DUET 4 AD

Drive integrated
servo motor

COMPACT.
INTEGRATED.
INTELLIGENT.

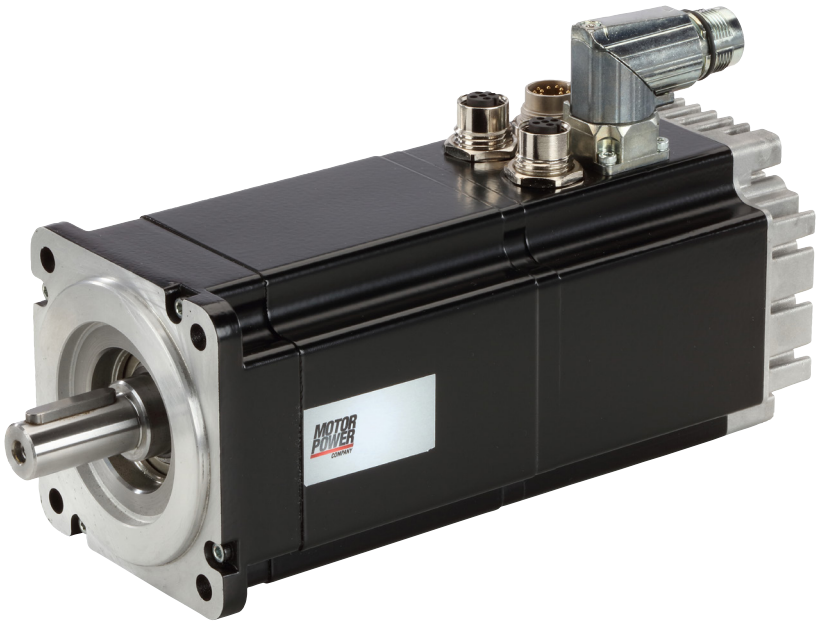


SEE IT BEFORE IT HAPPENS

MOTOR POWER COMPANY

DUET 4 AD

The new generation of integrated brushless servo motors designed around your applications.



Industrial automation is **constantly evolving**, with increasingly demanding applications and changing market requirements.

The **DUET 4 AD** reflects Motor Power Company's commitment to **anticipating these challenges**, combining decades of experience in **motion control** with a deep understanding of the industries we serve.

A **new solution** developed to meet **today's application** needs and support the evolution of **tomorrow's machines**.

COMPACT. INTEGRATED. INTELLIGENT.

THE DUET 4 AD

Advanced motion control directly integrated into the motor.

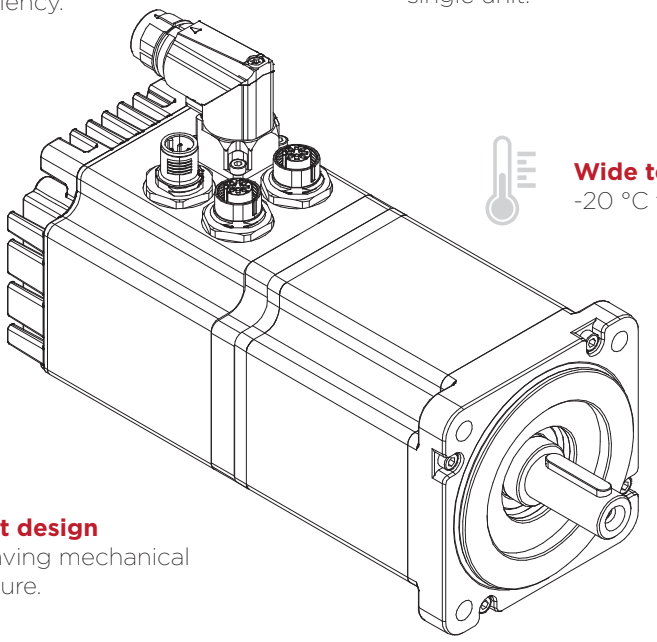
The **DUET 4 AD combines a the TC4 high-performance brushless servo motor** with an integrated drive, bringing advanced motion control, communication and diagnostics directly into the motor.

This highly integrated solution simplifies machine architecture, reduces wiring and installation complexity, and makes more efficient use of available machine space.

Designed for demanding industrial environments, the **DUET 4 AD delivers dynamic performance**, precision and reliability over a wide operating temperature range.

Brushless technology
high dynamic performance and efficiency.

Integrated drive
motor, drive and control in a single unit.



Advanced motion control
position, velocity and current/torque control.

Wide temperature range
-20 °C to +40 °C.

Compact design
space-saving mechanical architecture.

Industrial connectivity
CANopen, EtherCAT, PROFINET, EtherNet/IP

PERFORMANCE AND ROBUSTNESS

Compact dimensions. Powerful servo performance.

The **DUET 4 AD** is designed for demanding industrial environments, **combining dynamic performance with high reliability** and integrated protection functions.

Continuous torque
0.65–2.8 Nm

Rated speed
3,000 rpm

Motor size
60–80 mm

Operating temperature
-20°C to +40°C

PROTECTION AND SAFETY

IP54 standard / IP65 on request

STO SIL 2

CE and UL certified

Protection functions:

- Undervoltage and overvoltage monitoring
- Overtemperature monitoring.
- Overload protection.
- Static current limit.
- I^2t current limit.
- Brake control.
- Voltage-controlled deceleration.

