives



WITTENSTEIN alpha develops and produces mechanical and mechatronic servo drive systems for sectors that require maximum precision. Our products consistently raise the bar around the world.

We have divided our product portfolio into two areas in order to meet very different requirements: in the high-end segment, we focus on technology and performance, while in the general segment, cost-effective and high-demand products are the main focus.



WITTENSTEIN | motion control

WITTENSTEIN motion control GmbH  
Customized linear and rotary servo systems



WITTENSTEIN motion control uses our own power electronics, software, servo motors and gear systems to develop and produce customized mechatronic systems for extreme conditions.

In the Energy sector for instance, we focus on electric actuation solutions for subsea deep water Oil and Gas extraction. In the defense sector, we develop mechatronic drive systems for military applications. Here, integration is our guiding principle – for even better dynamics and power density.



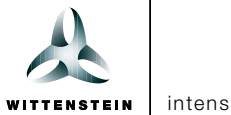
WITTENSTEIN | cyber motor

WITTENSTEIN cyber motor GmbH  
Highly dynamic servo motors and  
drive electronics



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

We collaborate closely with our customers to exchange ideas, learn from each other and discover new opportunities that help our customers stand out from the competition.



WITTENSTEIN intens GmbH  
Smart drive solutions in and on the human body



WITTENSTEIN intens specializes in the development and production of smart implants. We are the world's leading supplier of mechatronic drive solutions for correction of extremities.

Our outstanding expertise in the areas of mechatronics, miniaturization and system integration enables us to expand our drive systems to an ever increasing range of medical technology applications – both inside and outside the human body.



WITTENSTEIN  
aerospace & simulation GmbH  
Mechatronic drive systems for aerospace & simulation



WITTENSTEIN aerospace & simulation develops, integrates, produces and supplies mechatronic drive systems for aerospace and simulation applications. Our stringent and sophisticated system design processes ensure that our products meet our customers' requirements precisely.

Our innovative solutions are deployed in mission-critical, flight-critical and environment-critical systems, i.e. wherever the keys to success are performance, robustness, reliability and limitations on space and weight.



attocube systems AG  
Nanoprecision drive and measurement technology solutions



Attocube develops and produces drive and measurement technology for highly demanding nanotech applications. Their product range includes everything from piezo-based compact motors 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 with maximum precision and user-friendliness. This far superior technology is revolutionizing existing applications and guarantees lasting competitive advantages for our customers.

## Comprehensive product expertise

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

## Customized solutions

- Customer-specific solutions with maximum customer benefits
- We act holistically and are eager to explore new possibilities
- From conception and development to production and qualification

## Development and production in Germany

- Distinctive development team with profound expertise
- High degree of vertical integration, including own winding shop and certified test stands
- High quality achieved using innovative, manageable processes

Servo motors



Drive electronics

## WITTENSTEIN – Products that know no limits

Packaging



Pharmaceuticals and food

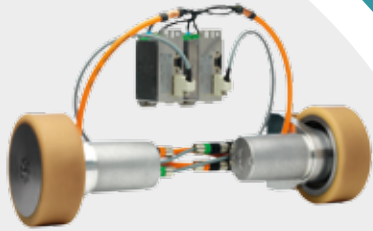


Assembly and measurement technology



Handling and robotics





Mechatronic systems

## Expert project management

- Feasibility studies for complex drive tasks
- Defined product development process supervised by professional 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
- ATEX (certified)
- EHEDG



Intralogistics



Semiconductor / electronics production



Electric mobility

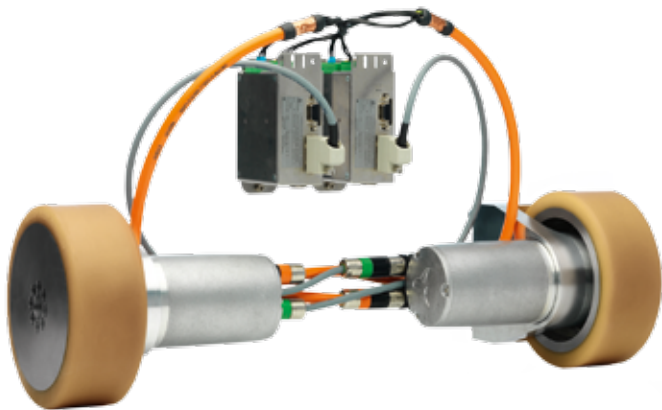


Oil and gas exploration



# iTAS®

## Servo drive system for driverless transport systems.



The first completely scalable,  
modular drive system for DTS.

**The latest generation of driverless transport systems (DTS) needs drive solutions that reduce complexity, while ensuring maximum power density and safety.**

The iTAS® modular system gets right to the heart of this ambition: with its diversity, efficiency and individual scalability, our fully integrated, modular servo drive system offers an innovative modular solution that is specially tuned to the requirements of DTS and logistics systems.

### i ... for individual

Fully scalable modular systems for individual requirements or specific industry sectors, which despite their individuality can be integrated in the vehicle with the greatest of ease.

### i ... for intelligent

Produce different vehicle concepts simply and reliably for every possible application with compact dimensions – thanks to a complete system in which all components interact efficiently and process data can be continually monitored by intelligent web servers.

### i ... for interactive

Design and individually scale DTS, get them up and running fast and use them reliably – with everything under control, at all times. With the interactive MotionGUI interface, plug & play is possible even for complex vehicle concepts.



# Smart system solution for implementing individual DTS concepts.



The combination of a freely configurable actuator system, an intelligent servo drive series and integrable, sector-specific components permits maximum flexibility when realizing new vehicle concepts – safe and space-saving in the smallest installation space.

## Power density of actuators

The core unit of the iTAS® drive system is available in various sizes and equipment versions.



## Easy-to-integrate electronics

The iTAS® drive system is rounded off by the simco® drive servo amplifier series, which is highly flexible and simple to integrate. With sector-specific functions such as brake actuation, energy recovery and acceleration sensor, the drive regulator is ideally equipped for use in DTS.



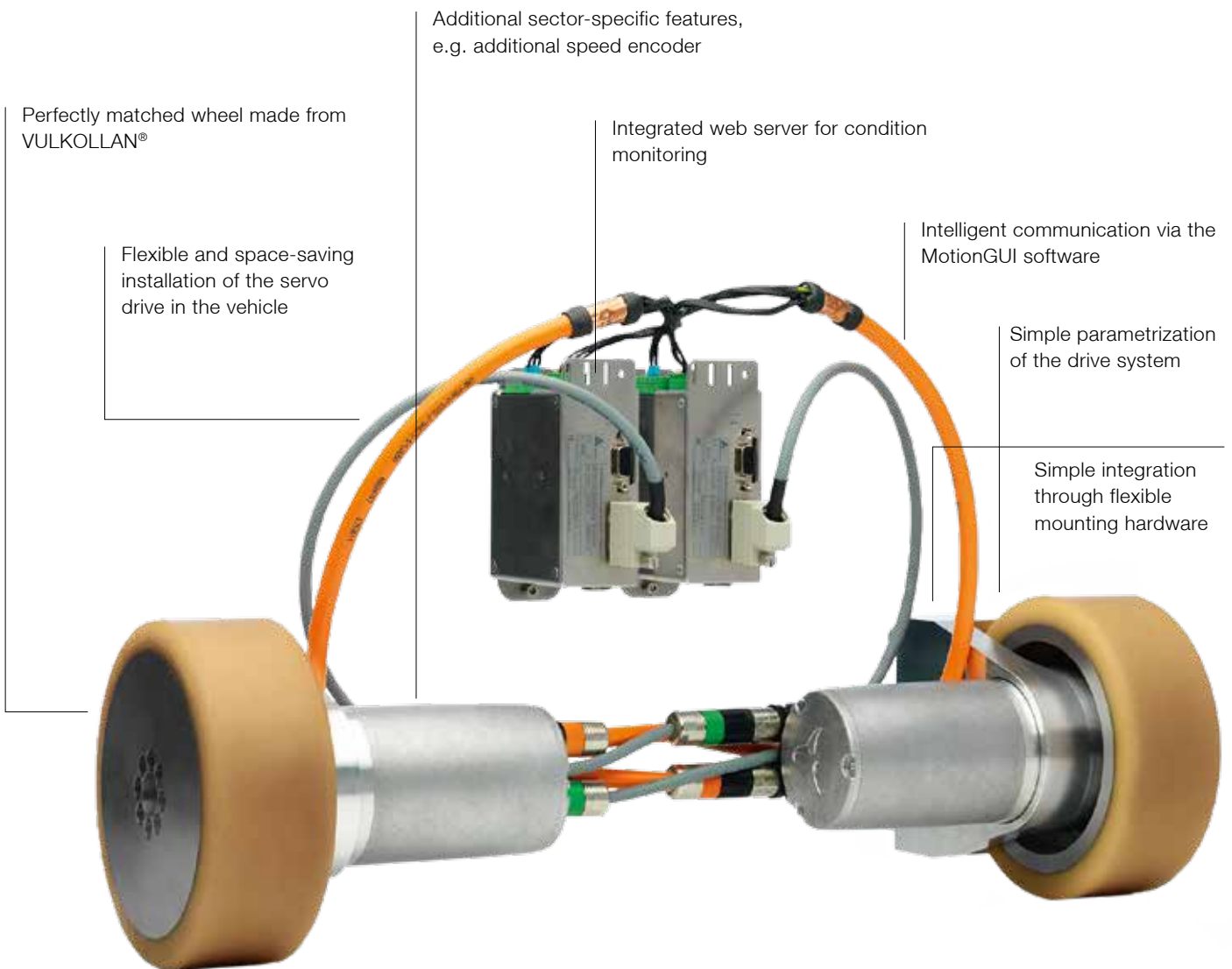
## Sector-specific elements

The vehicle can be designed to meet specific industry requirements by incorporating components such as a dynamic brake, an additional speed sensor for speed monitoring, and a wheel with mounting hardware.



# iTAS<sup>®</sup>

## An intelligent principle for increasing efficiency



A complete system that offers a host of benefits.

## Simplified vehicle design

The perfect-fit product design of the simco® drive and the TAS as well as sector-specific components such as a harmonized wheel with connection considerably simplify integration even in small vehicles – despite its compact design, the entire system can be individually scaled to suit different performance profiles. Sector-specific functions of the simco® drive, such as e.g. external limited switch, soft start or buck-boost converter to actuate the brakes, avoid the need for additional components in the vehicle.

## Lower operating costs

The simplicity with which TAS can be integrated without external ratio e.g. belt or chain, saves time and therefore costs. Moreover, the drives work with high efficiency, reducing energy consumption and extending driving cycles or shifts. The system allows simple parameter programming of the system by selecting the actuator version from a database stored in the drive – also saving time and preventing errors.

## Safe operation at all times

The integrated safety concept, which is implemented using an additional speed encoder and the STO (Safe Torque Off) safety function according to SIL3, enables thoroughly safe vehicle concepts in a system: TAS can, for example, be optionally equipped with an additional encoder for speed control. The system can also be safely shut down in an emergency thanks to the integrated STO (Safe Torque Off) safety function according to SIL3.

## Problem-free productivity

The innovative MotionGUI software allows intuitive operation with condition monitoring, a fault memory, a service function and parameter programming. This allows the continuous monitoring of process data and rapid error diagnosis. As a result, the integrated real-time clock function with event logging can reduce downtimes to ensure a high system availability.

# iTAS®

Ideal for intralogistics in the most diverse branches of industry.

Absolute cost effectiveness, permanent performance enhancement, continuous cost reduction, safety without compromise – the demands placed on internal logistics are just as high in industrial companies as they are in retail or public institutions.

For the smooth flow of materials and information, intelligent complete solutions are required that enable the greatest possible degree of customization with the maximum level of standardization. iTAS® for automated guided vehicles combines standardized power density with freely scalable performance parametrization – for maximum freedom and safety in intralogistics.

**The iTAS® complete system comprising actuators, electronics and sector-specificity is optimal for all unit-load AGVs as well as towing vehicles, piggyback AGVs, assembly AGVs and – owing to the compact dimensions of the system components – in particular mini AGVs.**



## Machine construction

- Extensive speed range
- Flat drive system design
- High vertical loads of the drive system



## Warehouse logistics

- Diverse scalability
- Decentralized intelligence of the drive system for additional axes (e.g. clamping processes)
- Simplified integration of the pre-parametrized drive system



## Clinic logistics

- High safety
- Flat and space-saving solution
- Low energy consumption



## Pharmaceutical industry

- Maximum safety
- Plug and play integration
- High degree of reliability
- High degree of scalability and modularity



## E-commerce

- Compact drive system for simple integration, also in small vehicles
- Extensive speed range
- Flat design
- High energy efficiency



## Food industry

- Coverage of a wide performance range
- High efficiency of the overall system
- High reliability and safety

# iTAS® – in practice already in the fast lane

## New paths in the health sector



iTAS® saves space and offers a high power density. Our vehicle can drive at a speed of up to 2 m/s and negotiate gradients of up to 7 percent."

*Bernd Dalhoff, Managing Director of 2-IT GmbH*

**Customer:**

2-IT GmbH from Alling near Munich

**Industry:**

DTS for the health sector and industrial applications

**Task:**

To develop an innovative AGV (Automated Guided Vehicle), which autonomously performs transport tasks in healthcare facilities.

**Solution:**

iTAS® with TAS 025 in equipment package performance - optimally customized to the specific requirements placed upon unit-load DTSs in a hospital environment: flat, space-saving design, integrated safety concept, low energy consumption.

**Description:**

Their use in intralogistics in hospitals and care facilities is challenging, because the vehicles have to navigate around the contours of the building, negotiate uphill and downhill gradients as well as elevators and automatic doors, all while sharing the space with hospital staff. As iTAS® is also designed as a differential drive, the vehicle is steered by means of a speed difference between the two drives, and can even turn on the spot if necessary. The drives have an energy efficiency of 93% and operating cycles in excess of 20 hours are possible without recharging.

**Special feature:**

A particularly challenging requirement for the drive of this vehicle is moving underneath four-wheeled containers in order to transport them. Despite being 170 cm long and nearly 60 cm wide, the vehicle is only 33 cm high. A scissor lift table for carrying loads up to 600 kg is incorporated. Miniature laser scanners, ultrasonic sensors and floor detectors ensure safety and assist with navigation.

Diverse scalability.  
Decentralized intelligence.  
Simplified integration.



## A real heavyweight for warehouse logistics



"Consulting from a single source and the coordinated interaction between the drive and control technology with iTAS® ensure the reliable planning of our projects."

*Joachim Walter, Managing Director at BeeWaTec GmbH*

**Customer:**

BeeWaTec GmbH from Pfullingen near Reutlingen

**Industry:**

Mini DTS for production and warehouse logistics

**Task:**

To develop a tailor-made drive solution for use in a modular mini-vehicle for transporting stacked goods containers.

**Solution:**

iTAS®: TAS 004 with simco® drive IP20 perfect match:  
dynamic line size 40 with simco® drive IP20

**Description:**

Instead of designing vehicle drives itself, BeeWaTec relies on the iTAS® complete drive system for its Bee-Mini series. The geared-motor-units are directly connected to the VULKOLLAN® wheels to ensure optimum capacity utilization. One iTAS® is used for each vehicle axis. The vehicle is steered by means of the speed difference between the two drives. This halves the load on each drive and keeps the size to a minimum.

