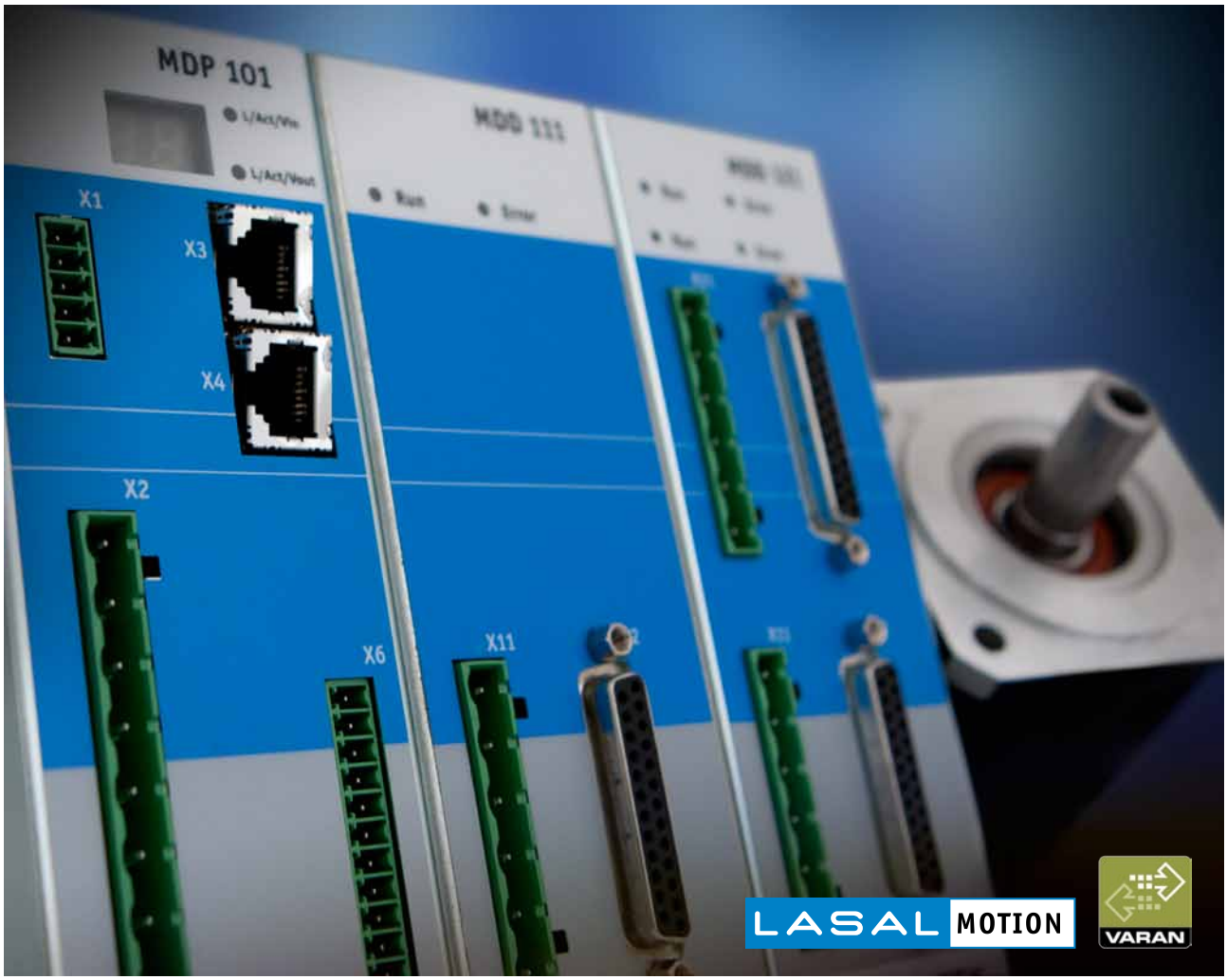
SIGMATEK

Motion Control System



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Contents

Flexible and efficient drive solutions

Motion Control System

Dynamic. Precise. Economic.

Modern machines and plants demand more efficient drive technology with greater flexibility, higher precision and reliability. With the Motion Control System from SIGMATEK, a high performance, user-friendly and economic complete solution is provided that offers you a great deal of freedom when implementing your machine and plant concepts.

Motors, drives, gears and software interact optimally and are fully integrated into the SIGMATEK control system. Even complex Motion Control tasks can therefore be solved simply and flexibly. The DIAS Drives of the 100 and 300 series, servo motors and planetary gears can be matched to these special requirements. In combination with the engineering tool LASAL MOTION, highly dynamic, synchronized and reliable servo applications are provided from one source. The fast and nearly jitter-free system communication is provided by the Ethernet-based VARAN bus.

Drives, motors and gears interact perfectly

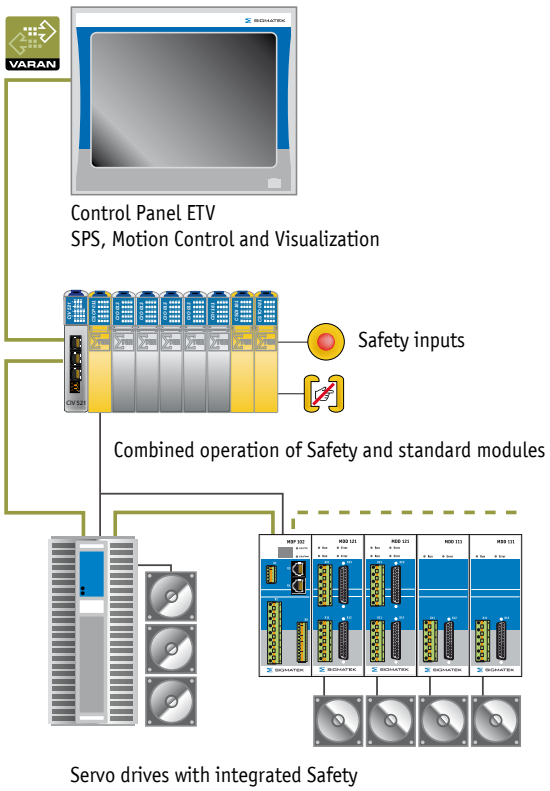
Optimal for any Application

With the DIAS Drives, the right system is available for any application. Thanks to the minimal cycle times, both series have excellent servo performance. The functions were limited to current, rotation speed and position control to avoid unnecessary overhead. An optimal price/performance ratio is therefore achieved.

Servo, linear, torque and asynchronous motors can be operated and all conventional feedback systems used. The parameters and configuration data of the drives are stored centrally in the control. The initial start-up, service and exchange are thereby simplified.

All drives have the most important Safety functions in compliance with SIL 3 according to EN 61508 and PL e according to ISO 13849 and can be easily integrated into the Safety concept of the machine.

Integrated control architecture with real-time Ethernet



All DIAS servo drives are fully integrated into the SIGMATEK automation system. Motion Control, PLC, Safety and Visualization are combined in a central control system. Simple programming and an organized structure of the application software can therefore be achieved. The control provides extensive Motion Control functions. The drive tasks are reduced and for the user, the operation is simplified.

All drive parameters and configuration data are stored centrally in the control and automatically reloaded with the exchange of a servo drive. This modern system structure is made possible through the hard real-time Ethernet bus VARAN, which is used for communication between the drive and control with the shortest cycle times. Cross traffic between the axes in such a system architecture is not needed.

Modular multi-axis system DIAS Drives series 100

DIAS Drive 100 is a modular servo drive system that is designed for highly dynamic machines in the mid and lower power range. It convinces with an exceptionally compact form and optimized power loss. Per component group, up to 8 axes are possible and that with an installation space of only 300 mm x 155 mm x 152 mm (W x H x D).

