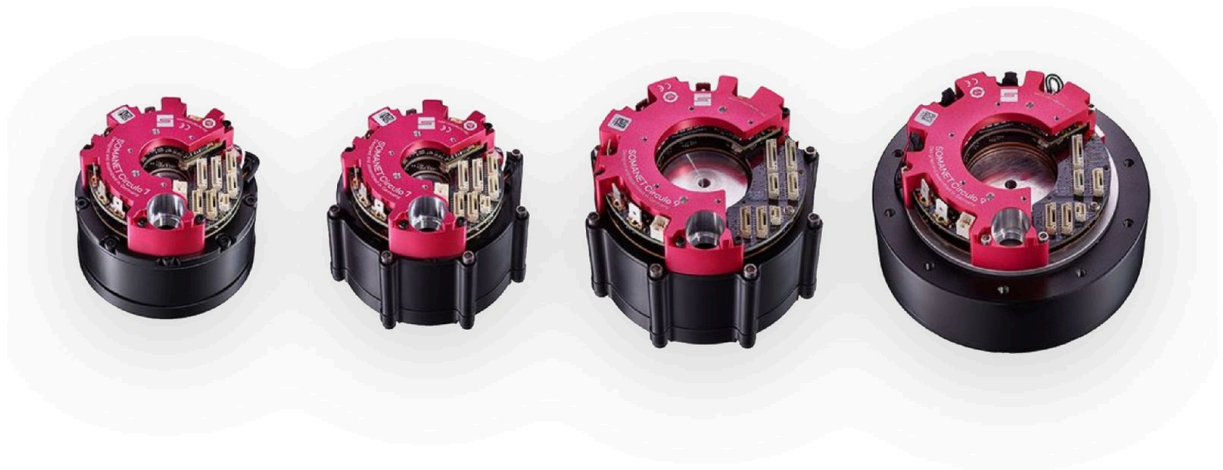


ACTILINK-JD **DYNAMIC ACTUATOR**

QDD DESIGN WITH SINGLE-STAGE PLANETARY GEARBOX
AND HIGH-TORQUE MOTORS, FULL ETHERCAT & FSOE SUPPORT



- **Cost-efficient robot actuators** for humanoid robots and robot dogs
- **Four frame sizes** — 08 / 09 / 10 / 12
- **Quality motor & gear design** — coaxial single-level layout, low cogging
- **Quasi-direct-drive** — superior dynamics and backdriveability
- **SOMANET™ Motion Drive** — EtherCAT, high-performance motion control, high efficiency
- **Functional safety** — STO + SBC standard, Safe Motion via FSoE option (SIL 3, PL e, Cat. 3)

The ACTILINK-JD series combines a compact coaxial design, high torque density, and precise low-backlash performance for modular robotics. A single-stage planetary gearbox paired with a high-torque motor and an integrated SOMANET™ Circulo drive delivers outstanding dynamics, backdriveability, and reliability under mechanical load — ideal for humanoid robots, robot dogs, and exoskeletons.

▲ ACTILINK-JD09 is a sample-stage product. * Outer diameter, length and weight are for the ECS1SS single-encoder build; ECD2 dual-encoder builds add the output encoder (see per-variant pages).

AJD	08-20-300	EC	D2	SM	S	00	XXXX
PRODUCT FAMILY	OUTER Ø & TORQUE / SPEED CLASS	FIELDBUS	FEEDBACK ENCODER	SAFETY	BRAKE	VERSIONING	CUSTOMIZATION
AJD Actilink Joint Dynamic	08-20-300 Ø 78.5 mm · ≈20 Nm · 7.75:1	EC EtherCAT	S1 Single internal encoder for motor	SS STO / SBC via IO	N No brake	00 Default version	blank Standard
	09-30-500 Ø 88 mm · ≈30 Nm · 9:1		D2 Dual encoders, internal for motor, external for output	SM Safe Motion (SIL 3, PL e, Cat. 3)	S Spring-applied friction brake		
	10-60-200 Ø 106 mm · ≈60 Nm · 9:1		D3 Other encoder combinations		P Permanent-magnet friction brake		
	12-120-200 Ø 120 mm · ≈120 Nm · 9:1				M Synapticon Microcoil (Solenoid Pin)		
	10-40-500 Ø 106 mm · ≈40 Nm · 9:1						