KEY BENEFITS

Designed around the needs of modern machines.

The **DUET 4 AD** offers a unique combination of performance, compactness and **intelligence to support the most demanding motion** applications.

INTEGRATED	Motor, drive, feedback and control in a single unit.
COMPACT	Optimized dimensions to save valuable machine space.
CONNECTED	Multiple fieldbus interfaces for easy integration into different automation architectures.
PRECISE	Position, velocity and current control for high dynamic performance.
INTELLIGENT	Monitoring, diagnostics and configuration tools for easy commissioning.
FLEXIBLE	Encoder, brake and gearbox options to meet specific application requirements.

MOTION CONTROL

Control where the motion happens.

The **DUET 4 AD** integrates the control functions required to manage demanding **servo applications directly** within the motor-drive unit.

Position Control

- Profile Position Mode.
- Cyclic Synchronous Position.
- Homing.
- Interpolated mode.

Current Torque Control

- Current mode.
- Torque control.
- Static current limit.
- I^2t current limit.

Velocity Control

- Profile Velocity Mode.
- Linear velocity ramps (trapezoidal profile).
- Cyclic Synchronous Velocity.

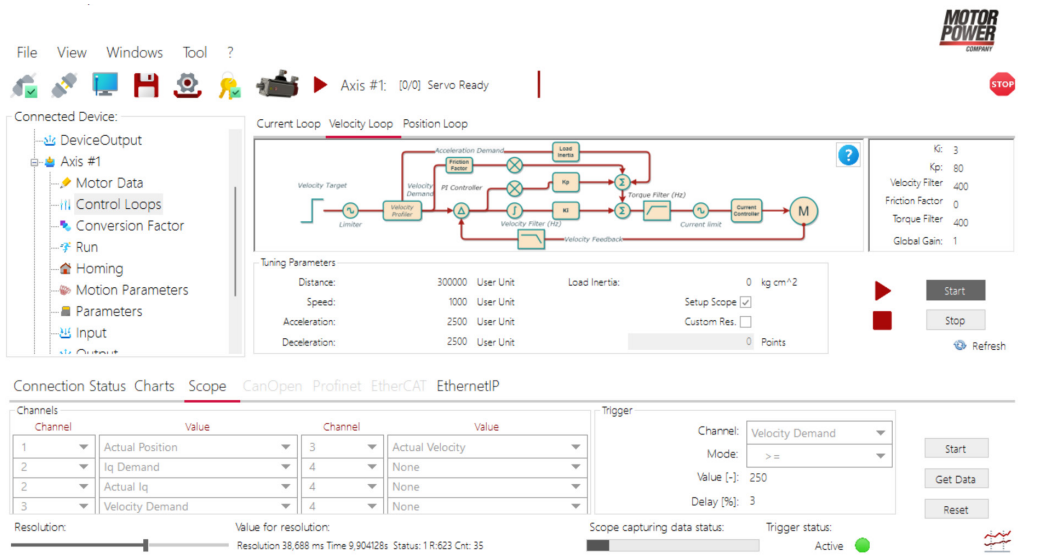
Synchronization

- Distributed clocks.
- NC axis operation.
- Interpolated mode.

CONFIGURATION SOFTWARE

Configure. Tune. Optimize.

The **DUET 4 AD** can be easily configured using a dedicated software tool, providing direct access to motor parameters, **tuning functions and comprehensive diagnostic tools**.



PARAMETERIZATION

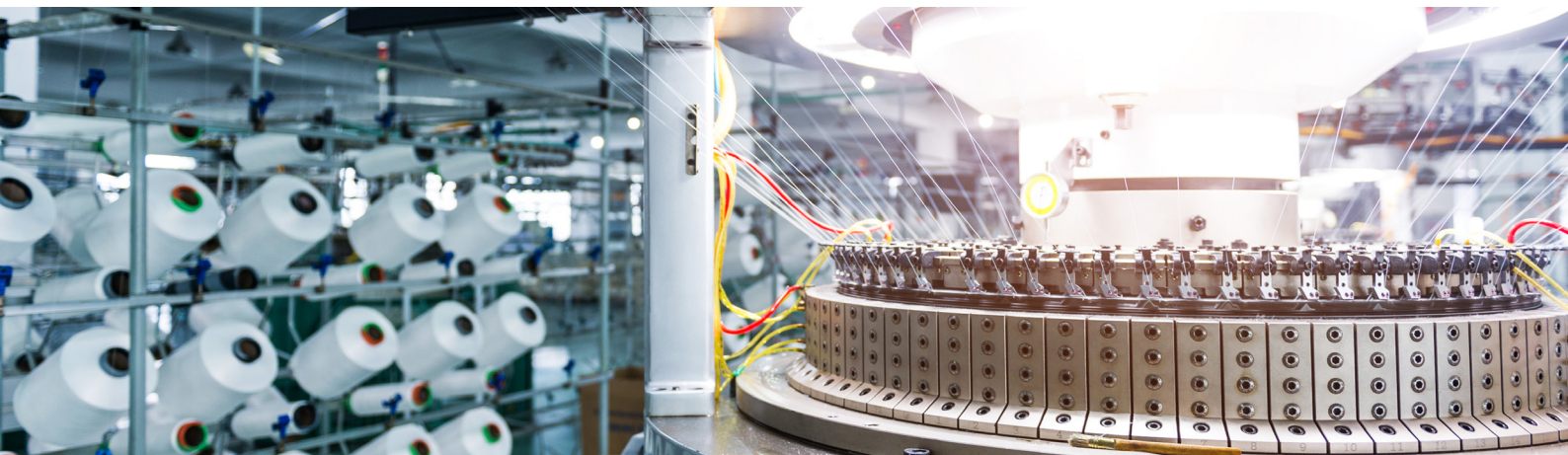
- Direct parameter access.
- Parameter management.
- Save parameter settings.
- Non-volatile memory.