Two power modules are available to choose from, as well as axis modules for one or two servo drives in a power range of up to 3 kW. Depending on the power module and motor type used, the system must be operated as 1-phase, 230 VAC or 3-phase 400-480 VAC. The modules can be mounted on the carrier with simple snap-on technology. The assembly and installation are thereby significantly reduced. The integration of brake resistance and a line filter contribute to maintaining small space requirements.

Compact multi-axis system DIAS Drives series 300

The DIAS Drives of the 300 series also score with their highly compact form: Up to three drives are integrated into a unit and thereby save space in the control cabinet - 158 mm x 378 mm x 240 mm (W x H x D). An optimal price/performance ratio, especially for robot and handling systems, is thereby achieved. The servo drive system is designed for multi-axis applications in a power range from 8 to 14 kW.

The drives have an individually adjustable and scalable output stage concept for servo motors. High efficiency, reduced power loss and an optimized cooling concept are further arguments for using the DIAS Drives 300. In Addition to the standard model with a fan unit, the DIAS Drives 310 is also available in an even more compact Cold Plate version.

Power range: no limits

DIAS Drive 310 Cold Plate

The DIAS Drive Series 500 is currently in preparation. This series will be designed for a power range from 11 to 80 kW. With 5 sizes and various cooling concepts, the user can flexibly tune the drive system according to performance and features.

Compactly control stepper motors: VST 011

The VST 011 is an ultra light compact function module used to control 2-phase stepper motors with a rated voltage of 18 to 70 VDC. It supports micro-stepping (32 steps). A continuous current of 5 A per motor is possible. Large stepper motors with high torque can therefore be operated. The standard configuration also consists of an incremental encoder interface. In addition, 4 digital in- and outputs (24 V) each are integrated, which can be used according to the application requirements.

Synchronous servo motors increase energy efficiency

With the use of servo motors, the energy efficiency of the application can be increased. The synchronous servo motors of the AKM series are compact power packages for highly dynamic motion tasks. They convince with high packaging density, optimal overloading capability and speed dynamics in a very compact form. The brushless, rotary current motors with three-phase windings have permanent magnets in the rotor made of Neodymium magnet material. Through the low inertial torque, they are highly dynamic. Different application areas require different motors: A broad palette in 8 sizes with rated torques from 0.17 to 150 Nm and peak torques up to 670 Nm is available to choose from.

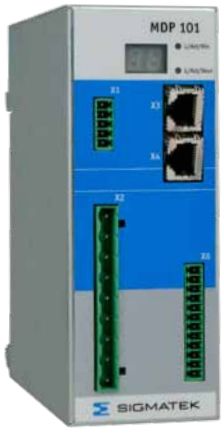
Accelerate mass inertia with planetary gears

The selection of servo motors is expanded with compact and low backlash planetary gears from the series P and PE/A. Fine tuning of the gear ratio ensures that the optimal combination of power, speed and torque is achieved. The smooth running and overload-capable motor gear units perform their job with the highest position accuracy, dynamics and efficiency.

Technical data

DIAS Drives Series 100

Power modules MDP 101 and MDP 102



The power modules are the head station of each DIAS Drive axis system. Depending on the power module and motor type used, the system must be operated as 1-phase, 230 VAC or 3-phase 400-480 VAC. The MDP 101 and MDP 102 respectively, are the communication interface for the control and responsible for the bus communication with connected axis modules. All conventional feedback systems such as Resolver, EnDAT®, Hiperface® and Sin/Cos encoders can be used.

Additional characteristics:

- Real-time Ethernet VARAN interface
- Spline interpolation implemented in addition to position control
- Integrated line filter
- Intermediate circuit is accessible for the coupling of additional devices
- Charging circuit
- Brake resistor
- Integrated Safety functions STO „Safe Torque Off“ and SS1 „Safe Stop 1“

		MDP 101	MDP 102
Characteristics			
Input voltage (symmetric against earth)	V_{AC}	3x 230 V $_{-10\%}$ - 480 V $^{10\%}$, 45 - 65 Hz	1 or 3x 115 V $_{-10\%}$ / 1x 230 V $^{+10\%}$, 45 - 65 Hz
Max. peak current with activation of the mains contact (limited by charging circuit)	A	3	2
Rated installed power for S1 operation	kVA	3	2
Rated installed power for S1 operation for input voltage (< 400 V / < 230 V)	VA	3 kVA - 7.5 W * (400 - input voltage/V)	2 kVA - 8.7 W * (230 - input voltage/V)
Rated intermediate circuit voltage	V_{DC}	290 - 680	150 - 360
Over voltage threshold of the intermediate circuit voltage	V_{DC}	450 / 800 / 900	450
+24 V auxiliary voltage	V_{DC}	22 - 30	22 - 30
Additional +24 V voltage supply power	W	maximum 50	maximum 50
Max. leakage current	mA	30	30
Stop brake supply voltage +24 V-BR	V_{DC}	23 to 26 (depending on selected stop brake type)	23 to 26 (depending on selected stop brake type)
Brake switch			
Capacitance of the intermediate circuit voltage	µF	135	540
G-VMAINS = 230 (rated supply voltage = 230 V)			
Turn-on threshold	V_{DC}	420	420
Cutoff threshold	V_{DC}	400	400
Over voltage cutoff	V_{DC}	450	450
Peak power of the internal ballast resistance (max. 1 s)	kW	5.3	5.3

		MDP 101	MDP 102
G-VMAINS = 400 (rated supply voltage = 400 V)			
Turn-on threshold	V_{DC}	730	-
Cutoff threshold	V_{DC}	690	-
Over voltage cutoff	V_{DC}	800	-
Peak power of the internal ballast resistance (max. 1 s)	kW	21	-
G-VMAINS = 480 (rated supply voltage = 480 V)			
Turn-on threshold	V_{DC}	850	-
Cutoff threshold	V_{DC}	810	-
Over voltage cutoff	V_{DC}	900	-
Peak power of the internal ballast resistance (max. 1 s)	kW	27	-
Safety input			
Input voltage between ENABLE_H (+) and ENABLE_L (-)	V	typically 24 V to a maximum of 30 V	
Signal level between ENABLE_H (+) and ENABLE_L (-)	V	low: ≤ +5, high: ≥ +15	
Input current	mA	typically 10 mA at 24 V	
Input switching delay times	s	Turn-on delay circa 0.02 s Turn-off delay at least 0.5 s, maximum 1 s	
Relay output (S1, S2)		NO	
Switching power		maximum 30 V DC, 42 V AC, 100 µA to maximum 0.5 A	
Digital inputs			
Input voltage Dig_IN1 to Dig_IN8	V	typically 24 V to a maximum of 30 V	typically 24 V to a maximum of 30 V
Signal level	V	low: ≤ +5, high: ≥ +15	low: ≤ +5, high: ≥ +15
Input current	mA	typically 10 mA at 24 V	typically 10 mA at 24 V
Input switching delay times	ms	typically 0.1	typically 0.1
Internal fuse			
Auxiliary supply voltage +24 V (+24 V - BGND)		electronic fuse	electronic fuse
Stop brake supply 24 V-BR (24 V-BR - BGND)		electronic fuse	electronic fuse
Ballast resistance		electronic protection	electronic protection
Resolver specification			
Exciter frequency f_{err}	kHz	8	
Exciter voltage U_{Ref}	U_{eff}	2.8	
Number of poles m	-	2, 4, 6, .., 32	
Resolver voltage $U_{sin/cos, max}$	U_{eff}	1.9	
Connector types			
Safety inputs (X1)		Phoenix FMC1.5/5-ST-3.5	Phoenix FMC1.5/5-ST-3.5
Power supply (X2)		Phoenix GFKC 2.5/9-ST-7.5	Phoenix GFKC 2.5/9-ST-7.5
VARAN bus (X3, X4)		RJ 45	RJ 45
Digital inputs (X6)		Phoenix FMC1.5/12-ST-3.5	Phoenix FMC1.5/12-ST-3.5
Dimensions			
Height / Width / Depth with module carrier (without / with plug)	mm	155 / 60 / 152 (195)	
Weight	kg	1.2	
Article number			
		09-403-101	09-403-102

Axis modules MDD 111 and MDD 121

Axis modules for 1 or 2 servo drives are available to choose from. The modules are mounted on a module carrier (MDM) using simple snap-on technology. The assembly and installation are thereby significantly reduced. The module carrier is provided for a power module and up to four axis modules respectively.