Standard option
Sample available
Possible custom option

ACTILINK-JD · Product Information

ACTILINK-JD08

ACTILINK-JD · AJD-08-20-400



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Continuous torque	7 Nm
Max. acceleration torque	17 Nm
Peak power	397 W
Rated speed	250 rpm
No-load speed	400 rpm
Torque density (peak)	33.3 Nm/kg
Emergency-stop operation	
Emergency-stop torque	30 Nm
Emergency-stop deceleration	6000 rad/s ²

Drivetrain & electronics	
Motor	14 pole-pairs (28 poles)
Torque constant	156.4 mNm/A _{rms}
Phase resistance	270 mΩ
Phase inductance	167 μH @ 1 kHz
Integrated drive	SOMANET™ Circulo 7 (CR7-48-24)
Supply voltage	24–48 V, 60 V peak

STANDARD CONFIGURATIONS

AJD-08... ECS1SS	Motor encoder, STO-SBC
AJD-08... ECD2SS	+ output encoder, STO-SBC
AJD-08... ECD2SM	+ output encoder, Safe Motion

† ECS1SS build (Ø 78.5 mm); ECD2 builds Ø 80 mm — 620 g / 73 mm (D2SS), 640 g / 73 mm (D2SM). ‡ Permissible load uses constant K — K = 1 at rated speed and 10 000 h lifetime; $K = (10000 \cdot \text{rated-speed} / t / v)^{1/3}$ for speed v rpm and lifetime t hours.

Mechanical	
Weight †	510 g
Outer diameter †	78.5 mm
Length †	65.5 mm
Rotary inertia (after reduction)	0.0042 kg·m ²
Gear type	Single-stage planetary
Reduction ratio	7.75 : 1
Backlash	< 22 arcmin

Permissible load ‡	
Tilting moment (S1 / D2)	K · 3.4 / 3.2 Nm
Radial load (S1 / D2)	K · 167.4 / 161.8 N
Axial load	K · 107.2 N
K for static load	2.21

Feedback & safety	
Motor encoder	19 bit absolute, MT (battery)
Output encoder (option)	20 bit absolute on gear output
Communication	EtherCAT (DS402)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

ENVIRONMENTAL

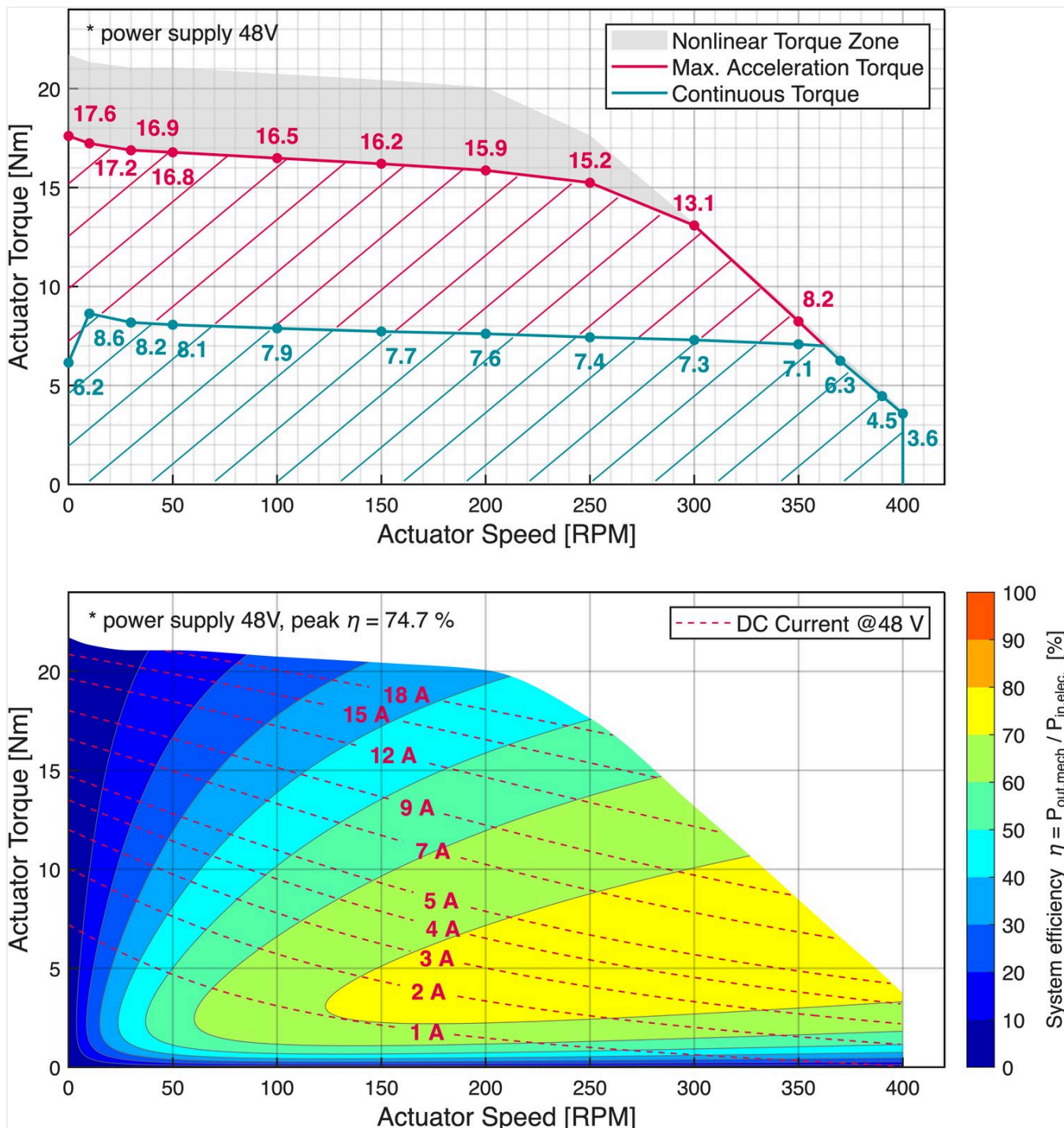
Operating temperature 0–50 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JD08