TUNING

- Wide range of tuning options.
- Online tuning
- Automated motion profiles.

COMMISSIONING

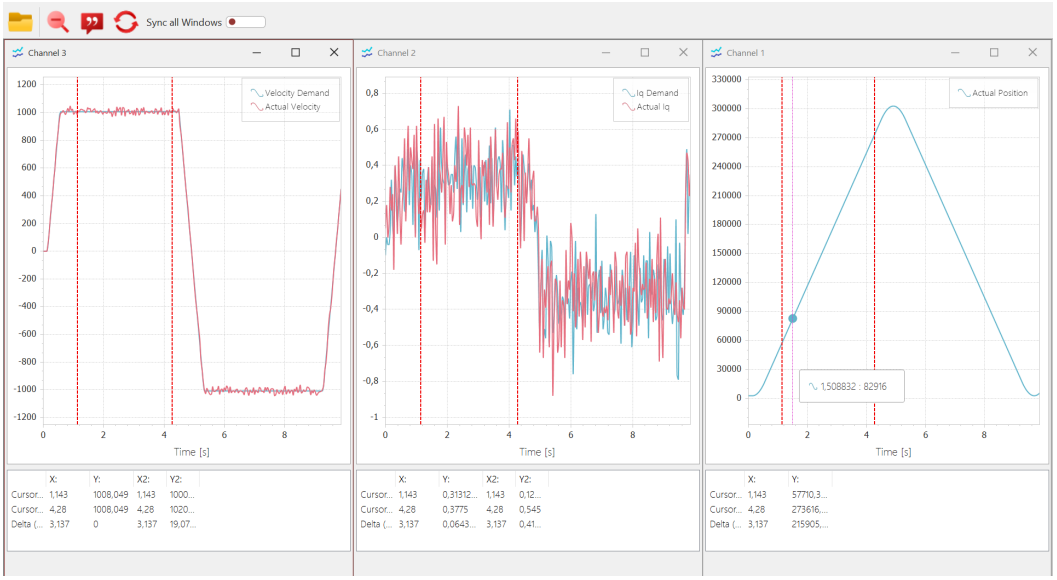
- Simple and intuitive setup.
- Firmware updates
- CAN monitor.



MONITORING AND DIAGNOSTICS

See. Record. Diagnose. Optimize.

Integrated monitoring and diagnostic functions give real-time insight into motor behaviour, helping to **optimize performance and reduce downtime**.



MONITORING

Real-time visualization of motor status and operating parameters.

OSCILLOSCOPE RECORDING

Record and analyze high-speed motion and velocity/current data in real time.

ONLINE OPTIMIZATION

Use recorded motion data to analyze and adjust system behaviour.

DIAGNOSTICS

Fault monitoring and diagnostic information for faster troubleshooting.

COMMUNICATION AND CONNECTIVITY

Ready for your automation architecture.

The **DUET 4 AD supports multiple fieldbus interfaces**, allowing seamless integration into different automation platforms and machine architectures.

PROFINET®

- RT PROFINET

EtherNet/IP™

- CIP Sync
- Hard real-time communication

CANopen

- CiA 301
- CiA 402
- LSS
- Interpolated mode

EtherCAT®

- CoE (CANopen over EtherCAT);
- Distributed clocks
- NC axis operation
- FoE
- Extensive object dictionary.

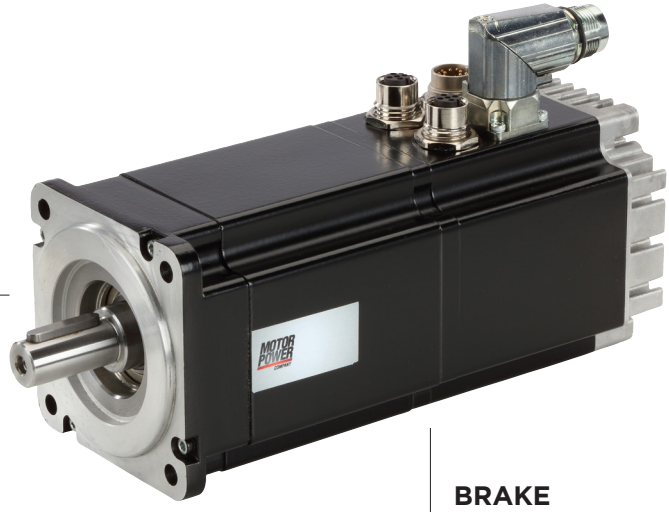
FEEDBACK AND OPTIONS

Configurable for your application.

The **DUET 4 AD** can be **configured with different feedback systems**, braking options and gearboxes to match the requirements of the application.