Additional characteristics:

- Excellent servo performance through the smallest controller cycle times
- Control of servo, linear, torque and asynchronous motors

		MDD 111	MDD 121
Characteristics			
Rated input voltage of power module	V_{AC}	230 / 400 / 480	230 / 400 / 480
Max. stop brake current per axis	A_{DC}	1	1
Stop brake voltage drop from the 24 V-BR to the output	V_{DC}	maximum 1 (at 1 A stop brake current)	maximum 1 (at 1 A stop brake current)
Max. total continuous current of axes 1 and 2 (heat sink) at 230 V	A_{RMS}	-	6
Rated output current of axis 1 (rms +/-3 %) at 230 V	A_{RMS}	6	3, maximum 5*
Rated output current of axis 2 (rms +/-3 %) at 230 V	A_{RMS}	-	3
Max. total continuous current of axes 1 and 2 (heat sink) at 400 V/480 V	A_{RMS}	-	4
Rated output current of axis 1 (rms +/-3 %) at 400 V/480 V	A_{RMS}	4	2, maximum 3*
Rated output current of axis 2 (rms +/- 3 %) at 400 V/480 V	A_{RMS}	-	2
Max. total peak current of axes 1 and 2 at 230 V for a max. of 5 s	A_{RMS}	-	18
Peak output current of axis 1 for a max. of 5 s (rms +/- 3 %) at 230 V	A_{RMS}	15	9, maximum 15**
Peak output current of axis 2 for a max. of 5 s (rms +/-3 %) at 230 V	A_{RMS}	-	9
Max. total peak current of axes 1 and 2 at 400 V/480 V for a max. of 5 s	A_{RMS}	-	12
Peak output current of axis 1 for a max. of 5 s (rms +/-3 %) at 400 V/480 V	A_{RMS}	9	6, maximum 9**
Peak output current of axis 2 for a max. of 5 s (rms +/-3 %) at 400 V/480 V	A_{RMS}	-	6
Output stage power loss (multiply the average current of the axis with the factor)	W/A_{RMS}	10	10
Output frequency of the output stage	kHz	8	8
Intermediate circuit capacitance	µF	60	60
Connector Types			
Feedback (X12, X22)		D-Sub 25-pin (female)	D-Sub 25-pin (female)
Motor (X11, X21)		Phoenix GFKC 2.5/6-ST-7.5	Phoenix GFKC 2.5/6-ST-7.5
Dimensions			
Height / Width/ Depth with module carrier (without / with plug)	mm	155 / 60 / 152 (195)	
Weight	kg	1.2	
Article number			
		09-404-111	09-404-121

*) The sum of both continuous currents of the axes is limited to the total continuous current, depending on axis 2
**) The sum of both peak currents of the axes is limited to the total peak current, depending on axis 2

Technical data

DIAS Drives Series 300

The SIGMATEK DIAS Drives (SDD) from the 300 series provide excellent servo performance in a compact form without the usual overhead, since the functions were consciously limited to current, speed and position control. All conventional feedback systems, such as Resolver, EnDAT®, Hiperface® and Sin/Cos encoder, can be used.

Additional characteristics:

- Real-time Ethernet VARAN interface
- Auto Scaling function
- Reduction of power loss through a PWM process
- Spline interpolation implemented in addition to position control
- Integrated class A line filter
- Intermediate circuit is accessible for the coupling of additional devices
- 1-phase operation possible
- Safety functions STO “Safe Torque Off” and SS1 “Safe Stop 1” integrated

		SDD 310	SDD 315	SDD 335	SDD 215	SDD 120
Rated values						
Rated input voltage (symmetrical opposite to earth) max. 5000 A eff. (L1, L2, L3)	V_{AC}	3x 230 V $_{-10\%}$ - 480 V $_{10\%}$ 45 - 65 Hz				
Max. peak current in electrical torque (limited by the charging circuit)	A	2.5				
Rated power in S1 mode	kVA	14				
Rated intermediate circuit voltage	V_{DC}	290 - 680				
Over voltage protection limit for the intermediate circuit	V_{DC}	450 - 900				
Additional voltage supply +24 V	V_{DC}	22 - 30				
Power from the additional +24 supply	W	35	35	35	35	25
Stop brake supply voltage +24 V-BR	V_{DC}	25 - 27				
Max. holding brake current per axis	A_{DC}	2				
Stop brake voltage drop at +24 V-BR load	V_{DC}	maximum 1 (at 3x 2 A holding brake current)				
Rated current for axis 1 (eff. +/- 3 %)	A_{RMS}	10	10	10	10	20
Rated current for axis 2 (eff. +/- 3 %)	A_{RMS}	10	10	10	-	-
Rated current for axis 3 (eff. +/- 3 %)	A_{RMS}	10	15	15	15	-
Max. total continuous current of all axis (heat sink)	A_{RMS}	20	20	20	20	-
Peak output current of axis 1 for a max. of 5 s (eff. +/- 3 %)	A_{RMS}	20	20	20	20	40
Peak output current of axis 2 for a max. of 5 s (eff. +/- 3 %)	A_{RMS}	20	20	30	-	-
Peak output current of axis 3 for a max. 5 s (eff. +/- 3 %)	A_{RMS}	20	30	35	30	-
Output stage loss	W/A_{RMS}	10				
Output frequency of the power output stage	kHz	8				
Max. error current	mA	15				

		SDD 310	SDD 315	SDD 335	SDD 215	SDD 120
Brake unit						
Capacitance of the intermediate circuit voltage	µF			700		
Internal brake resistance	Ω			25		
External brake resistance	Ω	25 - 50	25	25	25 - 50	25
Rated power of the internal brake resistor	W			200		
G-VMAINS = 230 (rated supply voltage = 230 V)						
Start-up limit	V_{DC}			420		
Switch-off level	V_{DC}			400		
Over voltage protection	V_{DC}			450		
Max. rated power of the external brake resistor	W			750		
Peak power of the internal brake resistor (max. 1 s)	kW			6.5		
G-VMAINS = 400 (rated supply voltage = 400 V)						
Start-up limit	V_{DC}			730		
Switch-off level	V_{DC}			690		
Over voltage protection	V_{DC}			800		
Max. rated power of the external brake resistor	W			1200		
Peak power of the internal brake resistor (max. 1 s)	kW			21		
G-VMAINS = 480 (rated supply voltage = 480 V)						
Start-up limit	V_{DC}			850		
Switch-off level	V_{DC}			810		
Over voltage protection	V_{DC}			900		
Max. rated power of the external brake resistor	W			1500		
Peak power of the internal brake resistor (max. 1 s)	kW			27		
Internal fuse						
24 V auxiliary supply voltage (+24 V to BGND)				electronic fuse		
Stop brake supply 24 V-BR (+24 V-BR to BGND)				electronic fuse		
Brake resistance				electronic protection		
Resolver specification						
Exciter frequency f_{err}	kHz			8		
Exciter voltage U_{Ref}	U_{eff}			4		
Number of poles m	-			2, 4, 6, .., 32		
Resolver voltage $U_{sin/cos, max}$	U_{eff}			2.2		
Connector Types						
Internal auxiliary power supply (X1A)				Combicon 5, 3-pin, 2.5 mm²		
Power supply (X1B)				Power Combicon 7.62, 8-pin, 4 mm²		
Feedback (X6, X7, X8)				D-Sub 25-pin (female)		
Motor (X3, X4, X5)				Power Combicon 7.62, 6-pin, 4 mm²		
Dimensions with fan unit						
Height (with connector) / Width / Depth	mm			378 (472) / 158 / 240		
Weight	kg			10		
Dimensions with Cold Plate (only SDD 310-3)						
Height (with connector) / Width / Depth	mm			428 (472) / 152 / 121.3		
Weight	kg			6.35		
Article number						
with fan unit		09-501-101-2	09-501-151-2	09-501-351	09-501-152-2	09-501-201-2
with Cold Plate		09-501-101-3				