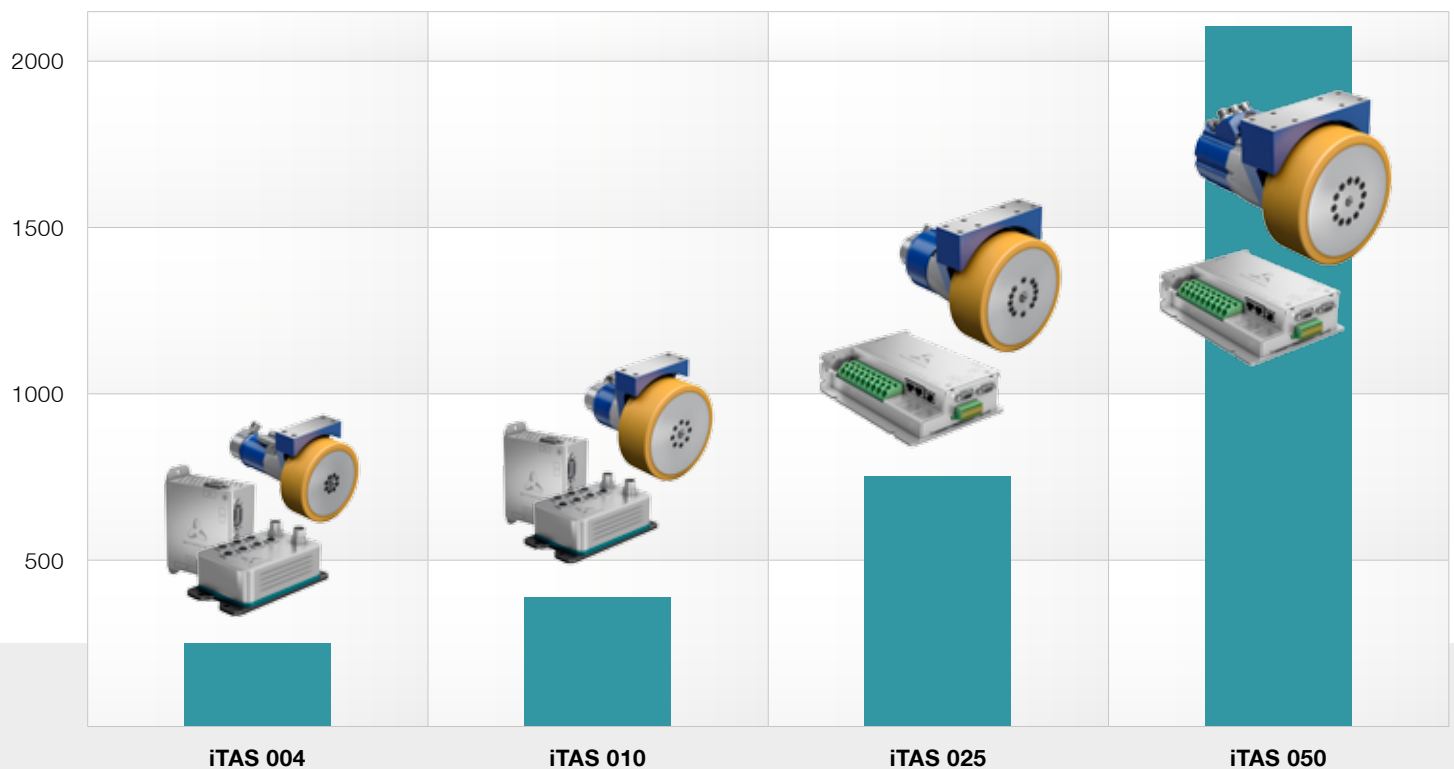
**Special feature:**

Unusual requirement for the complete drive system: the ability to transport an overall weight of up to 150 kg for the newly designed Bee-Mini compact vehicle. This is made possible by means of a clamping system, which was implemented with a dynamic line actuator in conjunction with the simco® drive servo amplifier. The clamping is controlled decentrally via the servo drive. It is connected to the vehicle computer via the digital inputs and outputs. Complex implementation with a field bus interface is omitted.

# iTAS<sup>®</sup>

## Flexible, fully scalable drive platform

Continuous power in watt



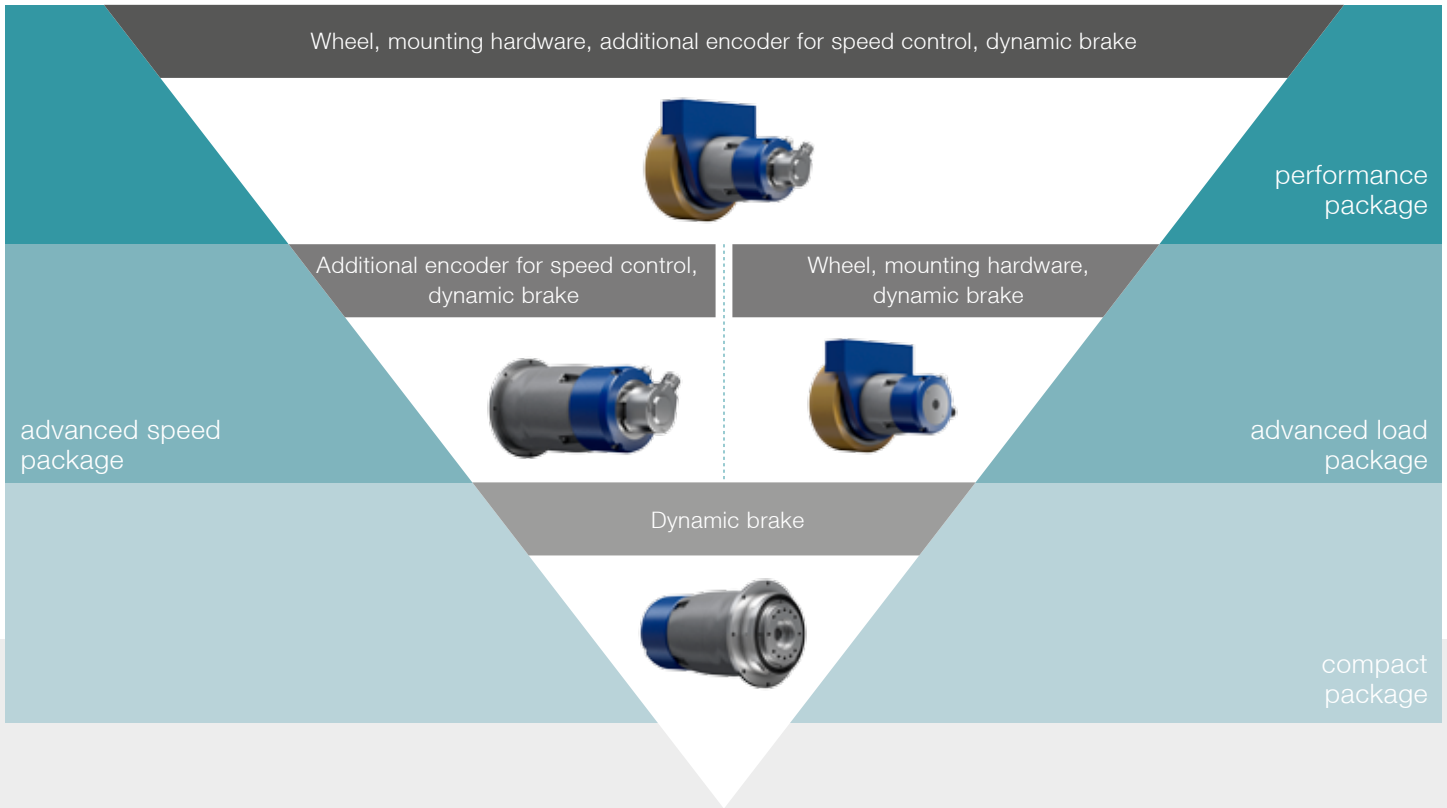
**In the servo actuators of the iTAS<sup>®</sup> system, the motor and the helical, low backlash planetary gearhead are combined to coupling-free drive units, which boast an impressively high torque, a compact design, high tilting torques and a wide speed range.**

In measurement terms, the servo drives that are available as a centralized version in IP20 and as a decentralized version in IP65 feature high-resolution current control and high torque precision in the system. Due to the extremely precise regulation of torques, the components of iTAS<sup>®</sup> are the ideal solution for DTS.

A temperature sensor, a resolver as a robust feedback system and a dynamic brake are integrated into the drives as standard. The drive system can be designed in a modular and application-specific manner using various equipment packages.



4 packages for the modular design of drive systems.



**compact package**

With integral service brake, available as standard version for all equipment packages.

**advanced speed and advanced load package**

Enables the connection of an additional SICK speed sensor or a mounted wheel (VULKOLLAN®93° Shore A) with connection for optimized utilization of the output bearing and increased loads.

**performance package**

Enables the full version of all equipment variants.

# TAS

## Minimal space requirements. Greater flexibility.



The models from TAS 004 to TAS 050 provide numerous benefits thanks to their extreme compactness: the low space requirements enable more structure, better overview and greater flexibility during practical use in DTS.

Thanks to the scalability of TAS, which is made possible by the individually selectable equipment packages for different requirements, this generation of servo actuators is the ideal performance factor in DTS – and consequently the optimal modular component in the flexible TAS system. Combined with the low moment of inertia of the actuator, the high torsional rigidity in the drive train and the exemplary smooth running, the TAS

range also represents a decisive "plus" for productivity.

The ideal performance factor in DTS.

Sector-specific components on request.

Different DTS requirements can be reliably implemented using sector-specific components.

### Additional speed encoder

- Additional encoder for speed control
- Realization of a redundant speed monitoring system with direct connection to the safety control system of the vehicle.
- Simplification through integrated solution

### Actuators

- Maximum power density
- Compact design
- Integrated planetary gearhead
- High number of ratio versions
- High precision
- Integrated resolver

### Mounting hardware

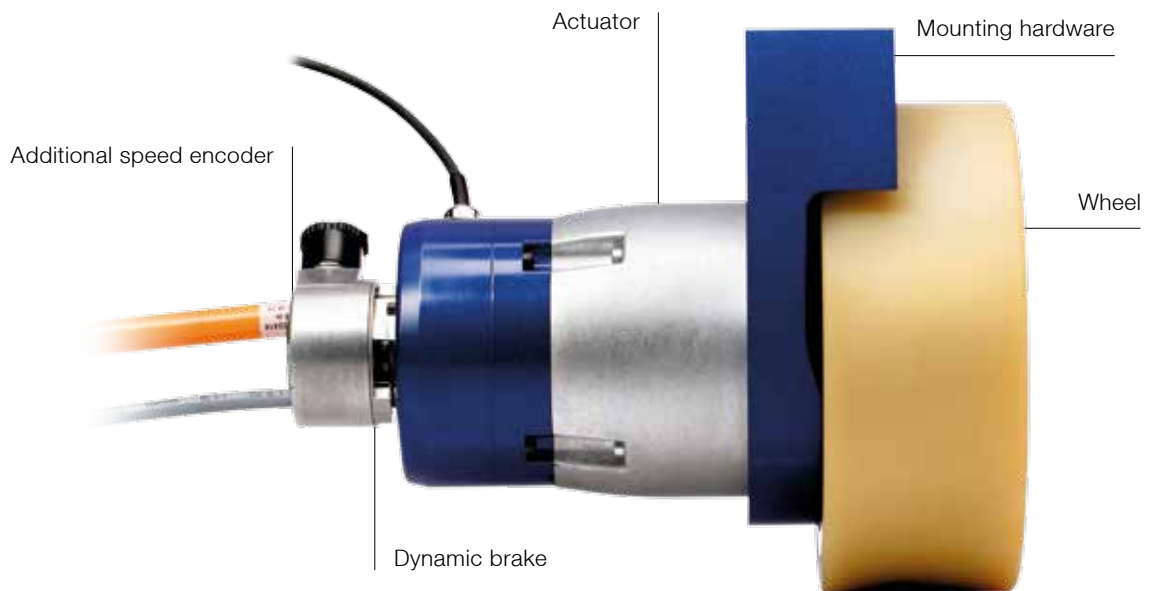
- Configurable and efficient interface for connection to the vehicle frame
- High support loads
- Integrated design
- High flexibility

### Dynamic brake

- Safety of ramp travel and braking processes during running operation
- High quality and reliability
- Application-specific design of the brake
- Factory-set brakes

### Wheel

- Integrated wheel in system
- Optimum mounting hardware for achieving higher vertical loads
- Material: VULKOLLAN® 93° Shore A
- Proven wheel technology
- Various wheel diameters possible



Unit	TAS 004	TAS 010	TAS 025	TAS 050
Wheel diameter	160 mm	200 mm	200 mm	250 mm
Gearhead ratio	16, 20, 28, 35, 50, 70, 100	16, 21, 31, 61, 91		
Vertical load per drive (advanced load / performance package)	280 kg	485 kg	655 kg	2000 kg
Intermediate circuit voltage	24 or 48 V DC			
Max. feed force	380 to 5200 N			
Continuous feed force	100 to 2000 N			
Nominal speed	Up to 2.6 m/s*			
Force dynamic brake	is specially designed for your operating system			
Resolution of addit. incremental speed encoder	1024 and 250 ppr			

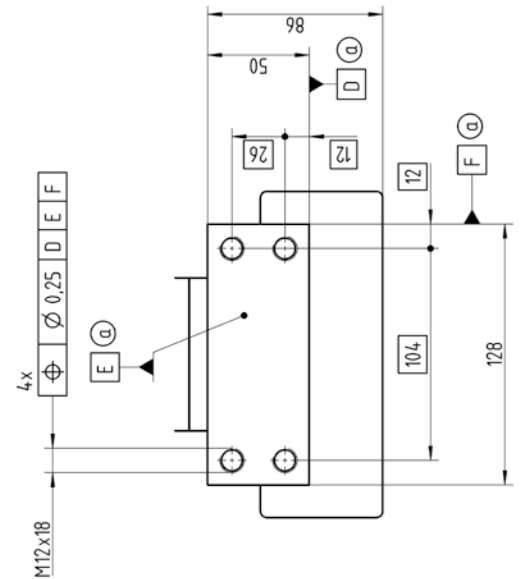
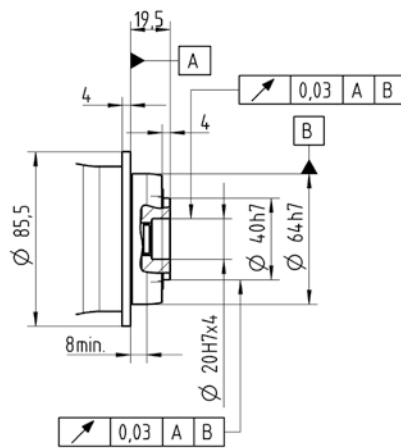
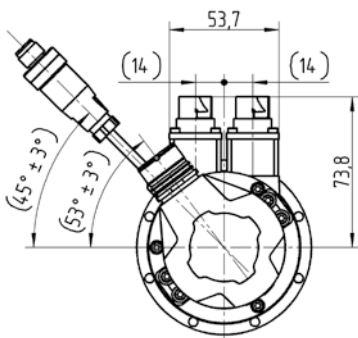
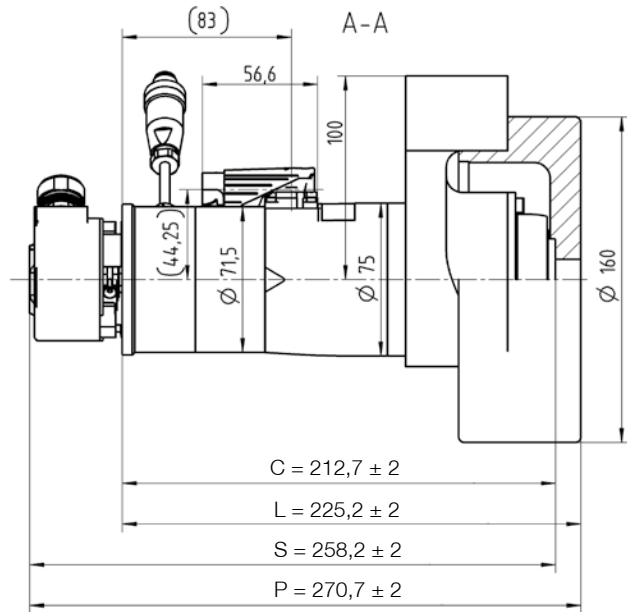
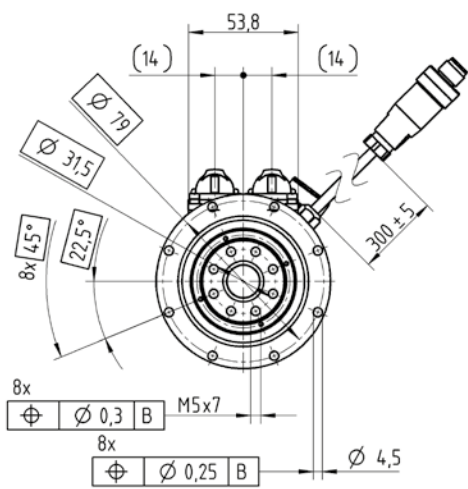
\* Dimensioning necessary