GEARBOX

Gearbox option available



ENCODERS

Absolute singleturn
4,096 ppr
Quasi-absolute

Absolute multiturn
18 bit singleturn
14 bit multiturn

BRAKE

Brake option available

DUET 4 AD TYPE

Example:

	1	2	3	4	5	6	7
DUET 4 AD	80 3A	02	S1	0	E-STO	0	XXXX
	MODEL	Winding	Feedback	Brake	Fielbus	Mechanical Arrangement	Optional

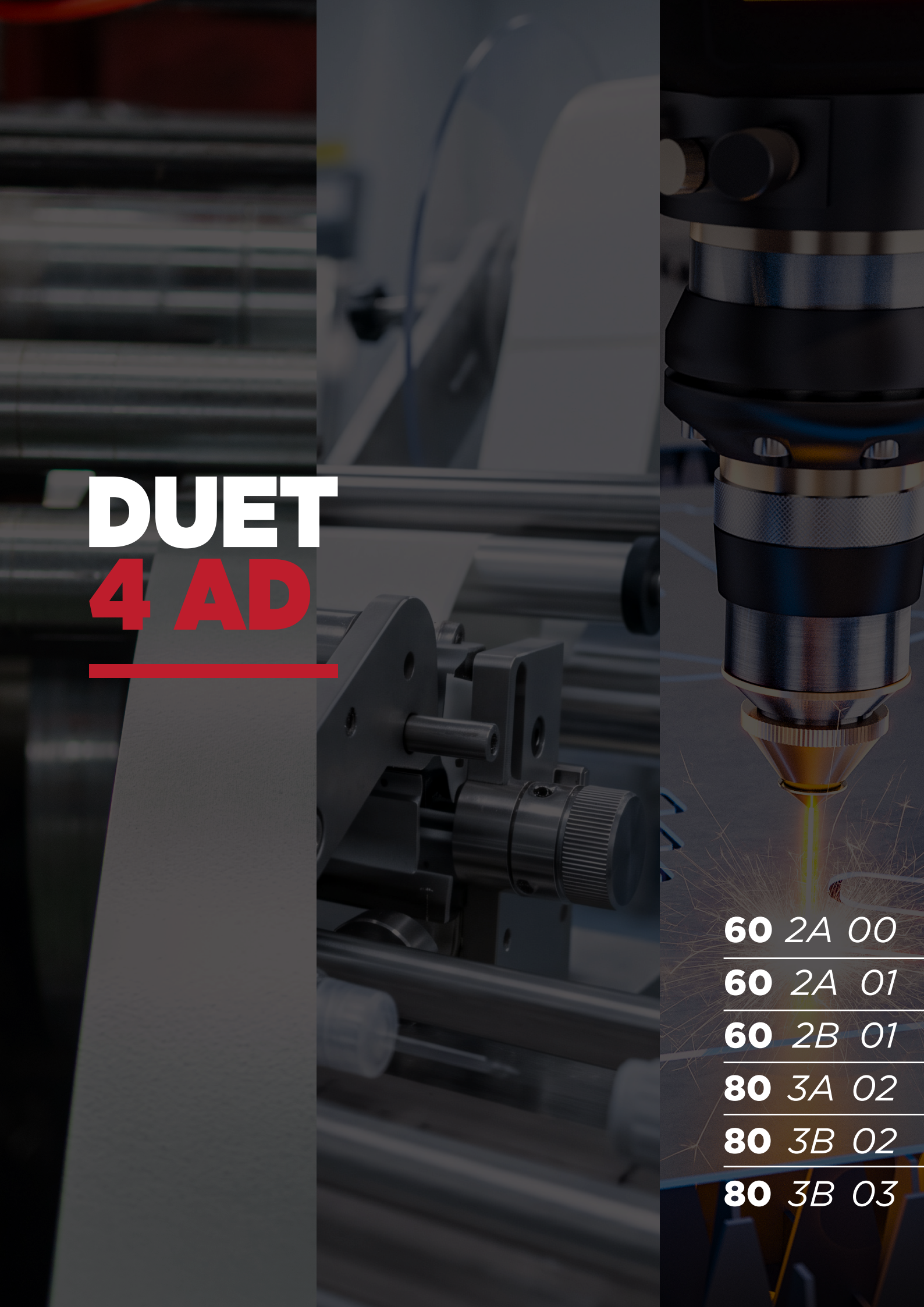
1	**MODEL**	60 2A 60 2B 80 3A 80 3B	
2	**WINDING**	Already specified in motor model	
3	**FEEDBACK**	**S1**	Absolute Singleturn encoder 12 bit + quasi-absolute
		A1	Absolute magnetic multiturn encoder – 18-bit singleturn / 14-bit multiturn
4	**BRAKE**	**0**	Without brake
		1	With brake
5	**FIELDBUS**	C-STO = CANopen with STO E-STO = EtherCAT with STO P-STO = PROFINET with STO EI-STO = EtherNet/IP	
6	**MECHANICAL ARRANGEMENT**	**0**	Shaft with key / without oil seal (front flange side IP 54)
		1	Shaft with key / with oil seal (front flange side IP 65)
		2	Shaft without key / without oil seal (front flange side IP 54)
		3	Shaft without key / with oil seal (front flange side IP 65)

Please note: fieldbus and feedback options must not be mixed. Select only one option by following the corresponding column.