Technical data

Servo Motors AKM

The synchronous servomotors from the AKM series are brushless, rotary current motors with three-phase windings for demanding servo applications. They contain permanent magnets in the rotor made of neodymium magnet material. Through the low inertial torque, the motors are highly dynamic and also have very low cogging. The robust, compact motors with high power density are available in 8 sizes and fine graduations, whereby an optimal selection is possible. Motor and encoder cables are available in standard lengths of 5m/10m/15m/20m.

Standard configuration:

- Smooth wave
- IP65 protection
- 2-pin Resolver
- Sensors in the stator windings to monitor temperature
- UL-conforming configuration

Options:

- Fitted key
- Stop brake (AKM 2 - 8)
- Water-cooled flange
- Shaft ring seal (IP67)
- Rotatable plug
- Various sensor systems

Motor		AKM 1	AKM 2	AKM 3	AKM 4
Nominal power	P_n (kW)	0.14 - 0.30	0.28 - 0.94	0.28 - 1.31	0.24 - 1.73
Nominal rotation speed	n_n (min^{-1})	8000	2500 - 8000	1000 - 7000	1200 - 6000
Motor idle torque	M_0 (Nm)	0.18 - 0.41	0.48 - 1.42	1.15 - 2.88	1.95 - 6
Rated torque	M_n (Nm)	0.17 - 0.36	0.39 - 1.32	0.95 - 2.64	1.58 - 5.22
Peak torque	M_{0max} (Nm)	0.71 - 1.73	1.65 - 5.61	4.49 - 12.01	7.02 - 24
Nominal current	I_n [A]	1.06 - 1.33	1.11 - 3.48	1.18 - 4.37	1.29 - 4.38
Peak current	I_{max} (A)	5.8 - 7.6	7 - 21.6	6.9 - 28.1	7 - 44
Rotor inertial torque	J [kgcm²]	0.017 - 0.045	0.11 - 0.27	0.33 - 0.85	0.81 - 2.7

Motor		AKM 5	AKM 6	AKM 7	AKM 8
Nominal power	P_n (kW)	0.55 - 3.83	1.87 - 6.45	3.94 - 7.46	11.9 - 19.5
Nominal rotation speed	n_n (min^{-1})	1000 - 6000	1200 - 6000	1200 - 3500	1800 - 3000
Motor idle torque	M_0 (Nm)	4.7 - 14.3	11.9 - 25	29.4 - 53	75 - 180
Rated torque	M_n (Nm)	1.95 - 12.9	5.7 - 20.2	20.1 - 43.5	67 - 150
Peak torque	M_{0max} (Nm)	15.6 - 54.8	40.9 - 93	117.6 - 217.6	210 - 670
Nominal current	I_n [A]	2.31 - 8.53	4.14 - 11.59	7.77 - 26.10	48 - 67
Peak current	I_{max} (A)	13.8 - 62.5	22.5 - 103.7	46.5 - 97.5	240 - 335
Rotor inertial torque	J [kgcm²]	3.4 - 12	17 - 40	65 - 120	172 - 495

Technical data

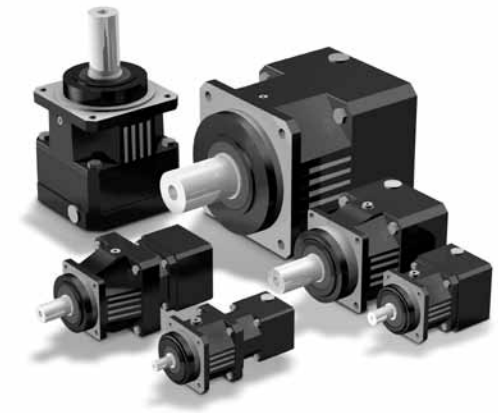
Planetary Gears

For demanding applications: Series P

The universal planetary gears of the P Series are used in demanding applications, which have high requirements on torque/dynamics, smoothness and precision. The user profits from compact, coaxially constructed drive units.

Highlights:

- Robust full wave
- Acceleration torque: 18 - 1600 Nm
- Very low backlash: ≤ 3 to ≤ 8 angular minutes
- High torsional stiffness
- Uniform amount of oil, can be used in all mounting positions
- FKM seal ring on the drive, continuous operation without cooling
- Symmetric friction-optimized output bearings (optionally available in amplifier configuration)
- Slanted gearing for perfect smoothness and stability
- Low mass moments of inertia
- Simple and safe motor adaptation in mounting position



Series P gears			P221	P222	P321	P322	P421	P422
Gear ratio	i	i	4 - 10	16 - 100	3 - 10	12 - 100	3 - 10	12 - 100
Rated torque	M2N	Nm	12 - 16	12 - 16	30 - 45	30 - 45	50 - 85	50 - 85
Max. input speed	n1MAX	DB (min^{-1})	4500	4500	3500 - 4500	4000 - 4500	3000 - 4000	3500 - 4500
Clearance	Λφ2	arcmin	6	8	4	5	4	5
Max. acceleration torque allowed	M2B	Nm	18 - 22	18 - 22	50 - 65	50 - 65	100 - 120	100 - 120
Efficiency		%	1-stage ≥ 97 %, 2-stage ≥ 95 %					

Series P gears			P521	P522	P721	P722	P821	P822
Gear ratio	i		3 - 10	12 - 100	3 - 10	12 - 100	3 - 10	12 - 100
Rated torque	M2N	[Nm]	120 - 210	120 - 210	280 - 440	280 - 440	700 - 1000	700 - 1000
Max. input speed	n1MAX	DB (min^{-1})	2500 - 3700	3000 - 4000	2200 - 3300	2500 - 3700	1800 - 2800	2200 - 3300
Clearance	Λφ2	arcmin	3	4	3	4	3	4
Max. acceleration torque allowed	M2B	[Nm]	200 - 300	200 - 300	500 - 700	500 - 700	1200 - 1600	1200 - 1600
Efficiency		%	1-stage ≥ 97 %, 2-stage ≥ 95 %					

Economic solution: Series PE and AE

For simple applications, the low-backlash planetary gears of the PE and AE series provide an inexpensive alternative. The multifaceted combination possibilities for motors and gears, as well as fine transmission ratios enable the optimal tailoring to customer requirements.