# TAS

## Size 004 – 24 V / 48 V

Ratio	i		016		020		028		035		050		070		100	
<b>Motor size</b>			<b>53B</b>													
Intermediate circuit voltage	$U_D$	V DC	24	48	24	48	24	48	24	48	24	48	24	48	24	48
Max. acceleration torque at output (max. 1000 cycles per hour)	$T_{2B}$	Nm	29		36.2		51.8		55.0		55.0		55.0		35.0	
Static output torque	$T_{20}$	Nm	7.9		9.9		15.0		19.5		28.3		40.0		18.0	
Braking torque on output, 100 °C	$T_{2BR}$	Nm	32		40		56		70		50		Design necessary		Design necessary	
Max. speed	$n_{2max}$	rpm	280.8	375.0	224.7	300	160.5	214.3	128.4	171.4	89.9	120	64.2	85.7	44.9	60.0
Max. motor acceleration current (static)	$I_{maxstst}$	$A_{eff}$	31.5		31.5		31.5		26.7		19.0		13.7		6.7	
Motor stall current	$I_0$	$A_{eff}$	10.5		10.5		10.5		10.5		10.5		10.3		4.0	
Backlash	$j_t$	arcmin	$\leq 4$													
Max. axial force	$F_{amax}$	N	1630													
Vertical load per drive (advanced load / performance) package		kg	280													
Max. tilting torque* (distance from point of rotation to output flange 57.6 mm)	$M_{kmax}$	Nm	110													
Weight (compact line)	$m_1$	kg	2.9													
Operating noise (measured at motor speed of 3000 rpm)	$L_{PA}$	dB(A)	$\leq 58$													
Max. permitted housing temperature	$\vartheta_{max}$	°C	90													
Ambient temperature	$\vartheta_V$	°C	0 to +40													
Protection class			IP65													
Mount. pos.			B5													
Lubrication			Synthetic oil, lubricated for life													
Insulating material class			F													
Paint			Painted blue as standard, unpainted upon request													

\*relates to the advanced speed and compact equipment packages. If a specific wheel is used, the tilting torque can be calculated according to the description on page 50.



Options	Abbreviation	Length in mm
compact	C	212.7
advanced speed	S	258.2
advanced load	L	225.2
performance	P	270.7

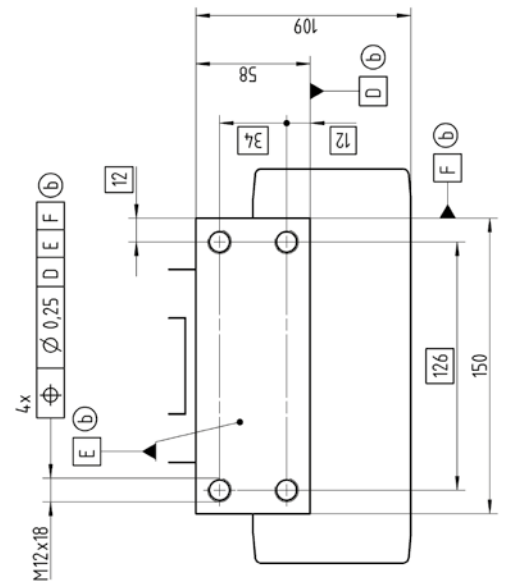
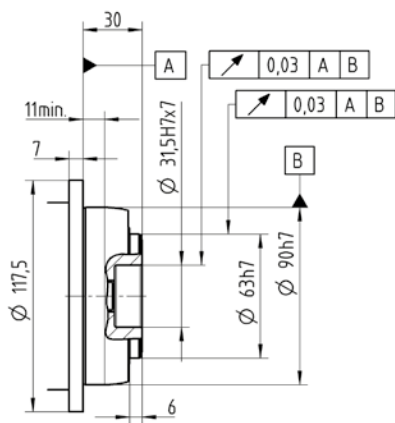
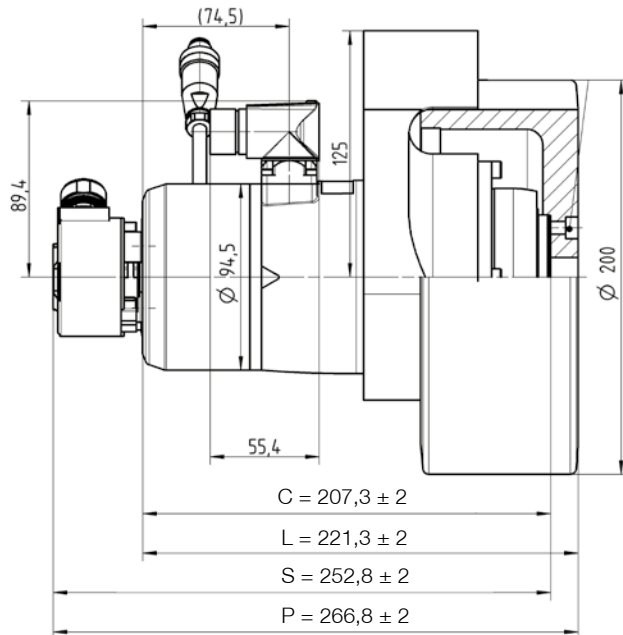
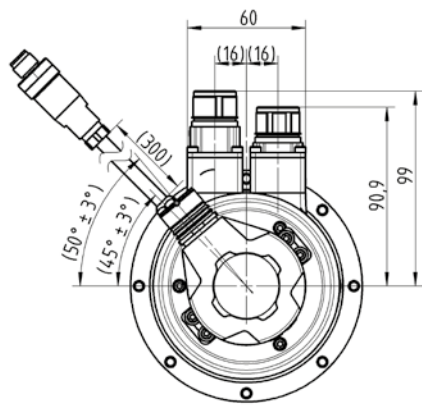
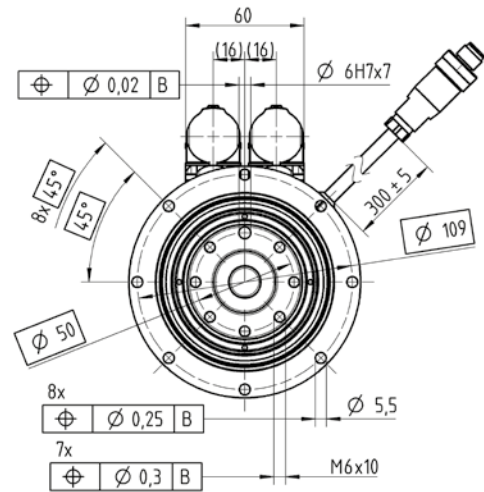
Electrical connection	Type of connection
Motor phases	itec, series 915
Motor feedback	itec, series 915
Dynamic brake	M12 connector, 4-pin
Speed encoder	M23x1 connector

# TAS

## Size 010 – 24 V/48 V

Ratio	i		016		021		031		061		091	
<b>Motor size</b>			<b>64B</b>									
Intermediate circuit voltage	$U_D$	V DC	24	48	24	48	24	48	24	48	24	48
Max. acceleration torque at output (max. 1000 cycles per hour)	$T_{2B}$	Nm	43.0	43.0	57.1	57.1	84.9	84.9	80.0	80.0	80.0	80.0
Static output torque	$T_{2nom}$	Nm	10.7	13.4	14.7	18.3	22.3	27.6	35.0	35.0	35.0	35.0
Braking torque on output, 100 °C	$T_{2BR}$	Nm	32		42		62		61		Design necessary	
Max. speed	$n_{2max}$	rpm	338.3	375.0	257.7	285.7	174.6	193.5	88.7	98.4	59.5	65.9
Max. motor acceleration current (static)	$I_{maxstst}$	$A_{eff}$	60.0	43.8	60.0	43.8	60.0	43.8	29.3	18.5	20.6	12.9
Motor stall current	$I_0$	$A_{eff}$	20.0	14.6	20.0	14.6	20.0	14.6	14.9	9.3	11.1	6.9
Backlash	$j_t$	arcmin	≤ 3									
Max. axial force	$F_{amax}$	N	2150									
Vertical load per drive (advanced load/performance) package		kg	485									
Max. tilting torque* (distance from point of rotation to output flange 82.7 mm)	$M_{kmax}$	Nm	270									
Weight (compact line)	$m_1$	kg	5.7									
Operating noise (measured at motor speed of 3000 rpm)	$L_{PA}$	dB(A)	≤ 62									
Max. permitted housing temperature	$\vartheta_{max}$	°C	90									
Ambient temperature	$\vartheta_V$	°C	0 to +40									
Protection class			IP65									
Mount. pos.			B5									
Lubrication			Synthetic oil, lubricated for life									
Insulating material class			F									
Paint			Painted blue as standard, unpainted upon request									

\*relates to the advanced speed and compact equipment packages. If a specific wheel is used, the tilting torque can be calculated according to the description on page 50.



Options	Abbreviation	Length in mm
compact	C	207.3
advanced speed	S	252.8
advanced load	L	221.3
performance	P	266.8

Electrical connection	Type of connection
Motor phases	speedtec, series 923 (M23x1 integral socket)
Motor feedback	speedtec, series 923 (M23x1 integral socket)
Dynamic brake	M12 connector, 4-pin
Speed encoder	M23x1 connector

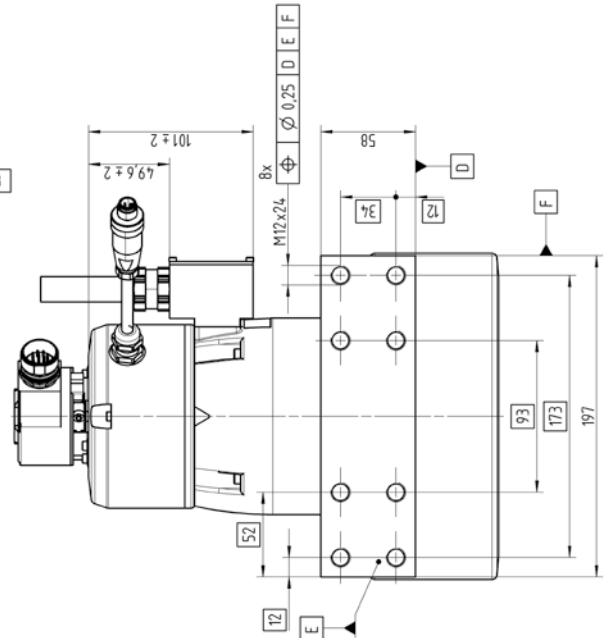
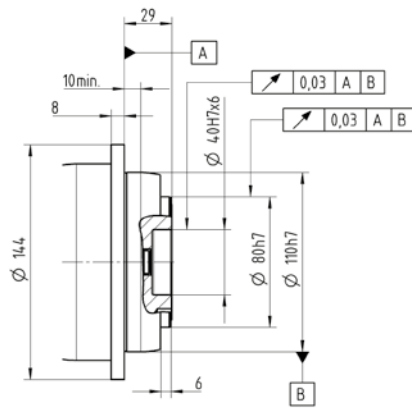
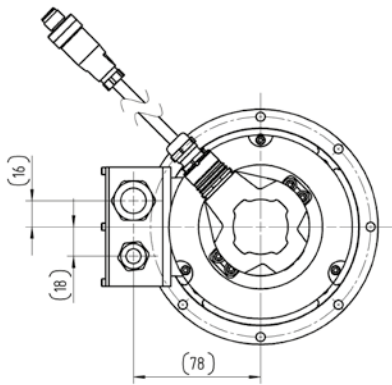
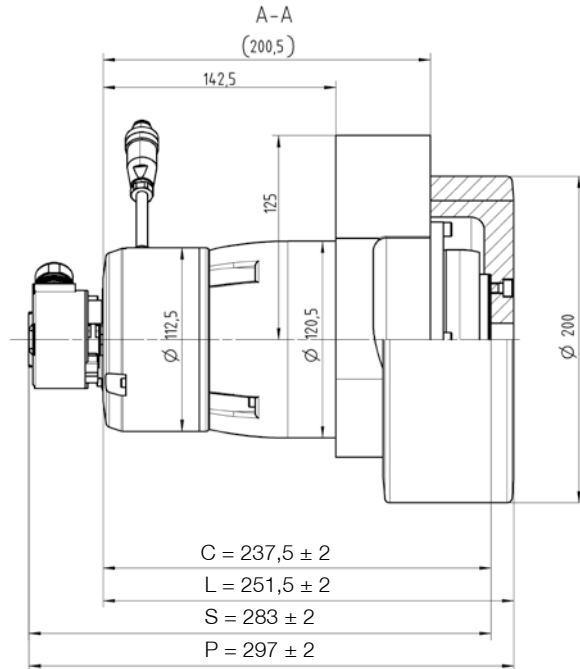
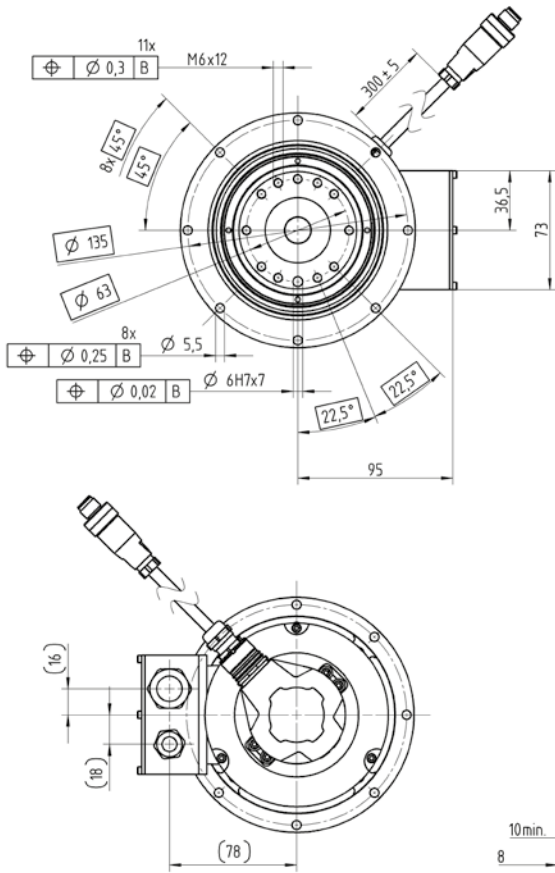
# TAS

## Size 025 – 24 V / 48 V

Ratio	i		016		021		031		061		091	
<b>Motor size</b>			<b>94C</b>									
Intermediate circuit voltage	$U_D$	V DC	24	48	24	48	24	48	24	48	24	48
Max. acceleration torque at output (max. 1000 cycles per hour)	$T_{2B}$	Nm	74.9	113.6	99.1	149.9	148.2	223.2	250.0	250.0	250.0	250.0
Static output torque	$T_{2nom}$	Nm	15.7	30.7	21.4	41.2	33.5	62.6	87.8	100.0	100.0	100.0
Braking torque on output, 100 °C	$T_{2BR}$	Nm	80		105		155		152.5		227.5	
Max. speed	$n_{2max}$	rpm	261.6	348.8	199.3	265.7	135.0	180.0	68.6	91.5	46.0	61.3
Max. motor acceleration current (static)	$I_{maxstst}$	$A_{eff}$	84.0	84.0	84.0	84.0	84.0	84.0	68.2	46.6	47.5	31.8
Motor stall current	$I_0$	$A_{eff}$	28.0	28.0	28.0	28.0	28.0	28.0	28.0	20.6	22.6	15.1
Backlash	$j_t$	arcmin	≤ 3									
Max. axial force	$F_{amax}$	N	4150									
Vertical load per drive (advanced load/performance) package		kg	655									
Max. tilting torque* (distance from point of rotation to output flange 94.5 mm)	$M_{kmax}$	Nm	440									
Weight (compact line)	$m_1$	kg	10.4									
Operating noise (measured at motor speed of 3000 rpm)	$L_{PA}$	dB(A)	≤ 64									
Max. permitted housing temperature	$\vartheta_{max}$	°C	90									
Ambient temperature	$\vartheta_V$	°C	0 to +40									
Protection class			IP65									
Mount. pos.			B5									
Lubrication			Synthetic oil, lubricated for life									
Insulating material class			F									
Paint			Painted blue as standard, unpainted upon request									

\*relates to the advanced speed and compact equipment packages. If a specific wheel is used, the tilting torque can be calculated according to the description on page 50.