TORQUE-SPEED CAPABILITY & POWER EFFICIENCY



Three curves are shown: continuous torque (limit without overheating at 25 °C ambient), max. acceleration torque (max torque with permissible current-torque linearity), and the nonlinear torque zone (usable with robust controllers). The lower chart maps system efficiency and DC current at 48 V. The nonlinear zone requires additional drive configuration and should be used only when current-torque nonlinearity and heating are carefully accounted for in the control policy.

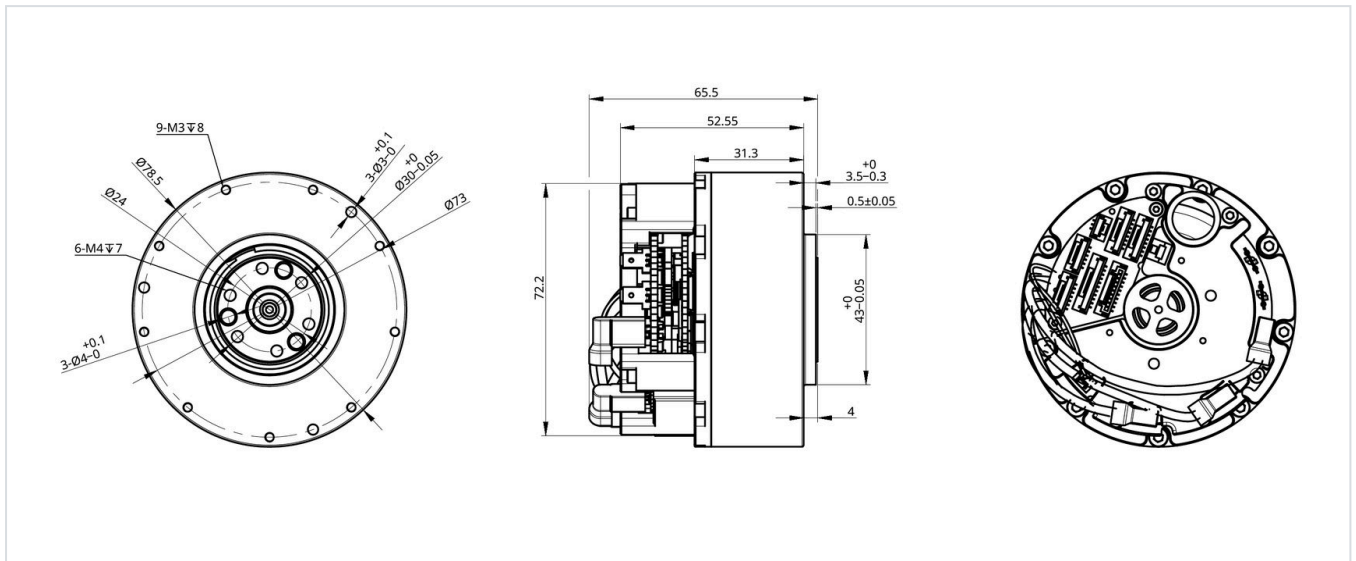


ACTILINK-JD08

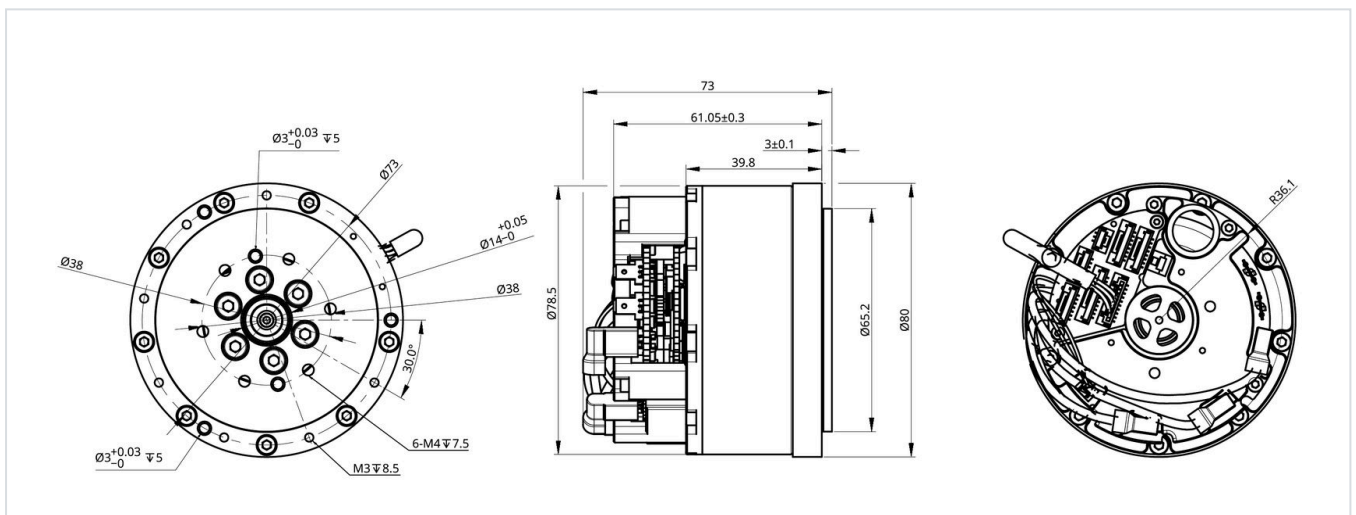
DIMENSIONS — 2D DRAWINGS



ECS1 — single integrated encoder



ECD2 — dual encoder (motor + output)



All dimensions in mm.

[LINK TO THE ONLINE PUBLICATION OF 2D/3D DRAWINGS ↗](#)

ACTILINK-JD09 SAMPLE

ACTILINK-JD · AJD-09-30-500



ESSENTIAL SPECIFICATIONS

Performance @ 48 V		Mechanical	
Continuous torque	11 Nm	Weight †	680 g
Max. acceleration torque	30 Nm	Outer diameter	88 mm
Peak power	696 W	Length †	70.29 mm
Rated speed	250 rpm	Rotary inertia (after reduction)	0.0086 kg·m²
No-load speed	470 rpm	Gear type	Single-stage planetary
Torque density (peak)	44.1 Nm/kg	Reduction ratio	9 : 1
Emergency-stop operation		Backlash	< 15 arcmin
Emergency-stop torque	TBD	Permissible load *	
Emergency-stop deceleration	TBD	Tilting moment	K · 12.5 Nm
Drivetrain & electronics		Radial load (S1 / D2)	K · 595.9 / 417.2 N
Motor	14 pole-pairs (28 poles)	Axial load	K · 446.9 N
Torque constant	122.2 mNm/A _{rms}	K for static load	1.78
Phase resistance	110 mΩ	Feedback & safety	
Phase inductance	72 μH @ 1 kHz	Motor encoder	19 bit absolute, MT (battery)
Integrated drive	SOMANET™ Circulo 7 (CR7-48-24)	Output encoder (option)	20 bit absolute on gear output
Supply voltage	24–48 V, 60 V peak	Communication	EtherCAT (DS402)
STANDARD CONFIGURATIONS		Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