Standard configuration:
IP64 (PE series), IP65 (AE series), lifetime lubrication, double attachment centering

Optional:
Food grease lubrication, low backlash classes, stainless steel motor adapter plates

Highlights series PE:
- Inexpensive series with spur gearing
- Geometric 50/70/90/120/155 flange size
- Backlash: ≤ 6 to ≤ 10 angular minutes
- High torsional stiffness
- Low noise

Series PE gears			PE050	PE070	PE090	PE120
Gear ratio	i		3 - 100			
Rated torque	M2N	Nm	9 - 14	26 - 39	65 - 104	150 - 215
Max. input speed	n1MAX	DB (min^{-1})	4500	4000	3600	3000
Clearance	Λφ2	arcmin	≤ 8 - ≤ 10	≤ 8 - ≤ 10	≤ 6 - ≤ 8	≤ 6 - ≤ 8
Max. acceleration torque allowed	M2B	Nm	13.5 - 21	39 - 58.5	97.5 - 156	225 - 322.5
Efficiency		%	1-stage ≥ 97 %, 2-stage ≥ 94 %			

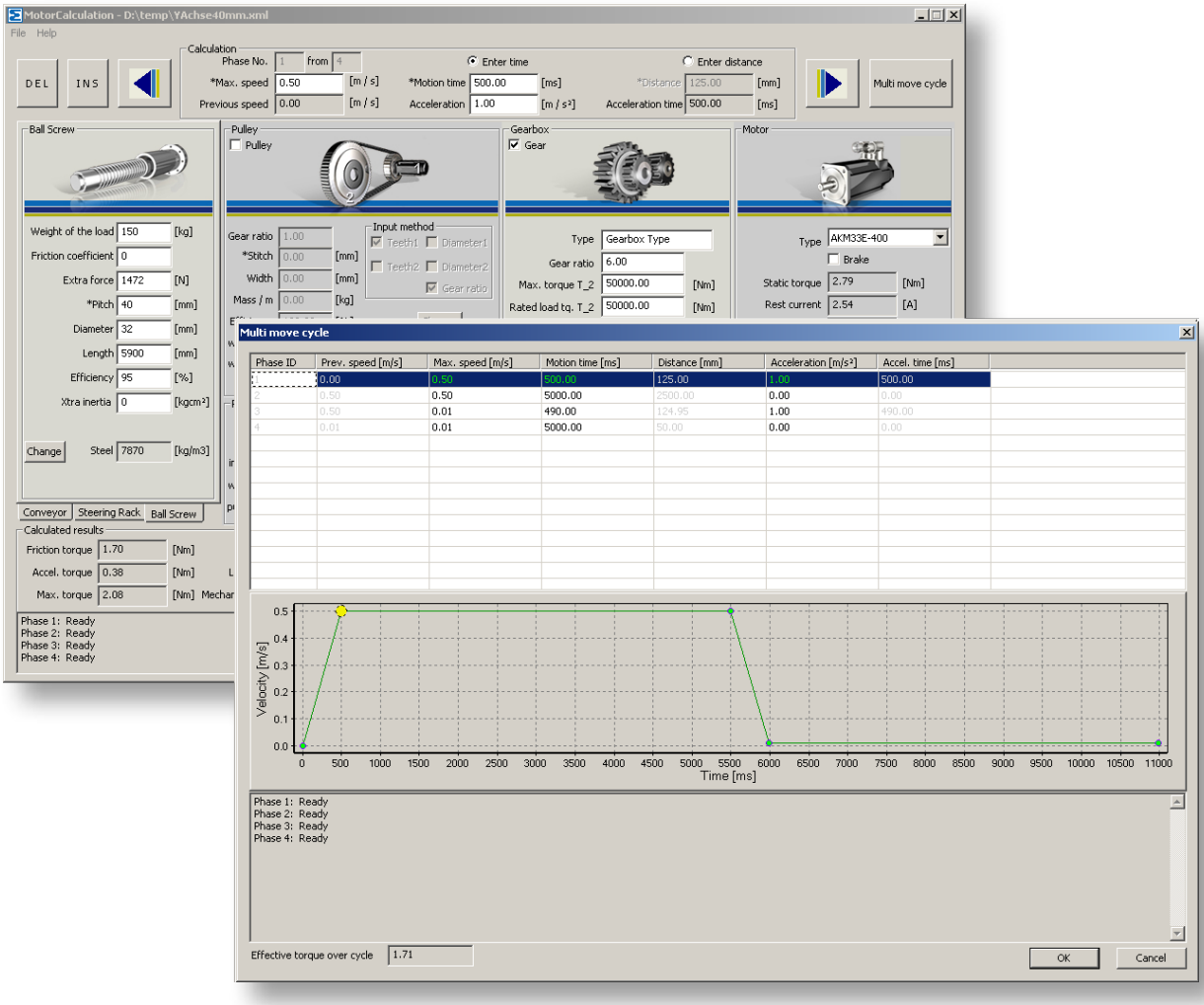
Highlights series AE:
- Basic housing and shafts made of stainless steel
- 7 sizes, from 50 mm to 235 mm
- Backlash: ≤ 8 to ≤ 12 angular minutes
- Straight and angled models
- High torsional stiffness and higher torques
- Low noise

Series AE gears			AE050	AE070	AE090	AE120
Gear ratio	i		3 - 100			
Rated torque	M2N	Nm	14 - 22	40 - 60	100 - 160	208 - 310
Max. input speed	n1MAX	DB (m in^{-1})	5000	5000	4000	4000
Clearance	Λφ2	arcmin	≤ 8 - ≤ 12			
Max. acceleration torque allowed	M2B	Nm	21 - 33	60 - 90	150 - 240	312 - 465
Efficiency		%	1-stage ≥ 97 %, 2-stage ≥ 94 %			

LASAL Motor Calculation software

Drive Layout Made Easy

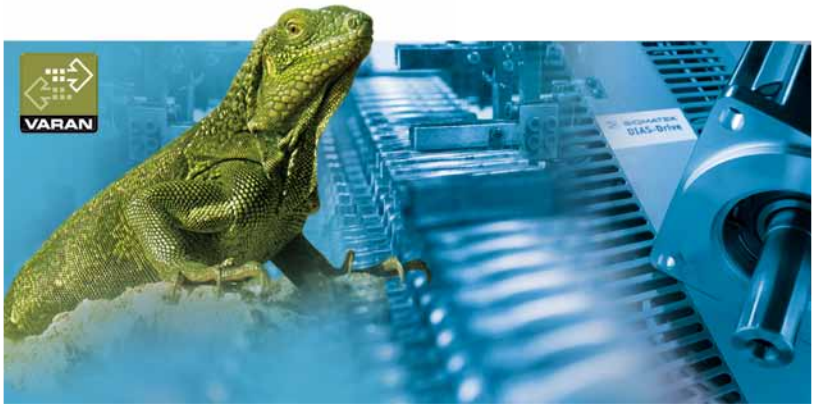
For any application: With an optimized drive concept, the machine and especially the energy efficiency can be increased. Important thereby, are need-based dimensioning and the professional layout of the drives, motors and gears. The all-in-one engineering supports the user with the comfortable “LASAL Motor Calculation” software. Based on user-definable speed profiles (speed, acceleration, distance or motion time) and mechanical data (weight, diameter, mass, ratios), the optimal drive can be specified for the respective application.



With the LASAL Motion Calculation software, the fitting drive components can be defined easily.

Seamless integration and perfect communication

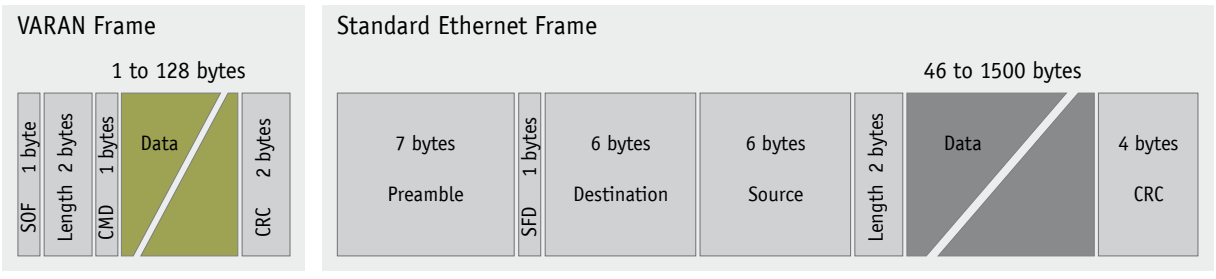
Real-Time Ethernet VARAN Bus



With the short access times and high synchronicity that can be reached with the real-time Ethernet VARAN bus, implementing controls for complex tracked profiles with multiple axes in combination with a high level PLC is simple and economic. In addition, a significantly deeper integration of the drive into the control is achieved with the VARAN bus. Data such as alarms, motor data, etc. can be processed and visualized in the PLC without time limitations.