Options	Abbreviation	Length in mm
compact	C	237.5
advanced speed	S	283
advanced load	L	251.5
performance	P	297

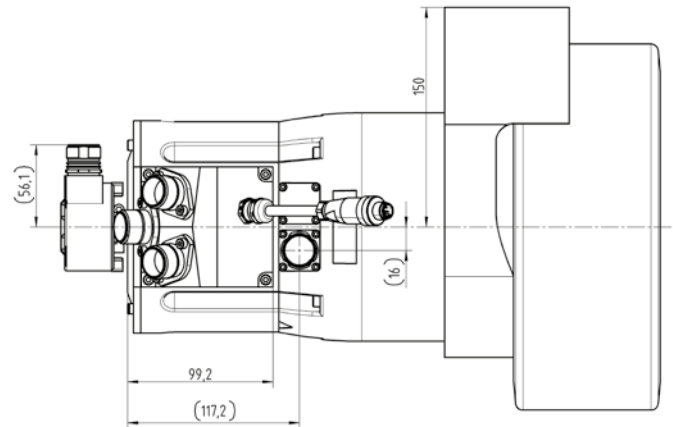
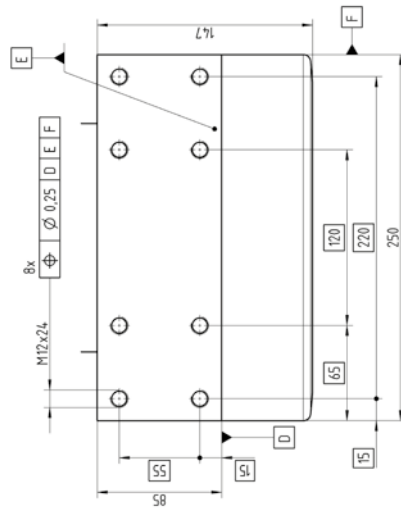
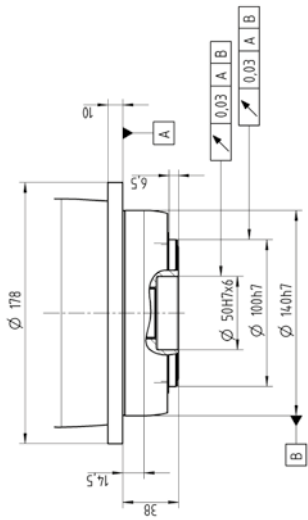
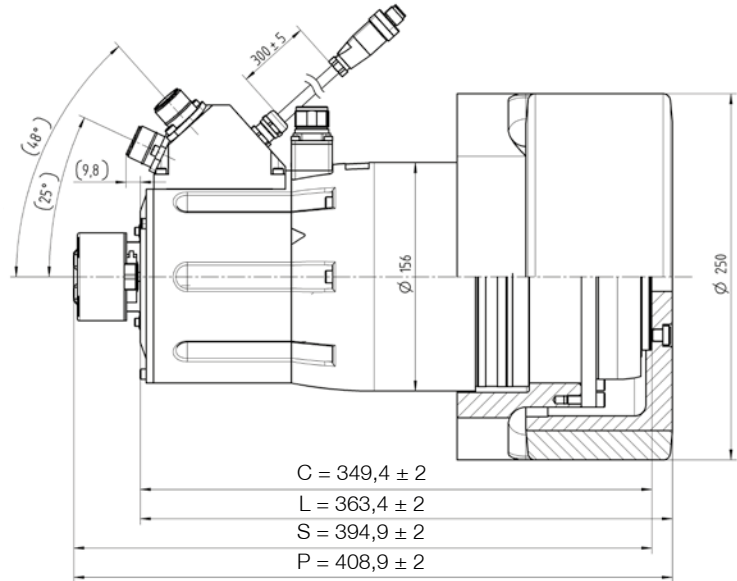
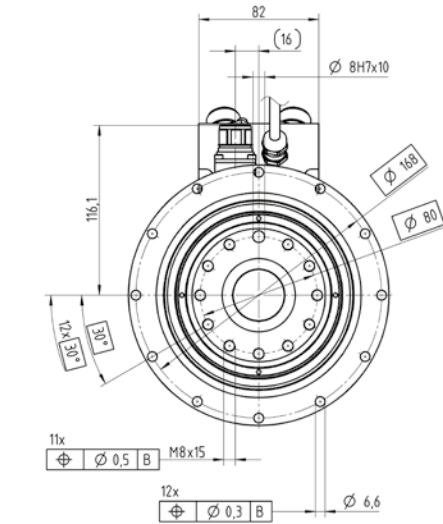
Electrical connection	Type of connection
Motor phases	Open cable ends
Motor feedback	Sub-D connector
Dynamic brake	M12 connector, 4-pin
Speed encoder	M23x1 connector

# TAS

## Size 050 – 24 V / 48 V

Ratio	i		016		021		031		061		091	
<b>Motor size</b>			<b>130D</b>									
Intermediate circuit voltage	$U_D$	V DC	24	48	24	48	24	48	24	48	24	48
Max. acceleration torque at output (max. 1000 cycles per hour)	$T_{2B}$	Nm	365.9		482.8		650.0		500.0		500.0	
Static output torque	$T_{2nom}$	Nm	124.3		165.7		249.2		220.0		220.0	
Braking torque on output, 100 °C	$T_{2BR}$	Nm	160		210		310		305		455	
Max. speed	$n_{2max}$	rpm	188	312.5	143.2	238.1	97.0	161.3	49.3	82.0	33.1	54.9
Max. motor acceleration current (static)	$I_{maxstst}$	$A_{eff}$	312.0		312.0		282.1		95.9		66.4	
Motor stall current	$I_0$	$A_{eff}$	104.0		104.0		104.0		46.7		33.4	
Backlash	$j_t$	arcmin	≤ 3									
Max. axial force	$F_{amax}$	N	6130									
Vertical load per drive (advanced load/performance) package		kg	2000									
Max. tilting torque* (distance from point of rotation to output flange 81.2 mm)	$M_{kmax}$	Nm	1335									
Weight (compact line)	$m_1$	kg	24.0									
Operating noise (measured at motor speed of 3000 rpm)	$L_{PA}$	dB(A)	≤ 66									
Max. permitted housing temperature	$\vartheta_{max}$	°C	90									
Ambient temperature	$\vartheta_V$	°C	0 to +40									
Protection class			IP65									
Mount. pos.			B5									
Lubrication			Synthetic oil, lubricated for life									
Insulating material class			F									
Paint			Painted blue as standard, unpainted upon request									

\*relates to the advanced speed and compact equipment packages. If a specific wheel is used, the tilting torque can be calculated according to the description on page 50.



Options	Abbreviation	Length in mm
compact	C	349.4
advanced speed	S	394.9
advanced load	L	363.9
performance	P	408.9

Electrical connection	Type of connection
Motor phases	singletec, series 923 (M23x1 integral socket)
Motor feedback	speedtec, series 923 (M23x1 integral socket)
Dynamic brake	M12 connector, 4-pin
Speed encoder	M23x1 connector

# simco<sup>®</sup> drive

## Less effort. Greater flexibility.



### The TAS drive system is completed with the simco<sup>®</sup> drive servo amplifier series.

A number of different power versions and designs are available: The drives are available with protection class IP20 with the power ratings 10, 15 and 50 A and IP65 with the power rating 10 A. The compact design enables their use in confined spaces and is ideal for DTS.

### Benefits at a glance

- Flexible and diverse interfaces
- Compact design
- Simplified installation in the vehicle
- Reduced wiring effort
- Reliable galvanic isolation between logic and power module
- Integrated safety functions STO and SS1\* according to SIL 3 (\* in conjunction with the vehicle control system)

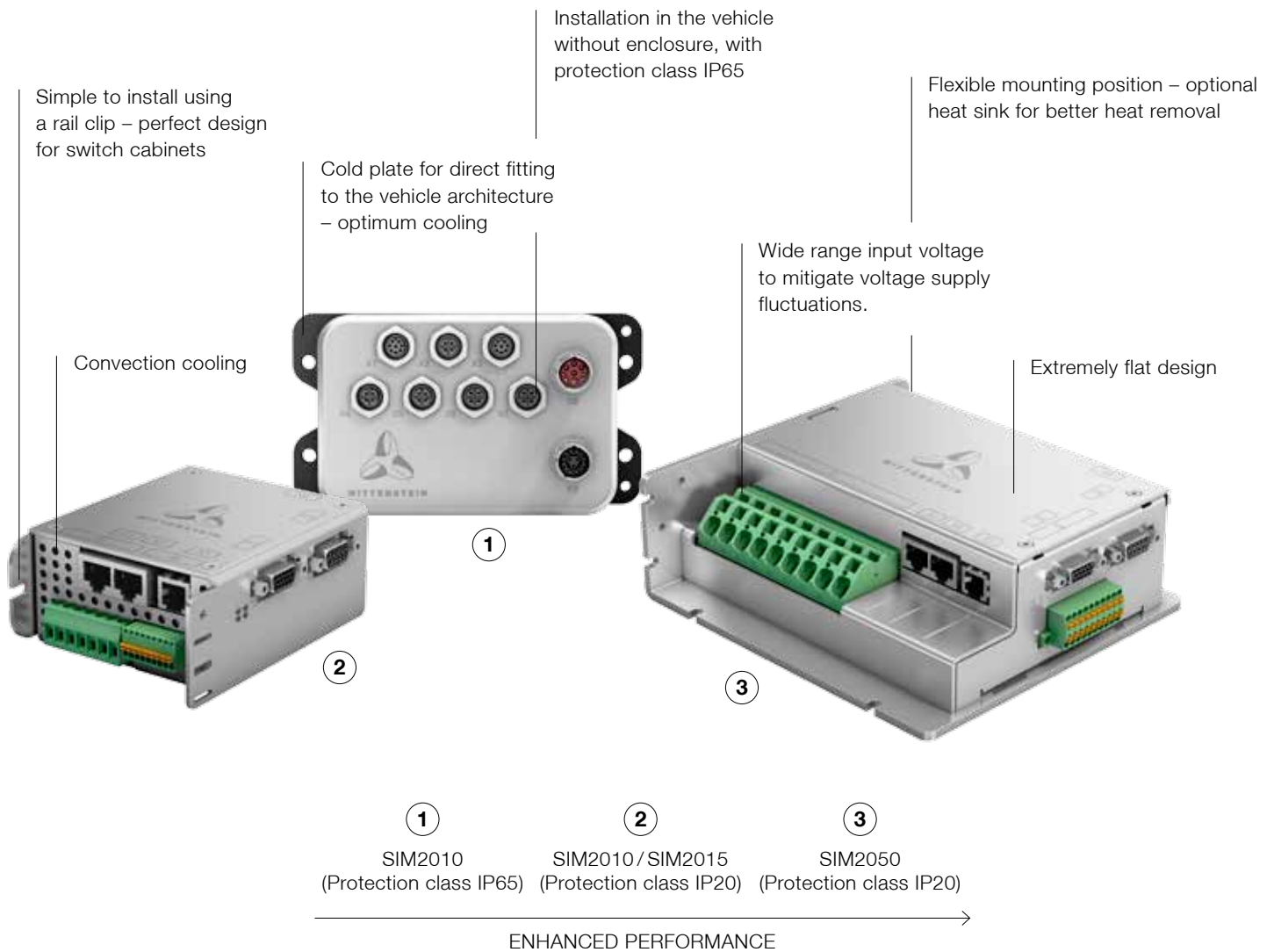
simco<sup>®</sup> drive impresses with numerous hardware features which are perfectly adapted to the requirements for construction of a driverless transport system. The software functions of the simco<sup>®</sup> drive, however, also offer significant added value.