AJD-09... Motor encoder, STO-SBC
ECS1SS

AJD-09... + output encoder, STO-SBC
ECD2SS

AJD-09... + output encoder, Safe Motion
ECD2SM

ENVIRONMENTAL

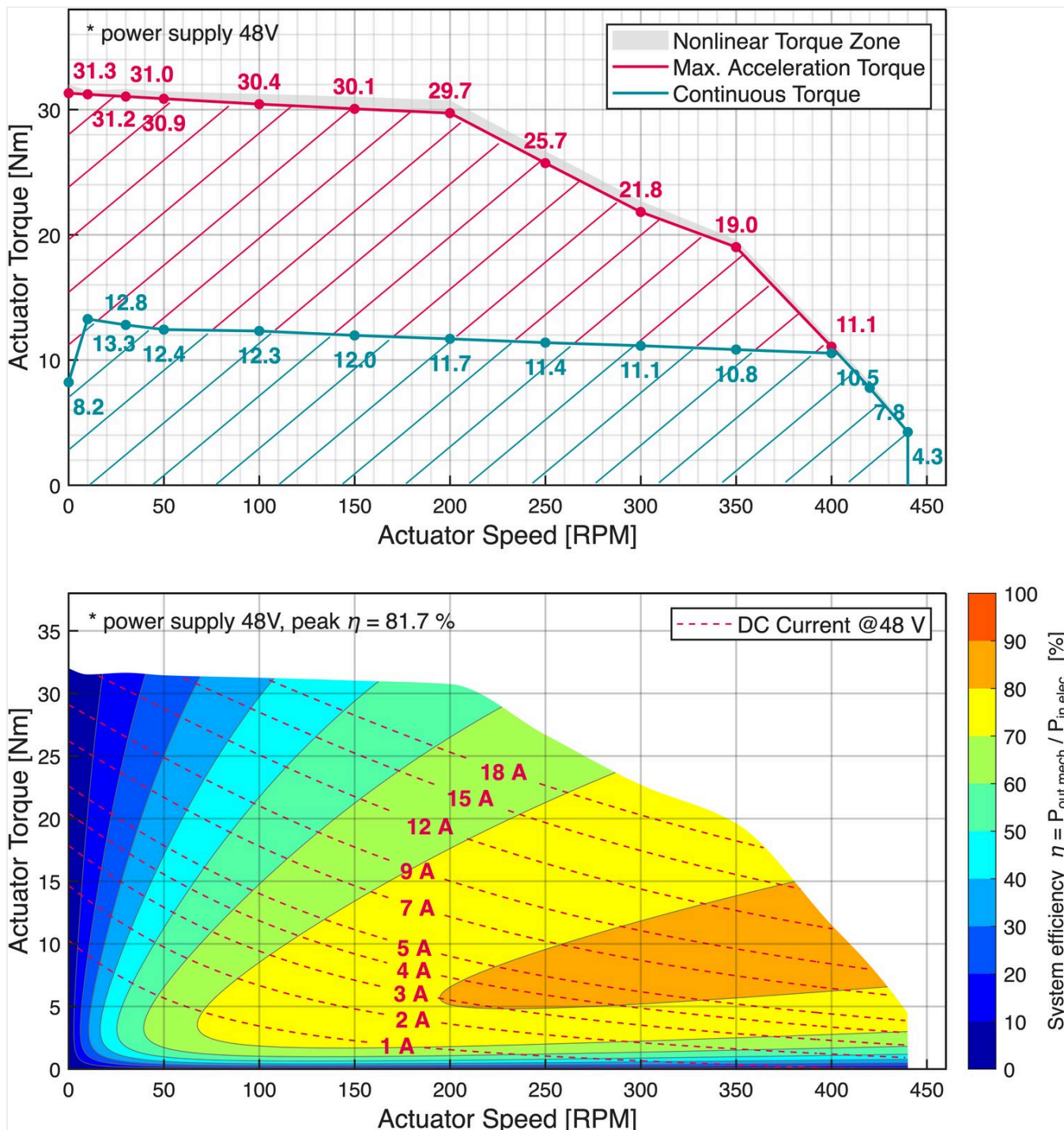
Operating temperature 0–50 °C (ambient air).
Storage temperature –30–70 °C. ACTILINK-JD09 is a sample-stage product; selected values are TBD.