PRODUCT LINEUP

Type	Rated Output Power (W)	Rated Torque (Nm)	Peak Torque (Nm)	Rated Voltage (Vdc)	Rated speed (rpm)	Feedback	Fieldbus
60 2A 00	265	0,85	2.6	48	3000	S1 Absolute Singleturn encoder 12 bit + quasi-absolute A1 Absolute magnetic multiturn encoder – 18-bit singleturn / 14-bit multiturn	**CANopen** **EtherCAT** **PROFINET** **EtherNet/IP**
60 2A 01	265	0,85	3,05				
60 2B 01	475	1.52	3.6				
80 3A 02	550	1.78	4.0				
80 3B 02	705	2.25	4.4				
80 3B 03	880	2.8	5.4				

DUET
4 AD



60 *2A 00*

60 *2A 01*

60 *2B 01*

80 *3A 02*

80 *3B 02*

80 *3B 03*

DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

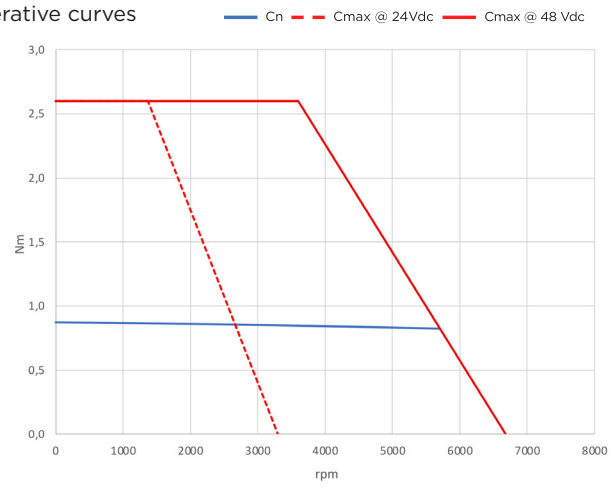
60 2A 00

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	6.6
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	0.87
	Nominal torque	M_n	[Nm]	0.85
	Peak torque	MMax	[Nm]	2.6
	Nominal power	P_n	[W]	265
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	6680
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.074
SERVOMOTOR MECHANICAL DATA	Mechanical time constant ([a])	Tm	[ms]	0.83
	Rotor inertia without holding brake	J	[kg·cm^2]	0.223
	Mass without holding brake	m	[kg]	0.92
	Max. axial shaft load at 3000 rpm	SL_a	[N]	42
	Max. radial shaft load at 3000 rpm	SL_r	[N]	260
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	1.3
	Engaging time	Tr	[ms]	75
	Release time	Tl	[ms]	45

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

60 2A 00

Operative curves



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DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

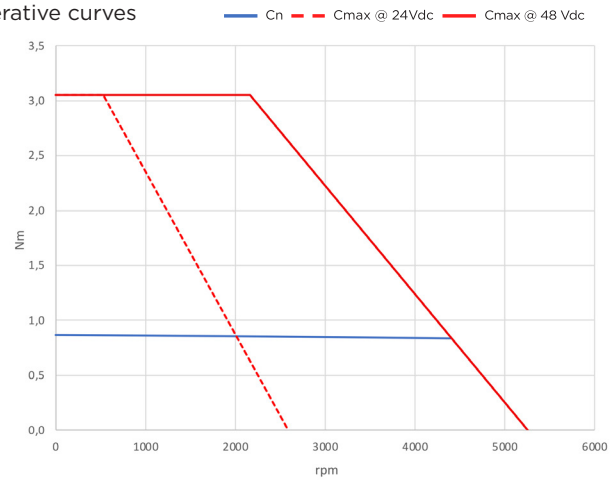
60 2A 01

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	6.6
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	0.87
	Nominal torque	M_n	[Nm]	0.85
	Peak torque	MMax	[Nm]	3.05
	Nominal power	P_n	[W]	265
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	5260
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.094
SERVOMOTOR MECHANICAL DATA	Mechanical time constant (a)	Tm	[ms]	0.83
	Rotor inertia without holding brake	J	[kg·cm2]	0.223
	Mass without holding brake	m	[kg]	0.92
	Max. axial shaft load at 3000 rpm	SL_a	[N]	42
	Max. radial shaft load at 3000 rpm	SL_r	[N]	260
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	1.3
	Engaging time	Tr	[ms]	75
	Release time	Tl	[ms]	45

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

60 2A 01

Operative curves



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DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

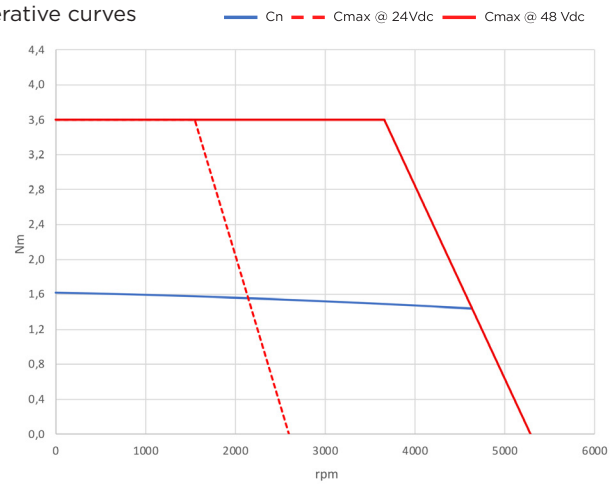
60 2B 01

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	11.8
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	1.62
	Nominal torque	M_n	[Nm]	1.52
	Peak torque	MMax	[Nm]	3.6
	Nominal power	P_n	[W]	475
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	5290
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.094
SERVOMOTOR MECHANICAL DATA	Mechanical time constant ([a])	Tm	[ms]	0.63
	Rotor inertia without holding brake	J	[kg·cm2]	0.414
	Mass without holding brake	m	[kg]	1.33
	Max. axial shaft load at 3000 rpm	SL_a	[N]	42
	Max. radial shaft load at 3000 rpm	SL_r	[N]	260
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	1.3
	Engaging time	Tr	[ms]	75
	Release time	Tl	[ms]	45