### Soft-start function

- Limitation of current when the device is switched on
- Protection against impermissible high currents
- Protection of external components (e.g. switches)
- Reduced effort during development of the vehicle
- Component savings

### Rolling software updates

- Integration of new software features with guaranteed availability of existing software versions
- Use of new features
- Update of the drives firmware via independent download file



### Encoder emulation

- Generation of differential incremental signals from the motor encoder.
- Output of the signal at the encoder connector for transmission to the safety PLC
- Implementation of a redundant speed monitoring system
- Saves effort
- An additional encoder at the input/output can be omitted.
- Simple implementation of the safety functions

### Integrated PROFIdrive profile

- Fully integrated drive profile for connection to SIEMENS controllers and for full utilization of existing technology functions
- Easy integration in SIEMENS control software
- Simple configuration of the drive system through installation of the GSDML file
- Error-free integration

### Web server

- Status analysis and monitoring of the drive system in existing network
- Simple and fast condition monitoring possible in the installed state
- Performance of analyses in the network
- No wiring necessary

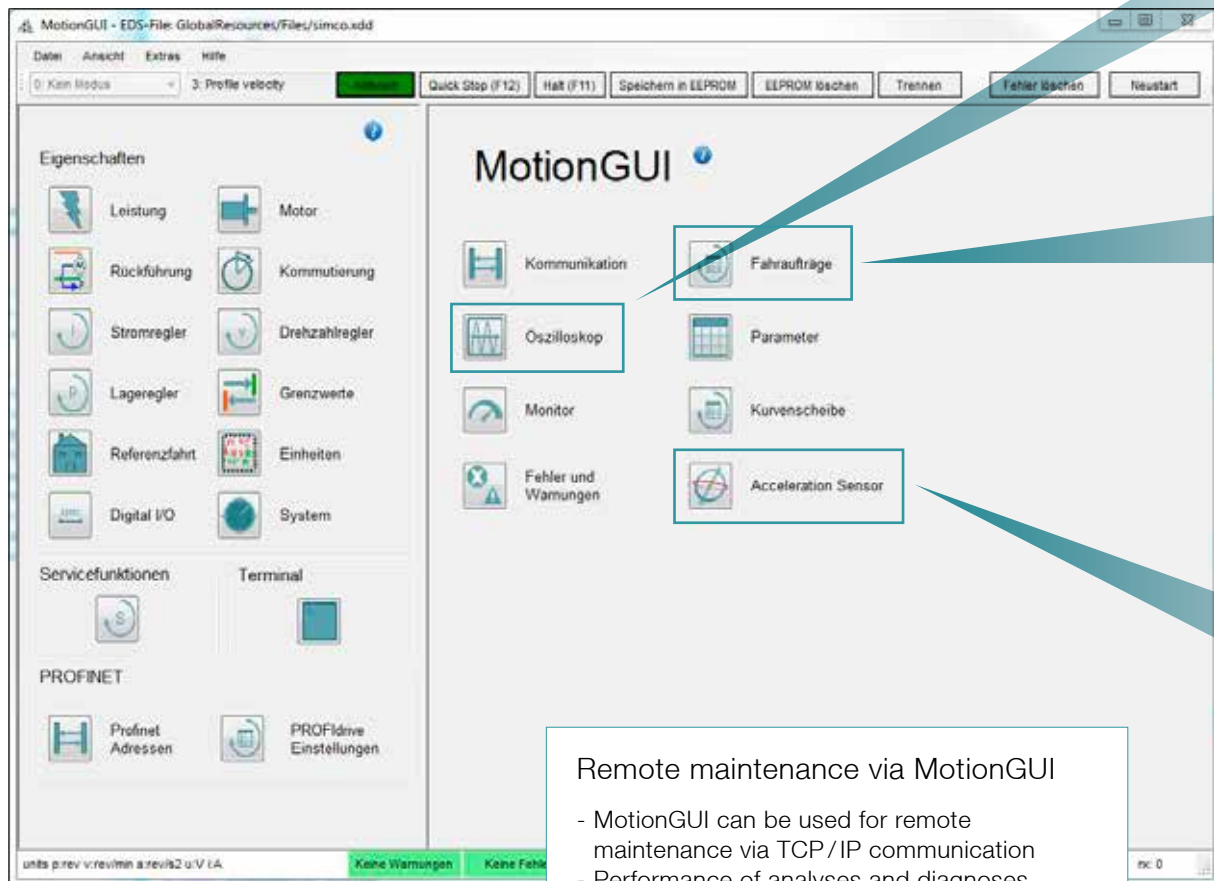
# simco<sup>®</sup> drive MotionGUI software

Intuitive control during commissioning and operation

**The MotionGUI 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 implemented by means of a real-time

clock. Condition monitoring as well as integration and maintenance work can be carried out in an efficient and time-saving way – visible at any time in MotionGUI software.



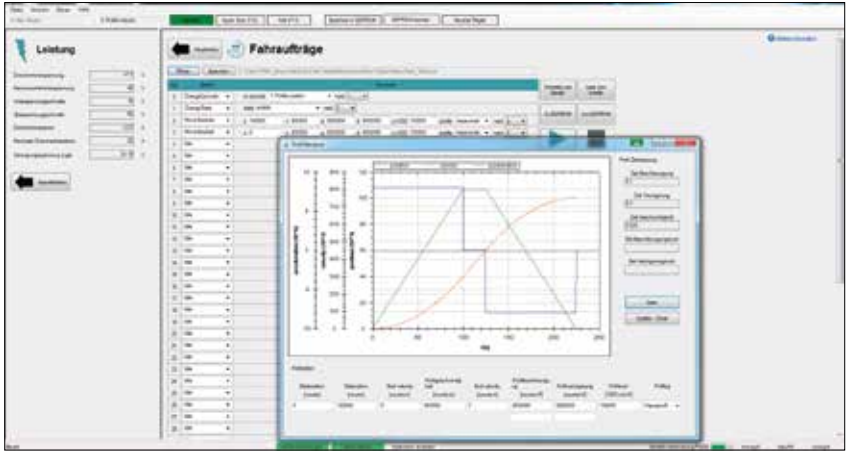
## Remote maintenance via MotionGUI

- MotionGUI can be used for remote maintenance via TCP/IP communication
- Performance of analyses and diagnoses in the installed state (e.g. during machine breakdowns)



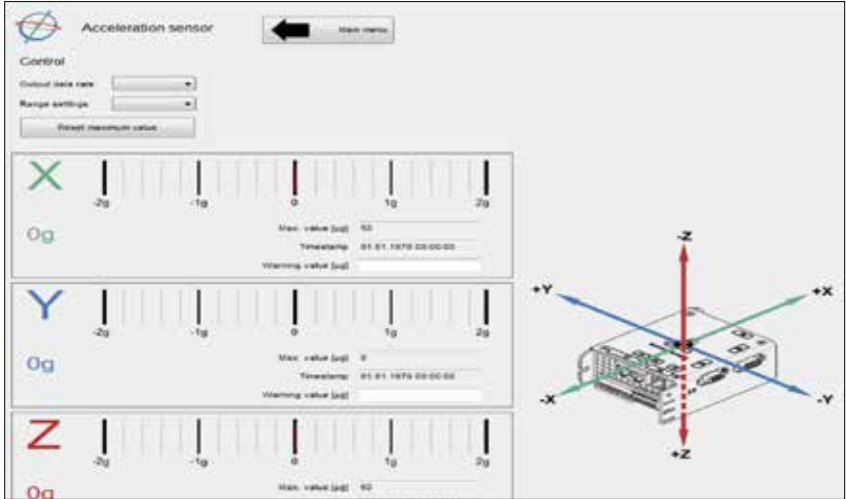
[ SCOPE ]  
Diagnostic functions

- **SCOPE function**  
Analysis of applications and movement sequences via the SCOPE function – also possible in offline mode
- **Errors and Warnings**  
Logging of errors and warnings for fast troubleshooting –storage of errors in error history



[ Motion tasks ]  
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 vehicle manufacturer
- Complex single-axis movements, such as clamping processes on the vehicle 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



[ Acceleration sensor ]  
Acceleration sensor on board

- Analysis of acceleration values in the x, y, z directions
- Output of warnings and errors when defined maximum acceleration values are exceeded
- Analysis of crashes and the floor conditions of the plant

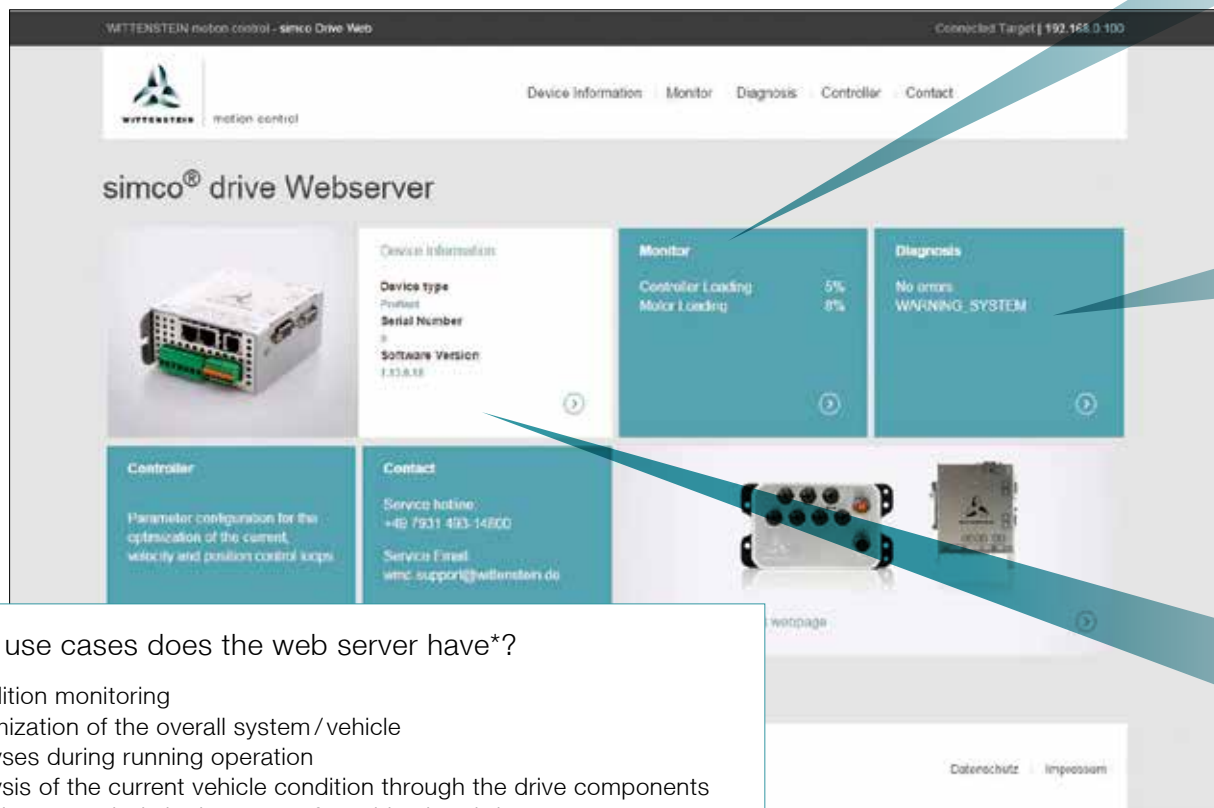
# simco<sup>®</sup> drive Web server

## Accessing the servo controller via the Internet

Using the web server integrated in the simco<sup>®</sup> drive, the amplifier can be accessed via the Internet during mobile operation. This makes it possible to check system utilization and respond

to error or warning messages in an immediate and targeted manner at all times. The intelligent provision of data in the web server also facilitates commissioning and enables permanent

condition monitoring during operational use of the vehicles, which contributes decisively to maximum availability of the entire DTS system.



### What use cases does the web server have\*?

- Condition monitoring
- Optimization of the overall system/vehicle
- Analyses during running operation
- Analysis of the current vehicle condition through the drive components
- Rapid error analysis in the event of machine breakdowns
- Practical automation mechanisms for optimized troubleshooting (e.g. mailing support hotline)
- Implementation of measures for long-term error prevention
- Indication of information on the overall system

\* The web server is currently available for the PROFINET and EtherNet/IP version of the simco<sup>®</sup> drive.





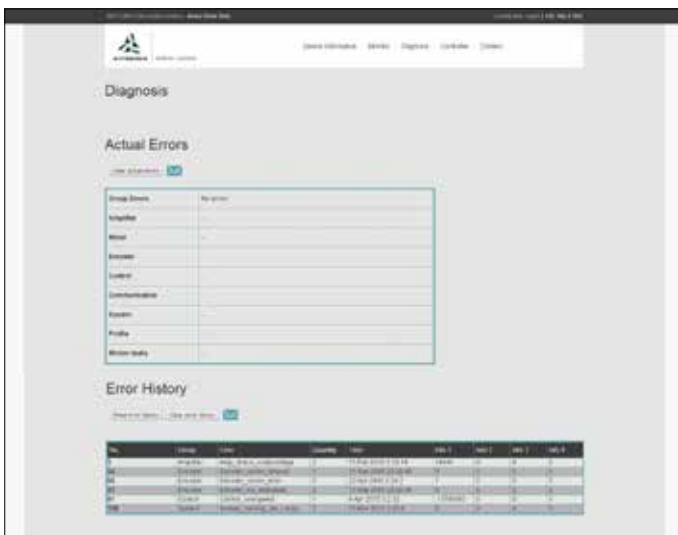
## Monitor

### Function:

- Analysis of drive parameters during ongoing operation, e.g. temperature, torque, speed
- Determination of motor and servo controller utilization
- Output of diagrams for analysis of the values over time
- Definition of operating / utilization ranges
- Analysis of acceleration values (acceleration sensor)

### Your benefits:

- Initiation of measures to optimize the system
- Simple condition monitoring
- Analysis of downsizing potential
- Optimization of operational processes



## Diagnosis

### Functions:

- Output of errors and warnings
- Acknowledgment of errors via the web server
- Display of error history

### Your benefits:

- Fast and simple analysis
- Analysis of errors and warnings during ongoing operation
- Initiation of troubleshooting measures
- Solution finding via automated e-mailing of the error codes to the WITTENSTEIN support hotline



## Device information

### Functions:

- Indication of the device information such as serial number and order code
- Analysis of the overall drive system consisting of the motor and electronics
- Indication of the firmware status used and motor database version
- Display of operating hours

### Your benefits:

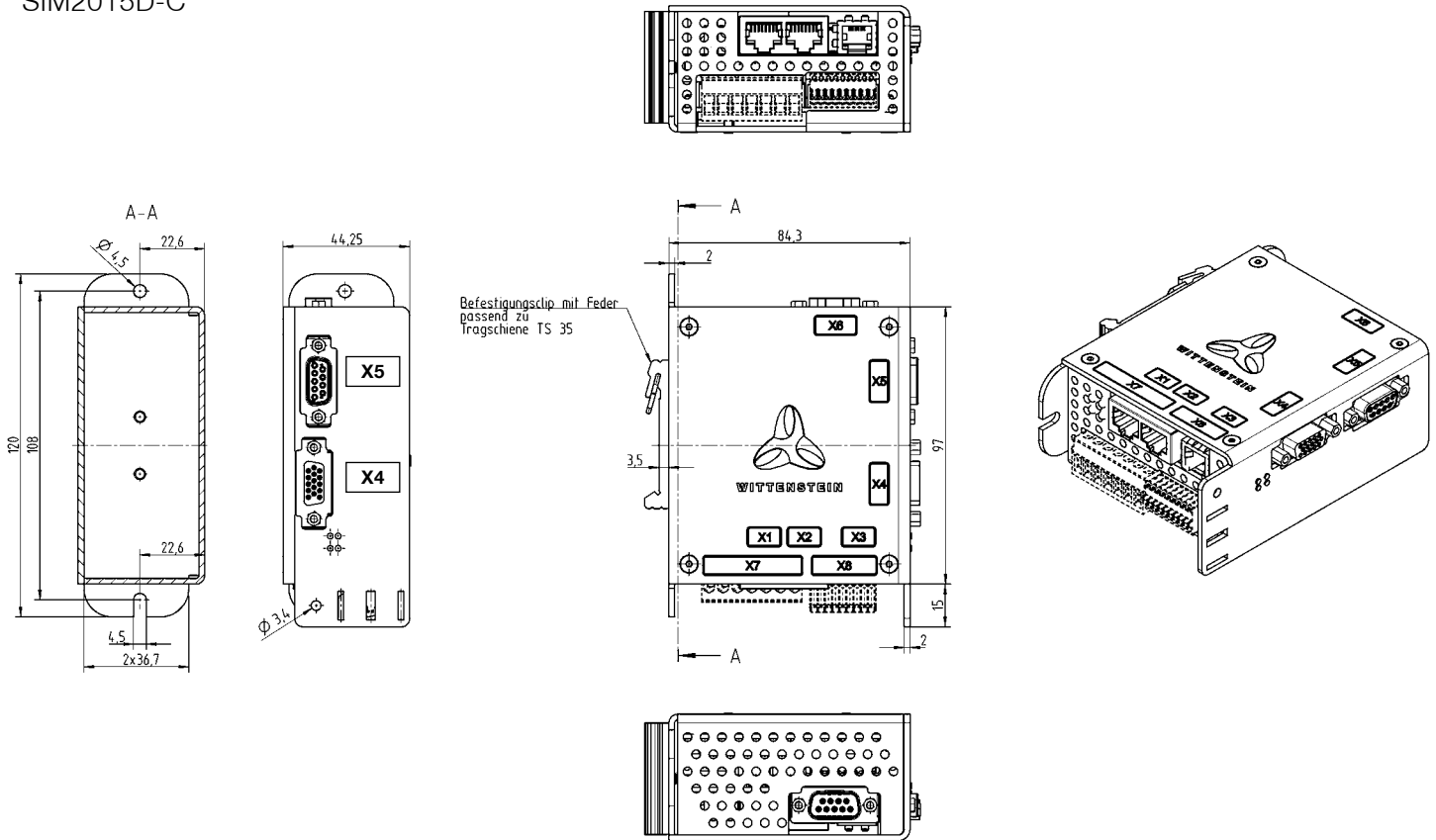
- Optimal indication of device information
- Fast and simple analysis