Hard real-time, short cycle times, high synchronicity

The VARAN bus is ideal for fast machines with a lot of drives, since all access can be synchronized in hard real-time (synchronicity jitter < 100 ns). Through the high data transfer rate and larger bandwidth of the real-time Ethernet communication, it is possible to activate more drives in a shorter time than with current field bus systems. For data exchange between the PLC and drive (16-byte read/write data corresponds to one drive), the VARAN bus needs only 5.05 µs. A significant advantage of VARAN, in comparison to other real-time Ethernet bus systems, is the very small packet size. Instead of the long standard Ethernet frames, the packet length for the VARAN bus uses a maximum of 128 bytes. The probability of corrupting a message is thereby extremely low. If this should occur however, the message is immediately repeated within the same bus cycle.



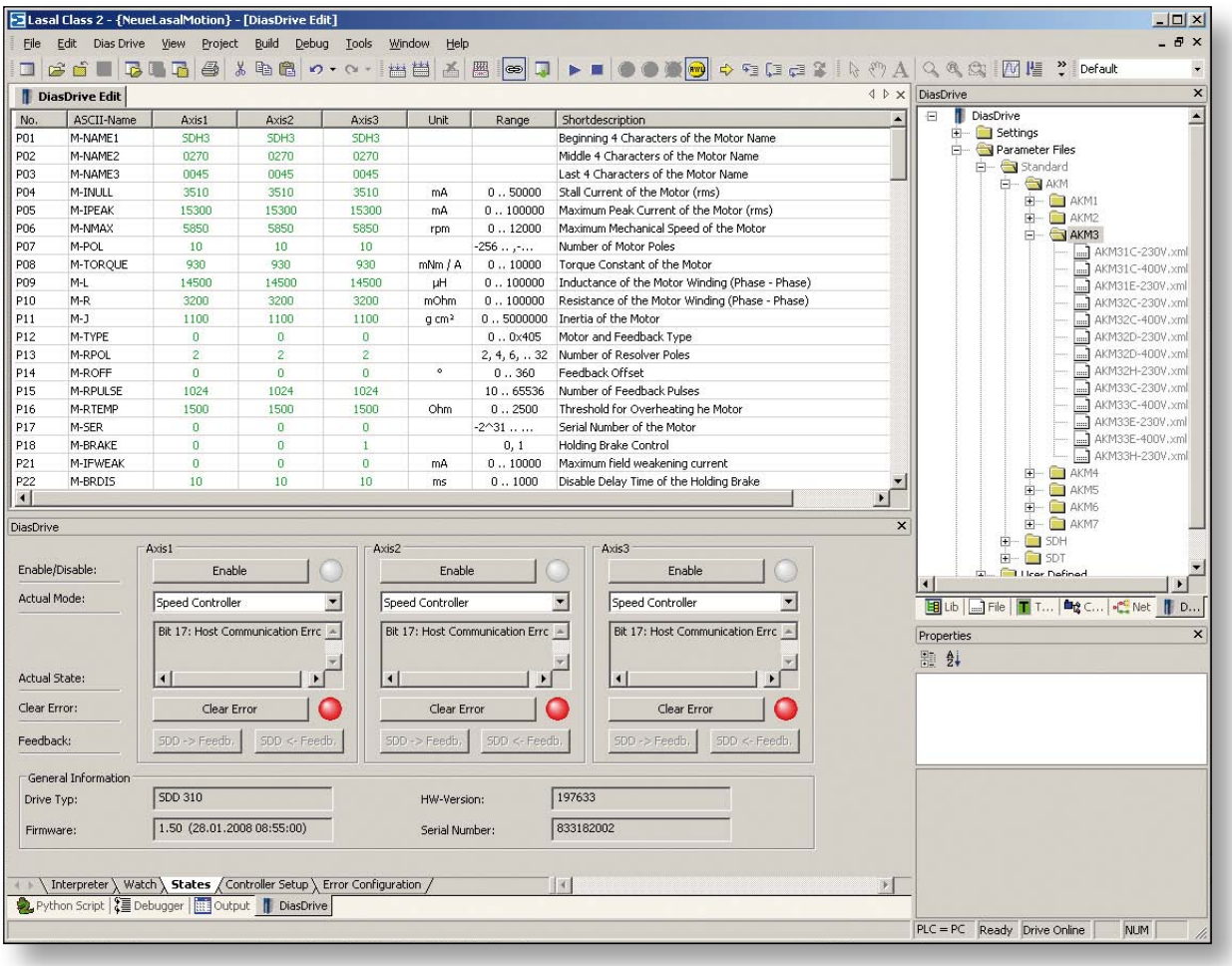
VARAN uses very short data packets. The minimized overhead and small payload gaurantee high flexibilty and data security.

Simple integration of drive technology with

LASAL and LASAL MOTION

Integration in LASAL

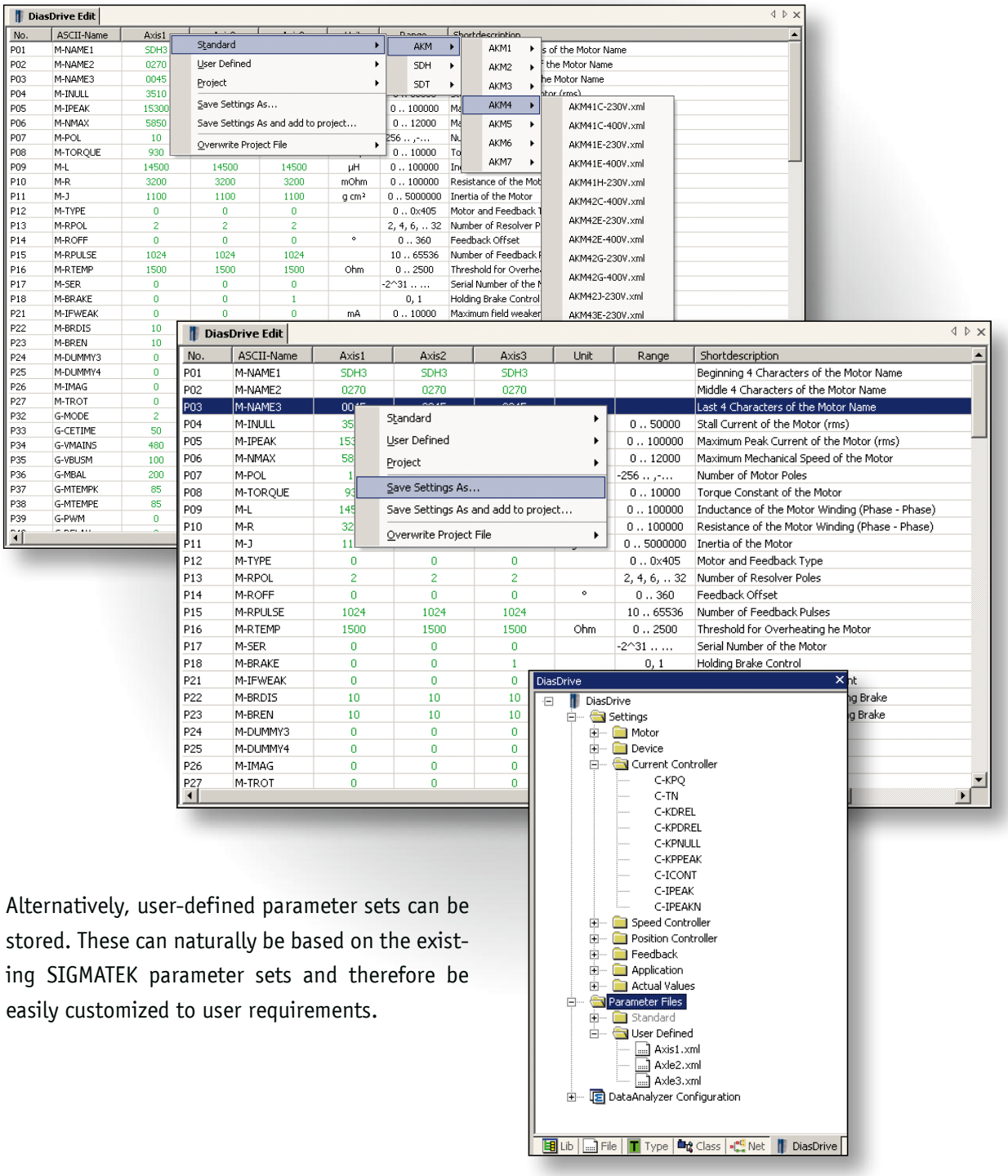
LASAL is the all-in-one engineering tool for SIGMATEK controls and makes a significant contribution to the fast and easy integration of drive technology into the control system. The initial start-up and parameterization for the DIAS Drives is completely integrated into LASAL; no additional software is required.