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

60 2B 01

Operative curves



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DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

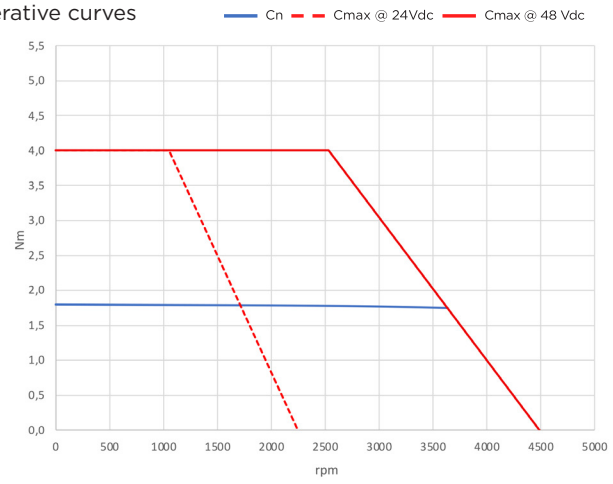
80 3A 02

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	13.54
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	1.80
	Nominal torque	M_n	[Nm]	1.78
	Peak torque	MMax	[Nm]	4.00
	Nominal power	P_n	[W]	555
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	4500
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.112
SERVOMOTOR MECHANICAL DATA	Mechanical time constant (a)	Tm	[ms]	1.03
	Rotor inertia without holding brake	J	[kg·cm2]	0.79
	Mass without holding brake	m	[kg]	1.83
	Max. axial shaft load at 3000 rpm	SL_a	[N]	115
	Max. radial shaft load at 3000 rpm	SL_r	[N]	440
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	2.5
	Engaging time	Tr	[ms]	100
	Release time	Tl	[ms]	100

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

80 3A 03

Operative curves



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DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

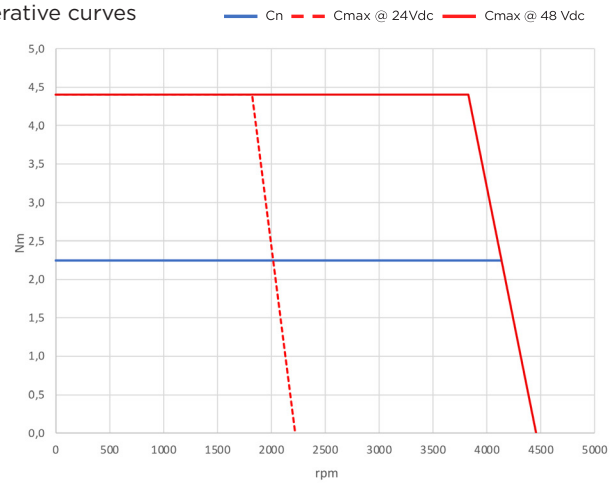
80 3B 02

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	16.2
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	2.25
	Nominal torque	M_n	[Nm]	2.25
	Peak torque	MMax	[Nm]	4.4
	Nominal power	P_n	[W]	705
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	4460
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.112
SERVOMOTOR MECHANICAL DATA	Mechanical time constant (a)	Tm	[ms]	0.52
	Rotor inertia without holding brake	J	[kg·cm2]	1.42
	Mass without holding brake	m	[kg]	2.76
	Max. axial shaft load at 3000 rpm	SL_a	[N]	115
	Max. radial shaft load at 3000 rpm	SL_r	[N]	440
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	2.5
	Engaging time	Tr	[ms]	100
	Release time	Tl	[ms]	100

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

80 3B 02

Operative curves



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DRIVE INTEGRATED SERVOMOTORS