Servo drive version			SIM2002D-C	SIM2002D-F	SIM2010D-C	SIM2010D-F	SIM2015-C	SIM2050D-C	
<b>Rated output current</b>	$I_N$	A	<b>2,5</b>	<b>2,5</b>	<b>10</b>	<b>10</b>	<b>15</b>	<b>42</b>	
Power supply (performance)	$U_{DC}$	V DC	+16 ... 56 (unregulated)	+16 ... 56 (unregulated)	+16 ... 56 (unregulated)	+16 ... 56 (unregulated)	+16 ... +56 (unregulated)	+12 ... +60 (unregulated)	
Power supply (logistics)	$U_{log}$	V DC	+24 (+/- 10 %)	+24 (+/- 10 %)	+24 (+/- 10 %)	+24 (+/- 10 %)	+24 (+/- 10 %)	+12 ... +60 (unregulated)	
Peak current	$I_{max}$	$A_{eff}$	5 (for 5s)	5 (for 5s)	20 (for 5s)	20 (for 5s)	30 (for 5s)	84	
Rated power	$P_N$	W	125	125	500	500	750	2500	
Peak power	$P_{max}$	W	250	250	1000	1000	1500	5000	
Switching frequency	$f_{PWM}$	kHz	8 ... 32						
Current control resolution		Bit	14	14	14	14	14	14	
Communication			CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT TCP/IP* RS232 EtherNet/IP	CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT** TCP/IP* RS232 EtherNet/IP**	CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT TCP/IP* RS232 EtherNet/IP	CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT** TCP/IP* RS232 EtherNet/IP**	CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT TCP/IP* RS232 EtherNet/IP	CANopen to DS402 EtherCAT with CoE PROFINET RT/IRT TCP/IP* RS232 EtherNet/IP	
Drive function acc. to DS 402 for CANopen/EtherCAT communication			<ul style="list-style-type: none"> <li>- Profile position mode</li> <li>- Homing mode</li> <li>- Profile velocity mode</li> <li>- Profile torque mode</li> <li>- Cyclic synchronous position mode</li> <li>- Cyclic synchronous velocity mode</li> </ul>						
Supported PROFIdrive application classes for PROFINET communication			<ul style="list-style-type: none"> <li>- Application class 1 (PROFINET RT)</li> <li>- Application class 3 (PROFINET RT)</li> <li>- Application class 4 (PROFINET IRT)</li> </ul>						
Encoder interfaces			<ul style="list-style-type: none"> <li>- BISS C</li> <li>- EnDat 2.2</li> <li>- Hall sensors</li> <li>- Resolver</li> </ul>						
Safety function			STO (Safe Torque off) certified according to SIL3/PLe						STO (Safe Torque off) according to SIL3/PLe (certification pending)
Technology functions			Disk cam, motion tasks						
Protection class			IP20	IP65	IP20	IP65	IP20	IP20	
Digital inputs			4, opto decoupled, freely programmable function						
Digital outputs			2, opto decoupled, freely programmable function						
Event logging with real-time clock					✓			✓	
Brake actuation					✓			✓	
Connection of an external ballast resistor					✓				
Drive program with PLC functions					✓			✓	
Operating temperature range	$\vartheta_A$	°C	0 ... 45						
Weight	m	kg	0,3	0,85	0,3	0,85	0,3	1,03	

\* Only available with PROFINET version and EtherNet/IP

\*\* pending

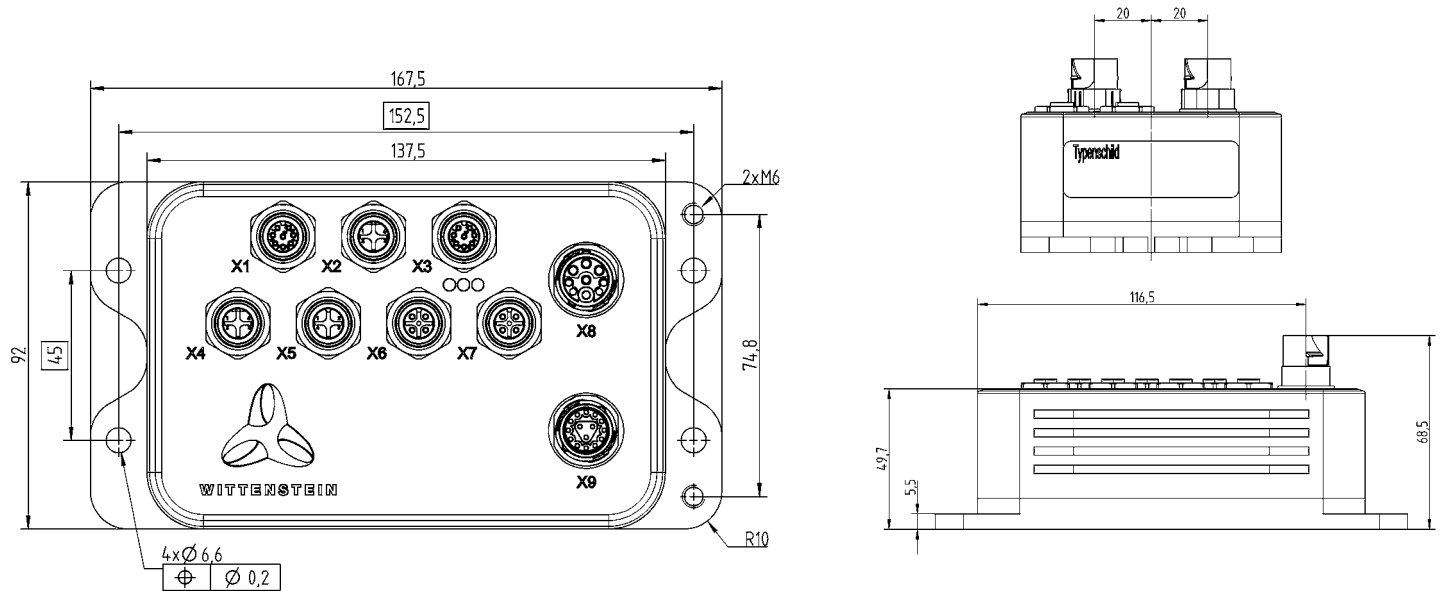
SIM2002D-C, SIM2010D-C and SIM2015D-C



Plug connections

Lettering	Interface type	Plug connection
X1	Input field bus interface	RJ45 socket
X2	Output field bus interface	RJ45 socket
X3	RS232 diagnostic interface	RJ12 socket
X4	Encoder interface	D-Sub, 15-pin, female
X5	Resolver interface	D-Sub, 9-pin, female
X6	Digital inputs/outputs	D-Sub, 9-pin, male
X7	Motor connection	Phoenix_MSTBA_2.5_HC/7-G
X8	Voltage supply	Phoenix_MC_0.5/9-G-2.5

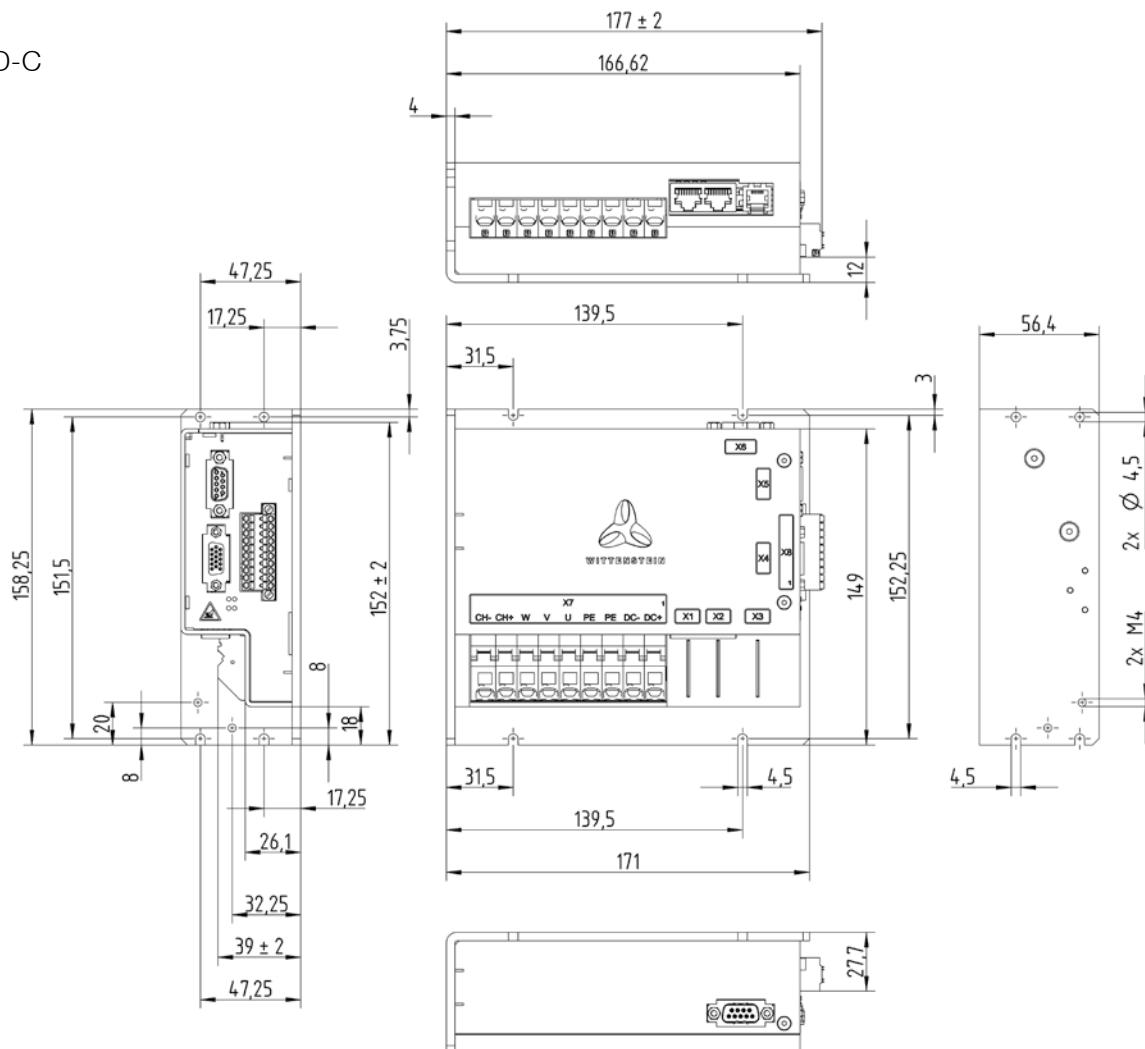
## SIM2002D-F and SIM2010D-F



### Plug connections

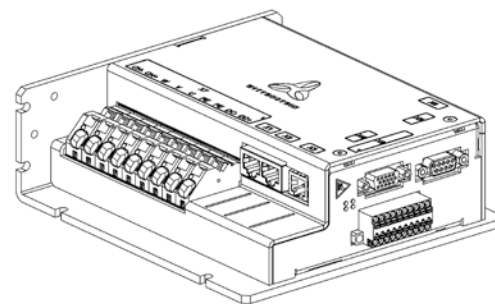
Lettering	Interface type	Plug connection
X1	Resolver interface	M12 8-pin, female, A-coded
X2	Digital inputs	M12 5-pin, female, B-coded
X3	Encoder interface	M12 8-pin, female, A-coded
X4	Digital outputs	M12 5-pin, female, B-coded
X5	RS 232 diagnostic interface	M12 4-pin, female, A-coded
X6	Input field bus interface	CAN version: M12 5-pin, female, A-coded EtherCAT version M12 4-pin, female, D-coded
X7	Output field bus interface	CANopen version: M12 5-pin, female, A-coded EtherCAT version M12 4-pin, female, D-coded
X8	Voltage supply	Intercontec itec 915, 9-pin, male
X9	Motor connection	Intercontec itec 915, 15-pin, female

# SIM2050D-C



## Plug connections

Lettering	Interface type	Plug connection
X1	Input field bus interface	RJ45 socket
X2	Output field bus interface	RJ45 socket
X3	RS232 diagnostic interface	RJ12 socket
X4	Encoder interface	D-Sub, 15-pin, female
X5	Resolver interface	D-Sub, 9-pin, female
X6	Digital inputs/outputs	D-Sub, 9-pin, male
X7	Motor connection	Phoenix Contact ZFKDS 10-10.00
X8	Voltage supply	Phoenix Contact MC 1.5/10-GF-3.5



Heat sink available as an accessory.

# Cables

## Pre-configured lengths

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

- Cables for [voltage supply](#) of the simco® drive
  - [Field bus cables](#) for CANopen, EtherCAT, PROFINET and EtherNet/IP communication
  - Cables for [commissioning](#)
  - [Motor connection cables](#) for connecting to the servo drive.
- Further cable lengths are available upon request.