Clear, structured display of the amplifier data.

Parameter sets available for all SIGMATEK motors

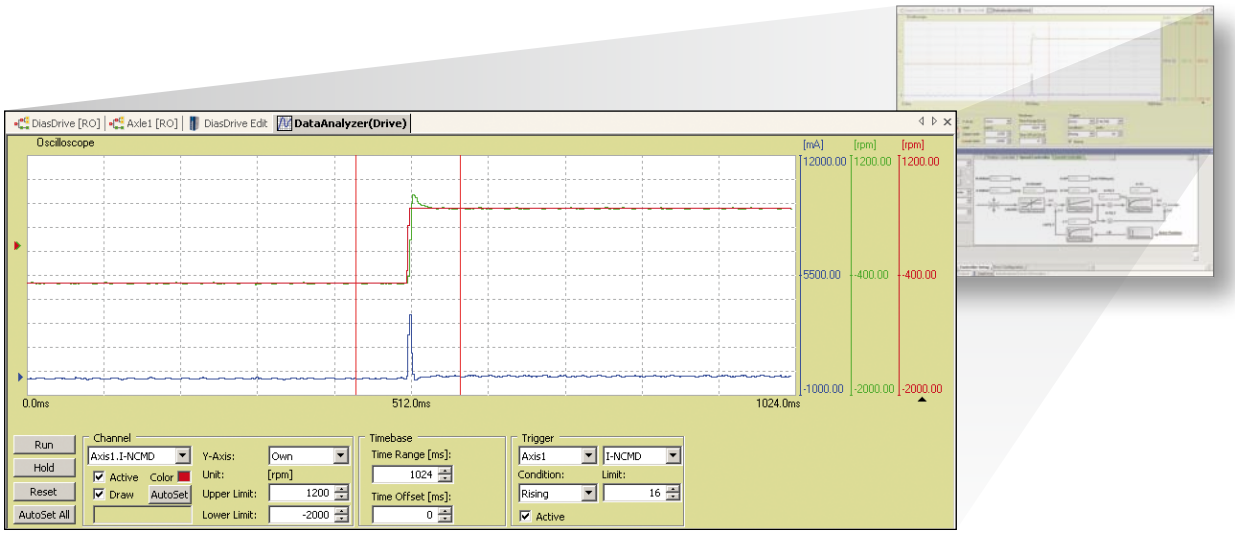
Parameter sets for all SIGMATEK motors are already available. The user only has to adjust the system-specific data and does not have to worry about the motor parameters. Since the parameters are stored in the control, the drive always has the correct data. Exchanging a drive is therefore simple and can be done without a software tool.



Alternatively, user-defined parameter sets can be stored. These can naturally be based on the existing SIGMATEK parameter sets and therefore be easily customized to user requirements.

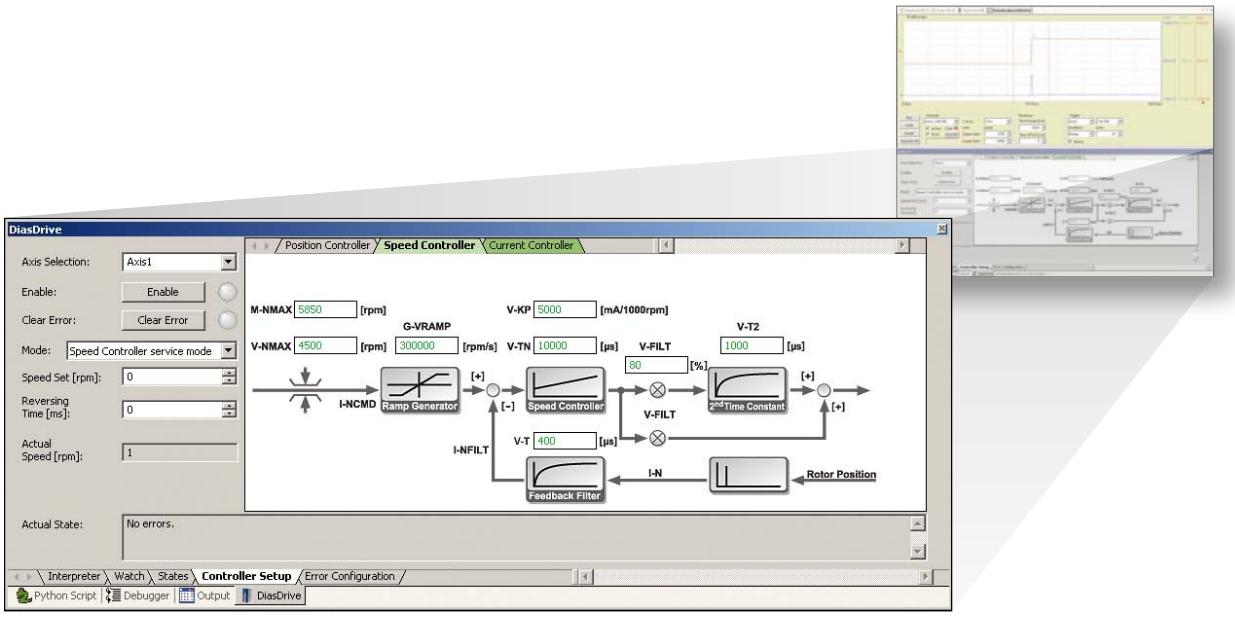
Internal data analyzer

The DIAS Drives have an internal data analyzer that can record data with a scan rate of 62.5 µs. This data is recorded in the converter in real time and displayed with the software tool. Optimizing the controllers and displaying the data analyzer can be done in the same screen view.



Graphic representation of the controller start-up

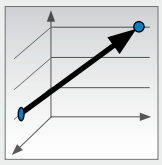
Current, rotation speed and position control are graphically displayed in the software, which ensures a clear overview at any time. All respective control parameters are visible at a glance and can be set individually.