DUET 4 AD

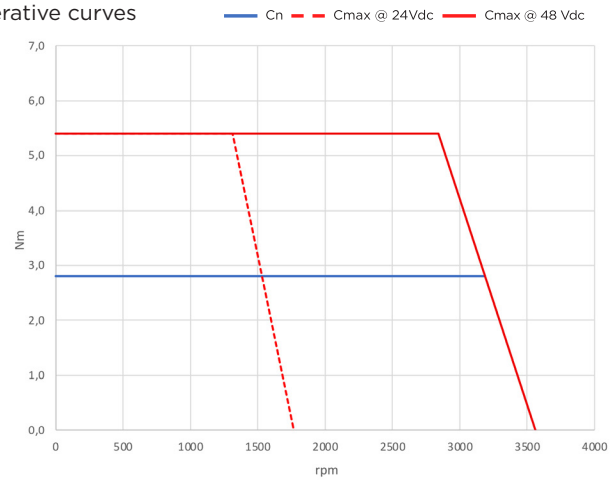
80 3B 03

DRIVE DATA	Min. drive voltage (dc)	Vmin	[V]	20
	Rated drive voltage (dc)	Vn	[V]	48
	Max. drive voltage (dc)	Vmax	[V]	55
	Idc rated current	Idc	[A]	20.2
SERVOMOTOR ELECTRICAL DATA	Continuous stall torque (*)	M_0	[Nm]	2.8
	Nominal torque	M_n	[Nm]	2.8
	Peak torque	MMax	[Nm]	5.4
	Nominal power	P_n	[W]	880
	Nominal working speed	n_N	[rpm]	3000
	Maximum working speed	n_{Max}	[rpm]	3560
	Torque constant ± 10 %	K_t	[Nm/Arms]	0.141
SERVOMOTOR MECHANICAL DATA	Mechanical time constant (a)	Tm	[ms]	0.50
	Rotor inertia without holding brake	J	[kg·cm2]	1.42
	Mass without holding brake	m	[kg]	2.76
	Max. axial shaft load at 3000 rpm	SL_a	[N]	115
	Max. radial shaft load at 3000 rpm	SL_r	[N]	440
	Protection degree	IP	[/]	65 (with oil seal mounted on the flange)
BRAKE DATA (Optional)	Static torque @20°C	Co	[Nm]	2.5
	Engaging time	Tr	[ms]	100
	Release time	Tl	[ms]	100

Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing - Operative temperature: -20 ÷ +40 ° - Insulation class: F
(*) without brake. (a) without brake and without feedback.

80 3A 03

Operative curves

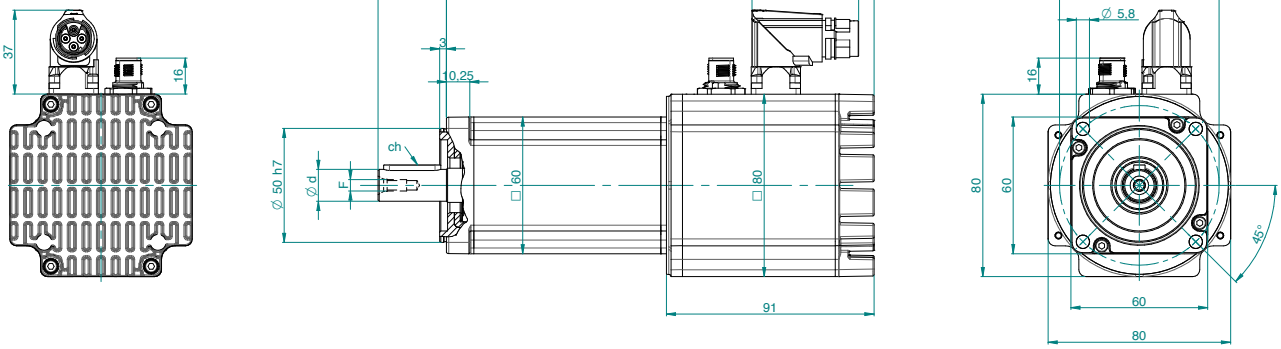


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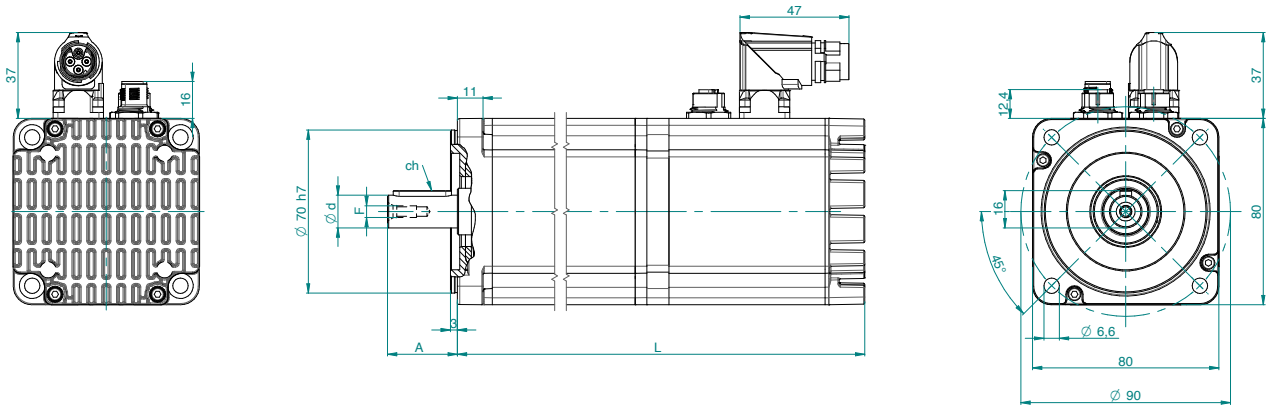
EXTERNAL DIMENSIONS

DUET 4 AD		60 2A	60 2B	80 3A	80 3B
L	mm	164,5	187,5	179,5	201,5
L (With Brake)	mm	194	217	208,5	230,5
A	mm	30	30	30	40
d (h6)	mm	14	14	14	19
ch	mm	5x5x25	5x5x25	5x5x25	6x6x30
F	mm	M5	M5	M5	M6

Duet 4 AD 60



Duet 4 AD 80

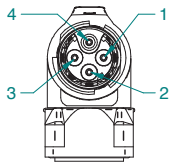




DUET 4 AD

EtherCAT WIRING CONNECTIONS

Power connector		Signal connector			
		EtherCAT		**STO** *option*	
Pin	Function	**Pin**	Function	**Pin**	Function
1	48V	**1**	TD+	**1**	Channel A
2	24V	**2**	RD+	**2**	Channel B
3	GND power	**3**	TD-	**3**	GND
4	PE	**4**	RD-	**4**	-