### Technical details of the motor connection cables:

- Temperature range -30 to 80 °C
- EMC shielding

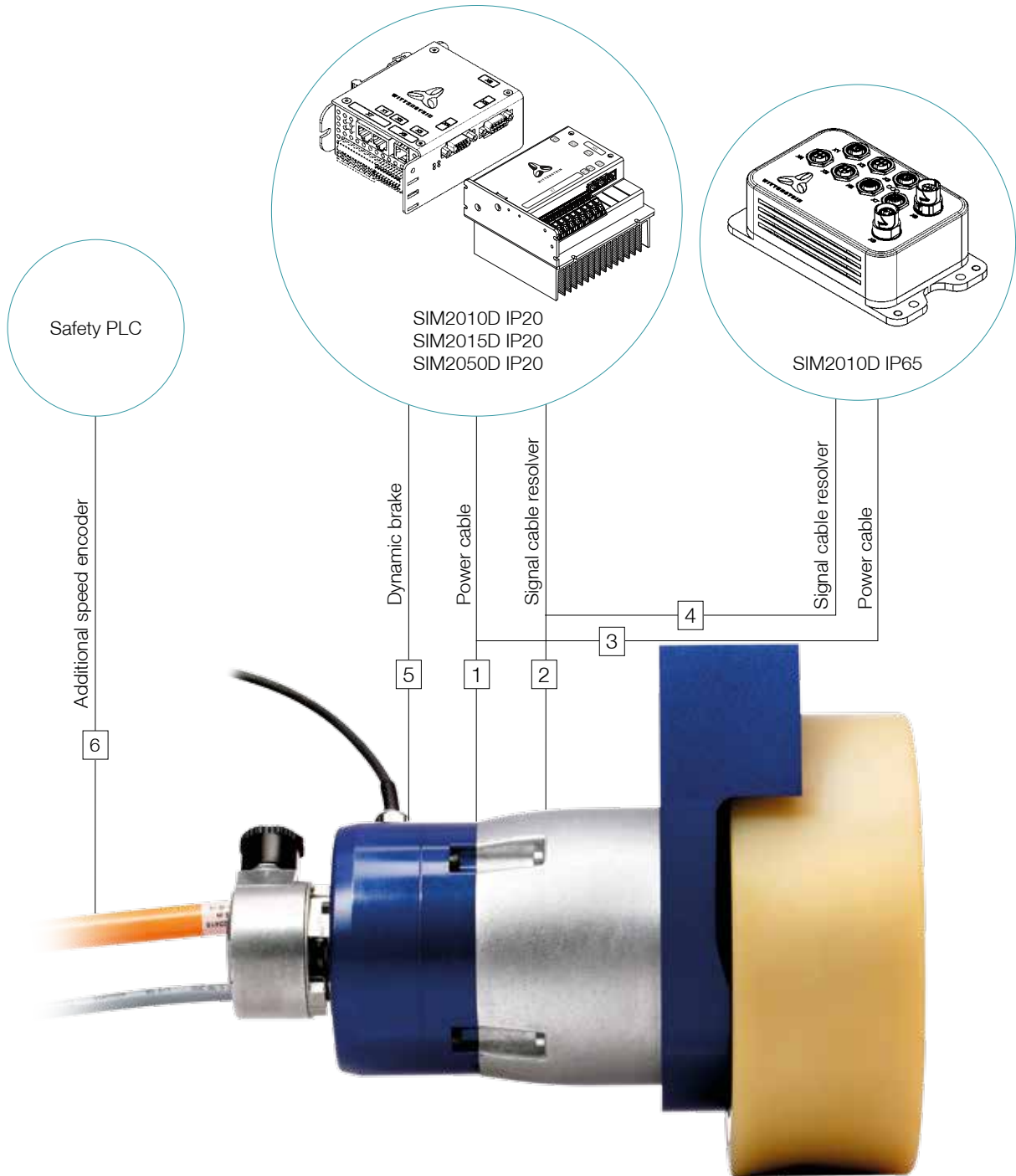
- Material: PUR
- drag chain suitable

Further technical data is available upon request.

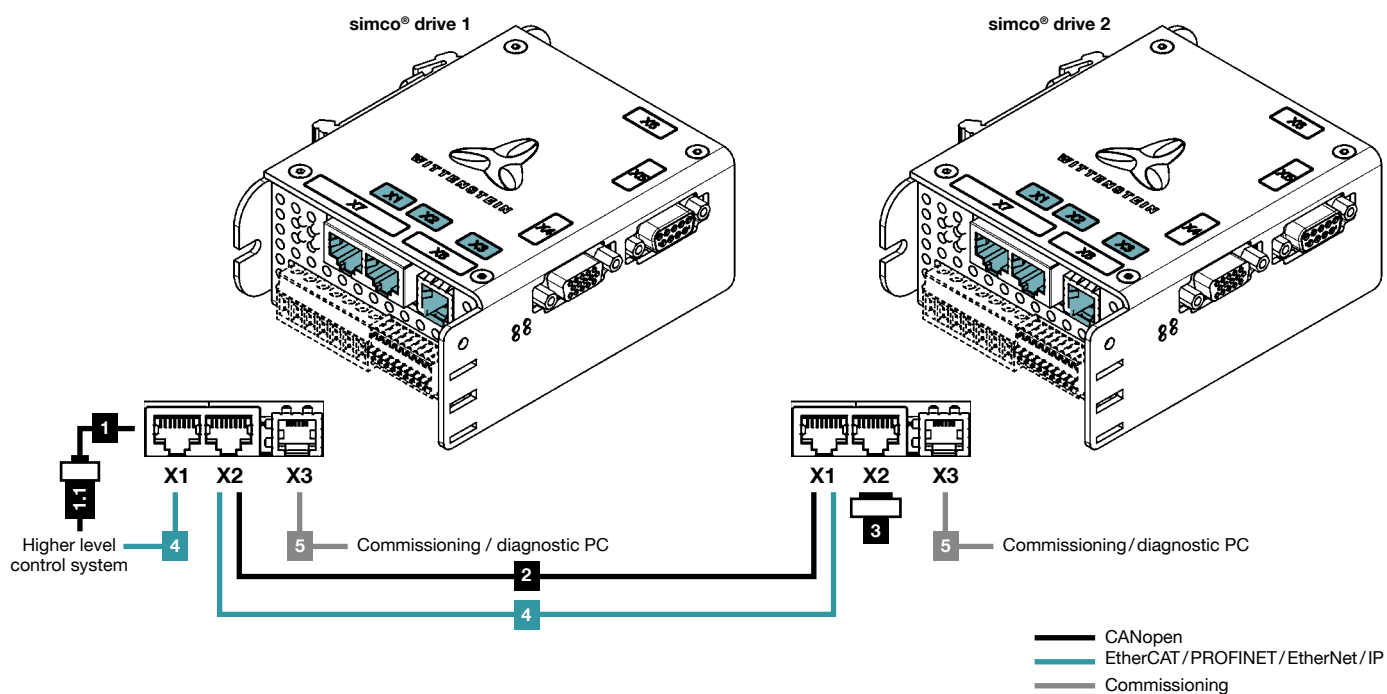
## Motor connection cables

No.	Servo drive	Cable type	Description	Interfaces		Standard lengths
				Motor	Servo drive	
<b>TAS 004</b>						
1	SIM2010D/	Power cable	CAB-POW-U-SIM2_C-D0150-E-LXXXX	itec, series 915	Phoenix Contact connector	1 m; 2 m; 3 m; 5 m
2	SIM2015 IP20	Signal cable resolver	CAB-SIG-R-SIM_C-D0000-E-LXXXX		Sub-D connector, 9-pin	
3	SIM2010D IP65	Power cable	CAB-POW-U-SIM2_F-D0150-E-LXXXX		itec, series 915	
4		Signal cable resolver	CAB-SIG-R-SIM_F-D0000-E-LXXXX		M12 connector, 8-pin	
5	-	Dynamic brake*	contained in article code of actuator	Direct cable outlet	M12 connector, 4-pin	0.4 m
6	-	Additional speed encoder	Cable not available in scope of supply; support can be provided for sourcing upon request			
<b>TAS 010</b>						
1	SIM2010D/	Power cable	CAB-POW-U-SIM2_C-D0150-S-LXXXX	speedtec, series 923	Phoenix Contact connector	1 m; 2 m; 3 m; 5 m
1	SIM2050D IP20	Power cable	CAB-POW-U-SIM2_C-D0250-S-LXXXX		Free cable ends with longer cables for the temperature sensor	
2	SIM2010D/	Signal cable resolver	CAB-SIG-R-SIM_C-D0000-S-LXXXX		Sub-D connector, 9-pin	
3	SIM2010D IP65	Power cable	CAB-POW-U-SIM2_F-D0075-S-LXXXX		itec, series 915	
4		Signal cable resolver	CAB-SIG-R-SIM_F-D0000-S-LXXXX	M12 connector, 8-pin		
5	-	Dynamic brake*	contained in article code of actuator	Direct cable outlet	M12 connector, 4-pin	0.4 m
6	-	Additional speed encoder	Cable not available in scope of supply; support can be provided for sourcing upon request			
<b>TAS 025</b>						
1	SIM2050D IP20	Power cable	contained in article code of actuator	Direct cable outlet	Free cable ends	see actuator order code
2	SIM2050D IP20	Signal cable resolver			Sub-D connector, 9-pin	
5	-	Dynamic brake*			M12 connector, 4-pin	0.4 m
6	-	Additional speed encoder	Cable not available in scope of supply; support can be provided for sourcing upon request			
<b>TAS 050</b>						
1	-	Power cable	CAB-POW-U-STEC23-D5000-T-LXXXX (single-phase motor cable)	singletec, series 923	Free cable ends	1 m; 2 m; 3 m; 5 m
1	SIM2050D IP20	Power cable	CAB-POW-U-STEC23-D1600-T-LXXXX (single-phase motor cable)	singletec, series 923	Free cable ends	
-	-	Signal cable resolver	CAB-SIG-R-CT_SP_-D0000-S-LXXXX	speedtec, series 923	Free cable ends	
2	SIM2050D IP20	Signal cable resolver	CAB-SIG-R-SIM_1C-D0000-S-LXXXX	speedtec, series 923	Sub-D connector 9-in; temp. sensor with separate outlet from connector	
5	-	Dynamic brake*	contained in article code of actuator	Direct cable outlet	M12 connector, 4-pin	0.4 m
6	-	Additional speed encoder	Cable not available in scope of supply; support can be provided for sourcing upon request			

\* Connection to safety PLC or to regulator through individual preparation; extension cable (M12 at open cable ends) available upon request.



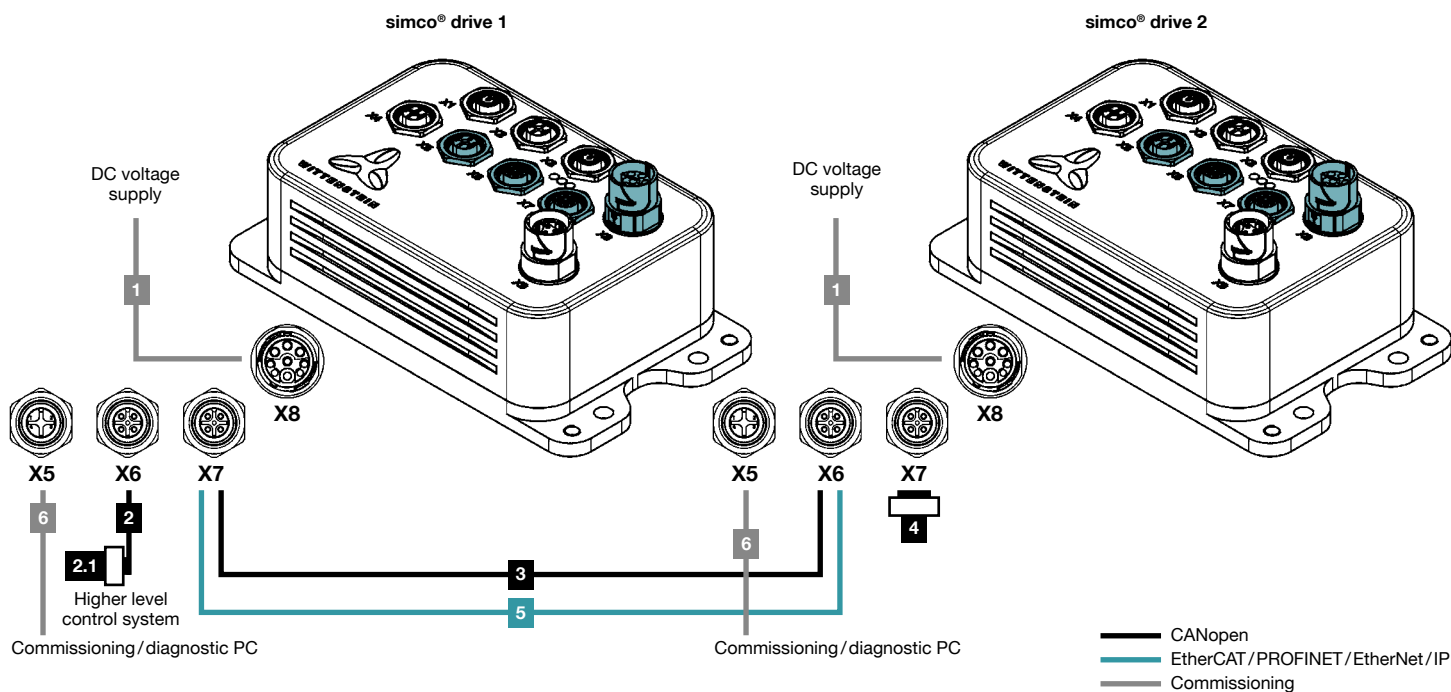
# Cables



## SIM2002D, SIM2010D, SIM2015D and SIM2050D IP20

No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			Servo drive	Controller / servo drive 2 / PC		
<b>CANopen field bus</b>						
1	CANopen field bus cable	CAB-BUS-CAN-RJ45-FL_-LXXXX	RJ45 connector, 8-pin	Free cable end	-	5 m
1.1	CAN Sub-D connector	SUBCON-PLUS-CAN/PG	-	-	9-pin connector with cable entry and outlet as well as switchable terminating resistor	-
2	CANopen field bus extension cable	CAB-BUS-CAN-RJ45-RJ45-LXXXX	RJ45 connector, 8-pin	RJ45 connector, 8-pin	-	1.5 m; 5 m
3	CANopen terminating resistor	CAB-BUS-CAN-RJ45-TERMINAT	-	RJ45 connector, 8-pin	Terminating resistor only necessary for CAN communication	-
<b>EtherCAT/PROFINET/EtherNet/IP field bus cable</b>						
4	EtherCAT/PROFINET field bus cable	CAB-BUS-ETH-RJ45-RJ45-LXXXX	RJ45 connector, 8-pin	RJ45 connector, 8-pin	-	1.5 m; 3 m; 5 m; 7.5 m; 10 m
<b>Commissioning</b>						
5	Extension cable RS 232	CAB-BUS-RS_-RJ12-SF09-LXXXX	RJ12 connector, 6-pin	Sub-D connector, 9-pin	Connection cable RS 232 for diagnostic purposes, commissioning with MotionGUI	3 m





## SIM2002D and SIM2010D IP65

No.	Type of accessory	Description	Interfaces		Description	Standard lengths
			Servo drive	DC voltage supply / Controller / Servo drive 2 / PC		
<b>Voltage supply</b>						
1	Voltage supply	CAB-SUP-SIM2010D-F-D0075-LXXXX	itec, series 915	Free cable end	DC voltage supply cable	2 m; 5 m
<b>CANopen field bus</b>						
2	CANopen field bus cable	CAB-BUS-CAN-M12M-FL_-LXXXX	M12 connector, 5-pin, A-coded	Free cable end	-	5 m
2.1	CAN Sub-D connector	SUBCON-PLUS-CAN/PG	-	-	9-pin connector with cable entry and outlet as well as switchable terminating resistor	-
3	CANopen field bus extension cable	CAB-BUS-CAN-M12M-M12M-LXXXX	M12 connector, 5-pin, A-coded	M12 connector, 5-pin, A-coded	-	0.5 m; 1 m
4	CANopen terminating resistor	CAB-BUS-CAN-M12M-TERMINAT	-	M12 connector, 5-pin, A-coded	Terminating resistor only necessary for CAN communication	-
<b>EtherCAT/PROFINET/EtherNet/IP field bus cable</b>						
5	EtherCAT/PROFINET field bus cable	CAB-BUS-ETH-M12M-M12M-LXXXX	M12 connector, 4-pin, D-coded	M12 connector, 4-pin, D-coded	-	1.5 m; 3 m; 5 m; 10 m
<b>Commissioning</b>						
6	Extension cable RS 232	CAB-BUS-RS_-M12M-SF09-LXXXX	M12, 4-pin	Sub-D connector, 9-pin	Connection cable RS 232 for diagnostic purposes, commissioning with MotionGUI	5 m