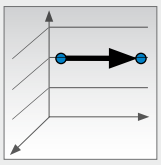


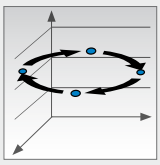
LASAL MOTION Flexible motion design

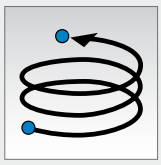
The LASAL MOTION package simplifies all drive technology tasks. Complex axis control tasks and regulation can be implemented comfortably.

The user is provided with a large a drive library: Functions such as absolute, relative and endless positioning, CNC functions as well as coordinated movements and several reference types are standard features. In addition, a selection of Motion Control and technology modules is also available. Examples are coordinated movements such as linear interpolation with up to 6 axes, circular interpolation, curved disks, flying saws or electronic CAM switches. These serve to further reduce programming and testing.

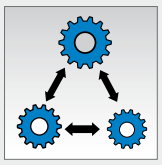

Linear interpolation

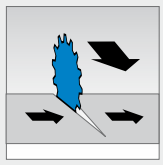

Point to point


Circular interpolation


Helix


Electronic CAM function


Electrical Gears

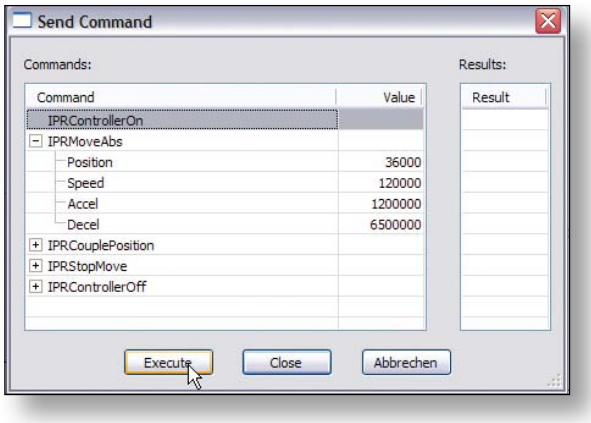

Flying saws

Axis control using the interpreter

In LASAL, an interpreter is integrated that enables commands to be called without additional programming. User-defined commands can be added to the preprogrammed standard commands.

In addition to normal function calls through the program, LASAL MOTION also provides the option to control all tracked movements, position and status queries as well as axis parameters through the interpreter interface.

This can be done through the Windows surface to implement axis starts without additional programming or the interpreter commands can be called through the respective application.



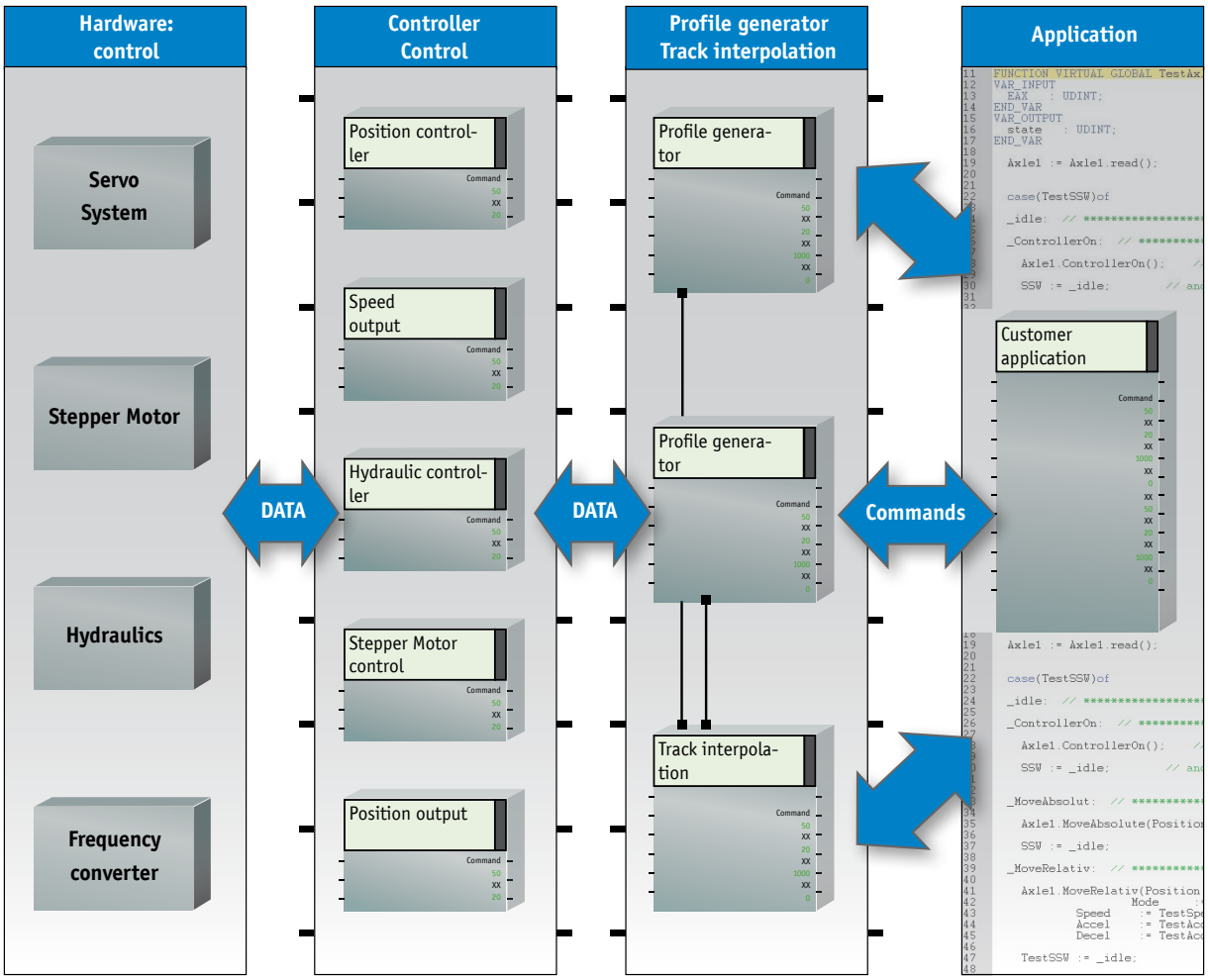
Axis movements can be easily performed without programming by simply entering data/instructions.

Modular construction of the LASAL MOTION software

Object oriented engineering with LASAL provides the user with the highest modularity. The Motion Control elements can also be combined as desired, whereby the implementation of various technical requirements for any application can be easily realized.

The modular construction of the software allows hardware-independent motion control. For the customer application, it is irrelevant whether a hydraulic axis, servo motor or similar is operated. The instruction call is always the same.

During the development of LASAL MOTION, a great deal of attention was given to ease of use and efficient axis commands. Several axes can therefore be synchronized with just one command call. Synchronization can be achieved through speed, position, position offset, with gear transmission or virtual axes.



The Motion Control elements can be combined as desired. Therefore the user is able to flexibly apply the application-specific requirements. The Motion Control is independent of the hardware used.

Motion Control System

Highlights Compact

Universal and fully integrated

Everything from one source: Control, HMI, drives, motors, gears and software all come from SIGMATEK. Integrated motion control simplifies the engineering and reduces the technical, training and management effort and costs.

Economic and flexible

The drive concentrates on its essential tasks, while the control assumes the application tasks. Doubled functions and expensive electronics in the drive are eliminated. The most varying motors can be operated. The parameters are stored in the PLC. The converter can therefore simply be exchanged.

Comfortable

LASAL MOTION provides an extensive library with preprogrammed motion control and technology modules. Engineering is simplified through efficient tools such as the real-time Data Analyzer and real-time trend recording.

Future-proof with real-time Ethernet

The use of the real-time Ethernet bus VARAN as the communication protocol allows a modern control structure and guarantees the highest reaction speeds.

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