† ECS1SS build; ECD2SS 800 g / 79.29 mm, ECD2SM 820 g / 79.29 mm. * Permissible load uses constant K — K = 1 at rated speed and 10 000 h lifetime; $K = (10000 \cdot \text{rated-speed} / t / v)^{1/3}$ for speed v rpm and lifetime t hours.



TORQUE-SPEED CAPABILITY & POWER EFFICIENCY

Three curves are shown: continuous torque (limit without overheating at 25 °C ambient), max. acceleration torque (max torque with permissible current-torque linearity), and the nonlinear torque zone (usable with robust controllers). The lower chart maps system efficiency and DC current at 48 V. The nonlinear zone requires additional drive configuration and should be used only when current-torque nonlinearity and heating are carefully accounted for in the control policy.

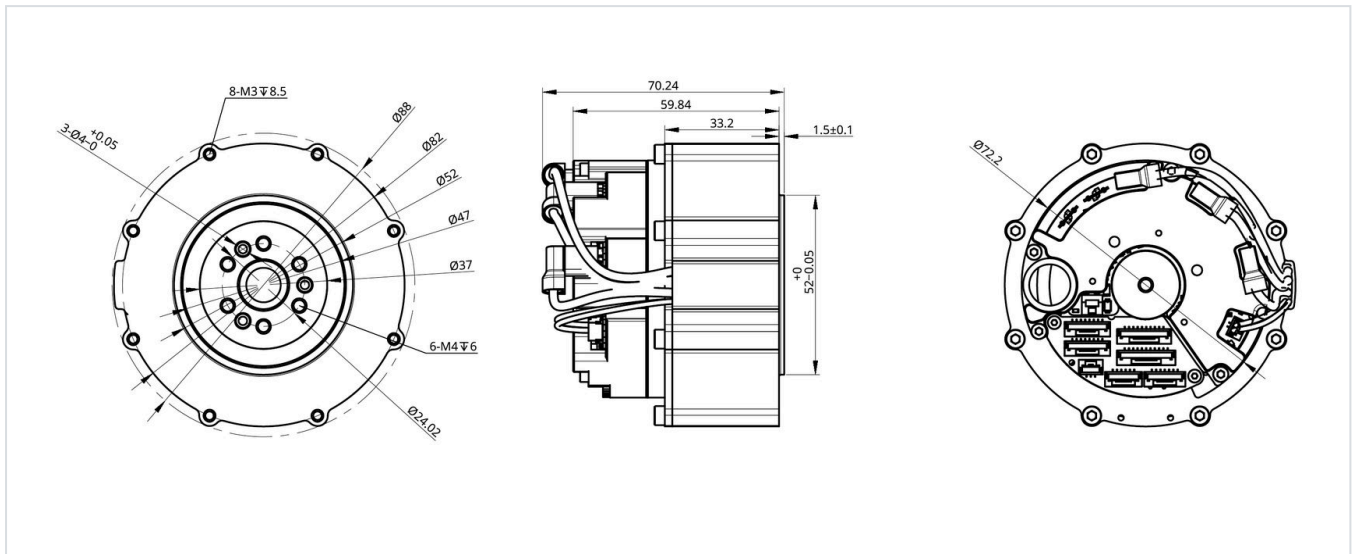


ACTILINK-JD09 SAMPLE

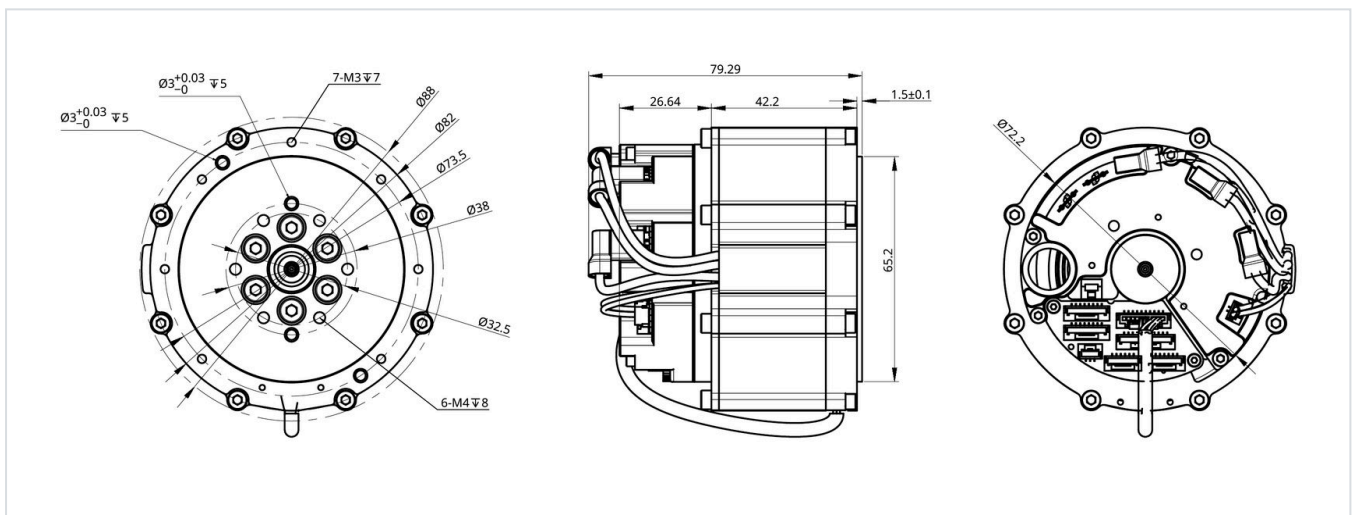
DIMENSIONS — 2D DRAWINGS



ECS1 — single integrated encoder



ECD2 — dual encoder (motor + output)



All dimensions in mm.

[LINK TO THE ONLINE PUBLICATION OF 2D/3D DRAWINGS ↗](#)

ACTILINK-JD10

ACTILINK-JD · AJD-10-60-200



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Continuous torque	21 Nm
Max. acceleration torque	68 Nm
Peak power	624 W
Rated speed	100 rpm
No-load speed	210 rpm