CN POWER M17x1
BEDC 894 MR 4p



CN ETHERCAT OUT
M12 Female 4p



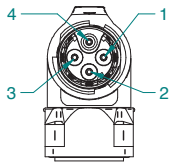
CN ETHERCAT IN
M12 Female 4p



CN STO
M12 Male 4p

DUET 4 AD WIRING CONNECTIONS

Power connector		Signal connector			
		PROFINET - EtherNet/IP		**STO** *option*	
Pin	Function	**Pin**	Function	**Pin**	Function
1	48V	**1**	TD+	**1**	Channel A
2	24V	**2**	RD+	**2**	Channel B
3	GND power	**3**	TD-	**3**	GND
4	PE	**4**	RD-	**4**	-



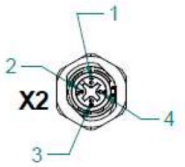
CN POWER M17x1
BEDC 894 MR 4p



CN PROFINET IN
M12 Female 4p



CN PROFINET OUT
M12 Female 4p

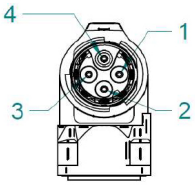


CN STO
M12 Male 4p

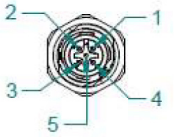
CANopen

DUET 4 AD WIRING CONNECTIONS

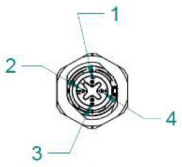
Power connector		Signal connector			
		CANopen		**STO** *option*	
Pin	Function	**Pin**	Function	**Pin**	Function
1	48V	**1**	n.c.	**1**	STO A
2	24V	**2**	n.c.	**2**	STO B
3	GND power	**3**	CAN GND	**3**	GND A B
4	PE	**4**	CAN HIGH	**4**	STO OUT
5			CAN LOW		



CN POWER M17x1



CN CAN OPEN
M12 male 5p



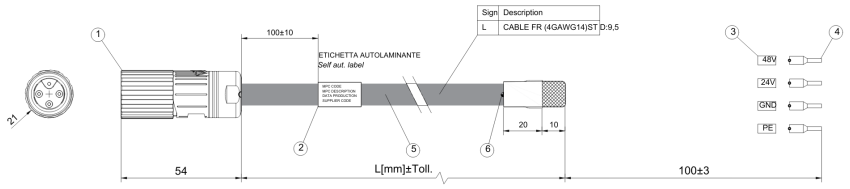
CN STO
M12 Male 4p

CABLES SPECIFICATIONS

POWER CABLE for DUET 4 AD (STO *version*)

Pin	Color	Function	For Cable order	
			Lengh (mm)	Part Number
1	Black 1	48 Vdc	3000	**003108020896**
2	Black 2	24 Vdc	5000	**003108020897**
3	Black 3	GND	10000	**003108020898**
4	Yellow/Green	Earth PE	15000**	**003108020908**
4	Shield	External cable shield	20000**	**003108020957**

**Note: When using cable lengths of 15 or 20 meters, the Duet 4 AD may experience some performance derating. Please contact our technical service team for further details.

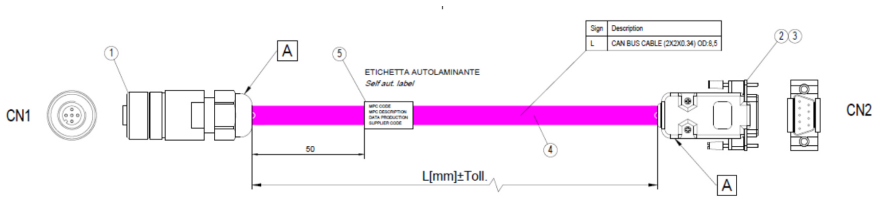


SIGNAL CABLE for Duet 4 AD (STO version)

	Part Number
CAVO-DUET.AD CN STO M12 4P FS - 1668124	**003108020896**

DUET 4 AD CANopen (Programming cable)

	Part Number
CAVO-DUE.CAN/CN.M12.5p.FM	**003108009812**



CAN ADAPTER for USB

	Part Number
Compact with a D-Sub 9 CAN interface and galvanic isolation is an easy and cost-efficient way to connect a computer to a CAN bus network.	**003108009812**

FLYING CONNECTORS for DUET 4 AD

	Part Number
Power connector BSTA896FR0985202A000 4p/M17	**005117000356**
Can Open connector M12 5P. FM IN PLASTICA 8A5000-325	**005117000580**

BRAKE FEATURES

DUET 4 AD		60	80
Operating motor temperature	[°C]	-20 ÷ 120	
External ambient temperature	[°C]	20 ÷ 40	
Standard brake duty	-	Stationary	
Minimum dry static torque (-20 ÷ 120 °C)	[Nm]	1.3	2.5
Nominal operating voltage (± 10 %)	[Vdc]	24	
Power consumption at 20 °C (± 7 %)	[W]	11.4	10.2
Release time	[ms]	45	100
Engage time	[ms]	75	100

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Catalogue 1.0 - 11/26

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