# Order codes

## TAS

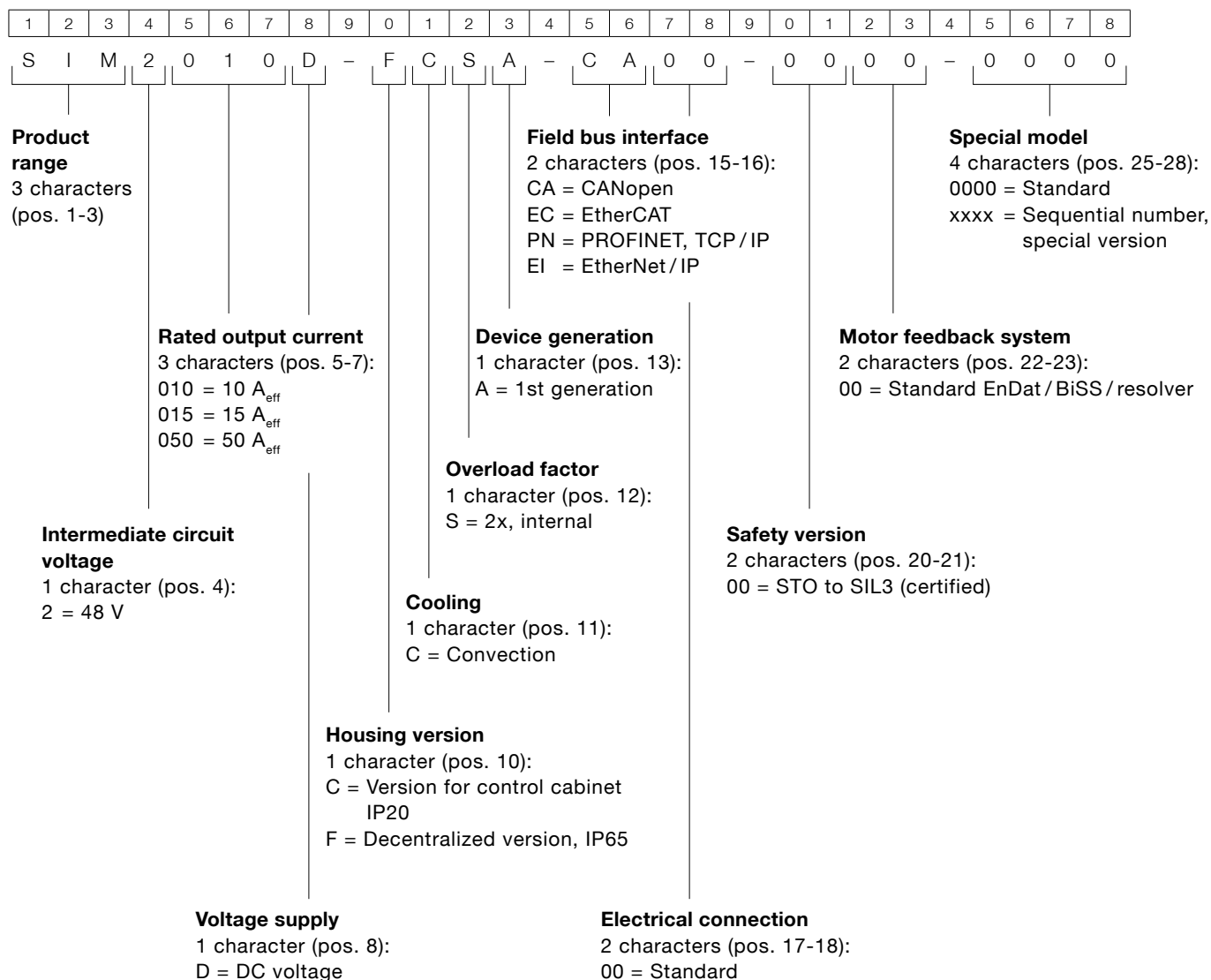
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
T	A	S	-	0	0	4	C	-	0	2	8	P	-	1	P	0	-	0	5	3	W	-	W	4	E	-	0	0	0

<p><b>Product and series designation</b> 3 characters (pos. 1-3): TAS series</p>	<p><b>Size</b> 3 characters (pos. 5-7): 004 010 025 050</p>	<p><b>Ratio</b> 3 characters (pos. 10-12): according to the gearhead ratio</p>	<p><b>Package</b> 1 character (pos. 8): C = compact S = advanced speed L = advanced load P = performance</p>	<p><b>Temperature sensor</b> 1 character (pos. 16): P = PTC T = PT1000</p>	<p><b>Additional encoder</b> 1 character (pos. 17): 0 = No 1 = DFS060 low resolution 2 = DFS060 high resolution</p>	<p><b>Winding</b> 1 character (pos. 22): W = Wide performance range</p>	<p><b>Motor size</b> 3 characters (pos. 19-21): see allocation table on pages 20, 22, 24, 26</p>	<p><b>Acceptable intermediate circuit voltage (max.)</b> 1 character (pos. 15): 1 = 24 V 2 = 48 V</p>	<p><b>Mounting hardware</b> 1 character (pos. 13): 0 = None P = Parallel installation (motor axis parallel to vehicle axis)</p>	<p><b>Electrical connection and pin assignment</b> 2 characters (pos. 24-25): W4 = Angled integral socket, pin assignment 4 (simco® drive compatible) (TAS 004, 010) G4 = Straight integral socket, pin assignment 4 (simco® drive compatible) (TAS 004, 010) G1 = Straight integral socket, pin assignment 1 (TAS 050) KS = Cable outlet, pin assignment 1 (simco® drive compatible) (TAS 025)</p>	<p><b>Special model</b> 3 characters (pos. 28-30), continuous</p>	<p><b>Cable length/connector type</b> 1 character (pos. 26): E = itec® series 615/915 S = speedtec® series 923 T = singletec® series 923 A = 1 m B = 2 m C = 3 m D = 5 m</p>
--	---	--	--	--	---	---	--	---	---	---	---	--

We will be pleased to configure a suitable iTAS® system for YOU.

## simco® drive



# Order codes

## iTAS power cable

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
C	A	B	-	P	O	W	-	U	-	S	I	M	2	-	C	-	D	0	0	7	5	-	E	-	L	X	X	X	X

**Cable harness**  
3 characters  
(pos. 1-3)

**Power connector assignment**  
1 character (pos. 9):  
U = Universal for all motor feedback

**Connector motor side**  
1 character (pos. 24):  
E = itec® series 615/915  
S = speedtec® series 923  
T = singletec® series 923

**Cable cross section**  
5 characters (pos. 18-22):  
D0075 = 0.75 mm<sup>2</sup>  
D0150 = 1.5 mm<sup>2</sup>  
D0250 = 2.5 mm<sup>2</sup>  
D5000 = 50 mm<sup>2</sup>

**Cable length**  
5 characters (pos. 26-30):  
L0100 = 1 m  
L0200 = 2 m  
L0300 = 3 m  
L0500 = 5 m

**Type**  
3 characters (pos. 5-7):  
POW = Power cable

**Connector motor side and controller version**  
6 characters (pos. 11-16):  
SIM2\_C = simco® drive IP20 (max. Vint = 48 V)  
SIM2\_F = simco® drive IP65 (max. Vint = 48 V)  
STEC23 = singletec® series 923 – free cable ends (single-phase motor cable)

## iTAS signal cable

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
C	A	B	-	S	I	G	-	R	-	S	I	M	-	-	C	-	D	0	0	0	0	-	E	-	L	X	X	X	X

**Cable harness**  
3 characters  
(pos. 1-3)

**Feedback system**  
1 character  
(pos. 9):  
R = Resolver

**Connector motor side**  
1 character (pos. 16):  
C = IP20  
F = IP65  
\_ = Open cable ends  
(universal)

**Connector motor side**  
1 character (pos. 24):  
E = itec® series 615/915  
S = speedtec® series 923

**Pin assignment**  
4 characters (pos. 11-14):  
SIM\_\_ = simco® drive (standard pin  
assignment 4)  
SIM\_1 = simco® drive (pin assignment  
1 – temperature sensor in  
signal cable)  
CT\_SP = Cable for pin-assignment  
1 (temperature sensor in  
signal cable)

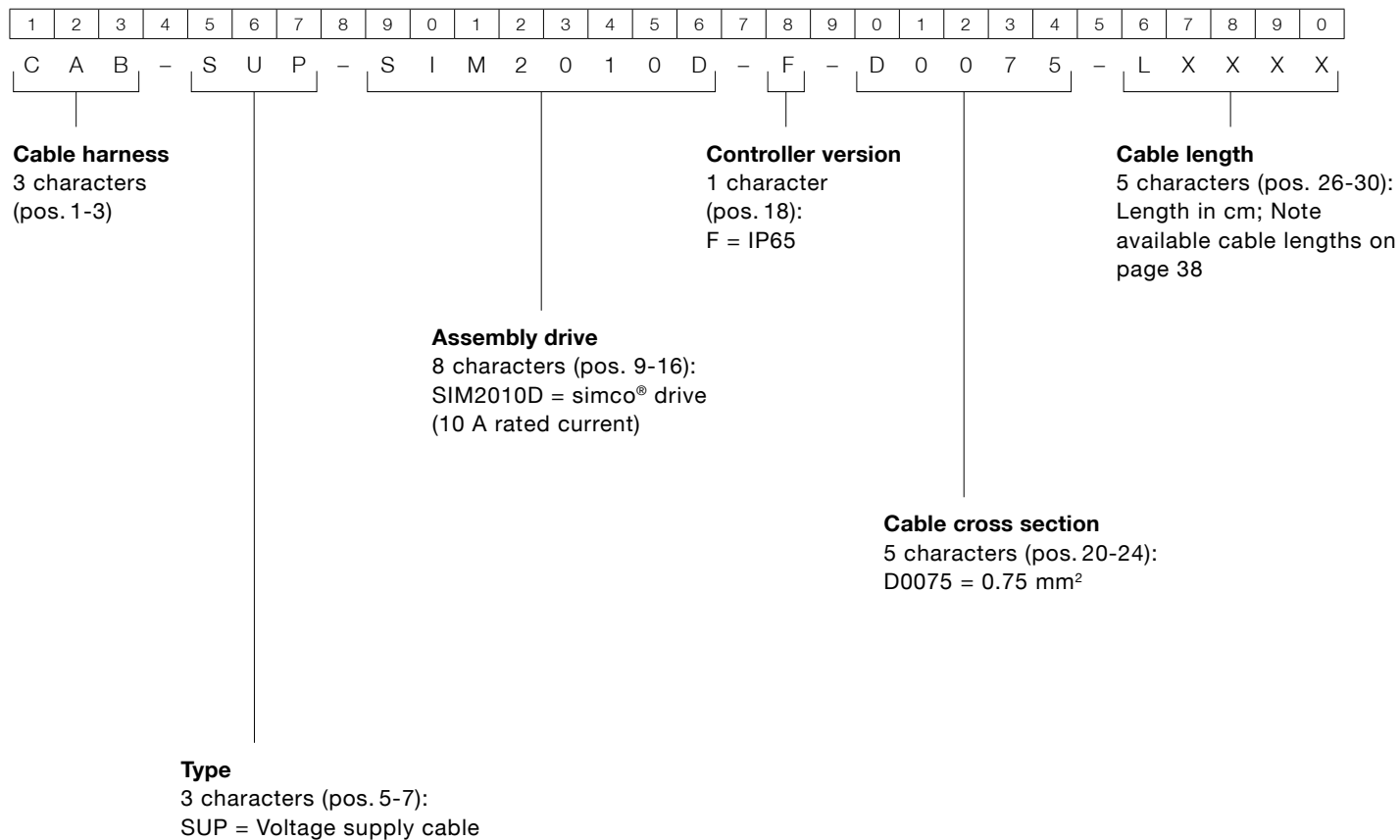
**Cable cross section**  
5 characters (pos. 18-22):  
D0000 = standard for all  
sizes

**Cable length**  
5 characters  
(pos. 26-30):  
L0100 = 1 m  
L0200 = 2 m  
L0300 = 3 m  
L0500 = 5 m

**Type**  
3 characters (pos. 5-7):  
SIG = Signal cable

# Order codes

## simco® drive power supply



## Field bus cable and RS232 connection cable

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
C	A	B	-	B	U	S	-	C	A	N	-	M	1	2	M	-	M	1	2	M	-	L	X	X	X	X

**Cable harness**  
3 characters  
(pos. 1-3)

**Type**

3 characters (pos. 5-7):  
BUS = Field bus cable

**Cable length**

5 characters (pos. 23-27):  
Length in cm:  
Note available cable lengths  
on page 38

**Cable end at control system**

4 characters (pos. 18-21):  
M12M = M12 connector, 5-pin, straight  
RJ45 = RJ45 connector, 8-pin  
FL\_\_ = Free cable end  
SF09 = Sub-D connector, 9-pin

**simco® drive cable end**

4 characters (pos. 13-16):  
M12M = M12 connector, 5-pin, straight  
RJ45 = RJ45 connector, 8-pin  
RJ12 = RJ12 connector, 6-pin

**Type of connection**

3 characters (pos. 9-11):  
CAN = CANopen field bus cable  
RS\_ = RS232 connection cable  
ETH = EtherCAT/PROFINET field bus cable

# SERVICE CONCEPT



## Our services at a glance

PRE-SALES		AFTER-SALES	
Planning	Investment	Application	Re-investment
Consultation & design Customer training Info & CAD Finder	cymex® sizing software Engineering Sensors cymex® Statistics	Manuals Commissioning Pick-up & return service Repair service Preventive maintenance	Modernization service

Our **service concept** continues to raise the bar in service quality. We are there for you, from the initial concept and throughout the entire life cycle of your application.





## Contact information

### PRE-SALES

#### Support hotline

For reliable and expert dimensioning.

**Tel.:** +49 7931 493-15800  
**Fax:** +49 7931 493-10905  
**Email:** [info@wittenstein-cyber-motor.de](mailto:info@wittenstein-cyber-motor.de)

### AFTER-SALES

#### Service hotline

For fast and unbureaucratic assistance with repairs and questions about supplied products.

**Tel.:** +49 7931 493-15900  
**Fax:** +49 7931 493-10903  
**Email:** [service@wittenstein-cyber-motor.de](mailto:service@wittenstein-cyber-motor.de)

### Technical support

For any questions on installation, commissioning and optimization.

**Tel.:** +49 7931 493-14800  
**Email:** [wcm-support@wittenstein.de](mailto:wcm-support@wittenstein.de)

For detailed information, please visit [www.wittenstein-cyber-motor.de](http://www.wittenstein-cyber-motor.de)



# Information on project planning

## Tilting torque design instructions

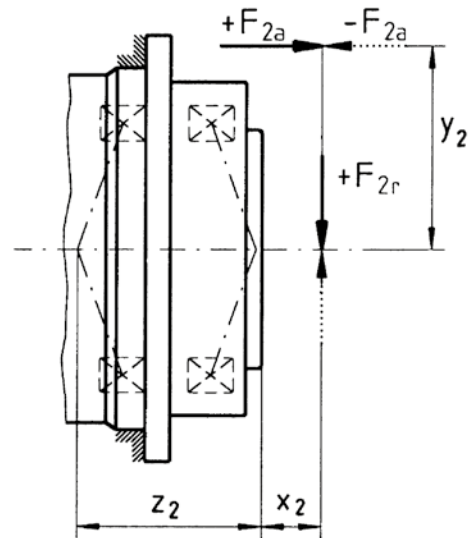
The technical data in the catalog already includes the tilting torque of the TAS drives in the various equipment packages.

If the TAS is used with a specific wheel, however, the tilting torque produced from prevalent radial and axial forces can also be determined and compared with the permissible value.

$$M_{2k} = \frac{F_{2a} * y_2 + F_{2r} * (x_2 + z_2)}{1000} \quad M_{2k} \leq M_{2k \max}$$

Please refer to the following table for values corresponding to  $z_2$ :

TAS	004	010	025	050
$z_2$ [mm]	57,6	82,7	94,5	106,8







cyber motor

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