Torque density (peak)	64.8 Nm/kg
Emergency-stop operation	
Emergency-stop torque	105 Nm
Emergency-stop deceleration	4200 rad/s ²
Drivetrain & electronics	
Motor	20 pole-pairs (40 poles)
Torque constant	241.7 mNm/A _{rms}
Phase resistance	195 mΩ
Phase inductance	110 μH @ 1 kHz
Integrated drive	SOMANET™ Circulo 9 (CR9-48-60)
Supply voltage	24–48 V, 60 V peak

STANDARD CONFIGURATIONS

AJD-10... ECS1SS	Motor encoder, STO-SBC
AJD-10... ECD2SS	+ output encoder, STO-SBC
AJD-10... ECD2SM	+ output encoder, Safe Motion

† ECS1SS build; ECD2SS 1230 g / 86.3 mm, ECD2SM 1255 g / 86.3 mm. ‡ Permissible load uses constant K — K = 1 at rated speed and 10 000 h lifetime; $K = (10000 \cdot \text{rated-speed} / t / v)^{1/3}$ for speed v rpm and lifetime t hours.

Mechanical	
Weight †	1050 g
Outer diameter	106 mm
Length †	72.8 mm
Rotary inertia (after reduction)	0.02 kg·m ²
Gear type	Single-stage planetary
Reduction ratio	9 : 1
Backlash	< 13 arcmin
Permissible load ‡	
Tilting moment	K · 24.5 Nm
Radial load (S1 / D2)	K · 1021.7 / 653.9 N
Axial load	K · 766.3 N
K for static load	1.92
Feedback & safety	
Motor encoder	20 bit absolute, MT (battery)
Output encoder (option)	20 bit absolute on gear output
Communication	EtherCAT (DS402)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

ENVIRONMENTAL

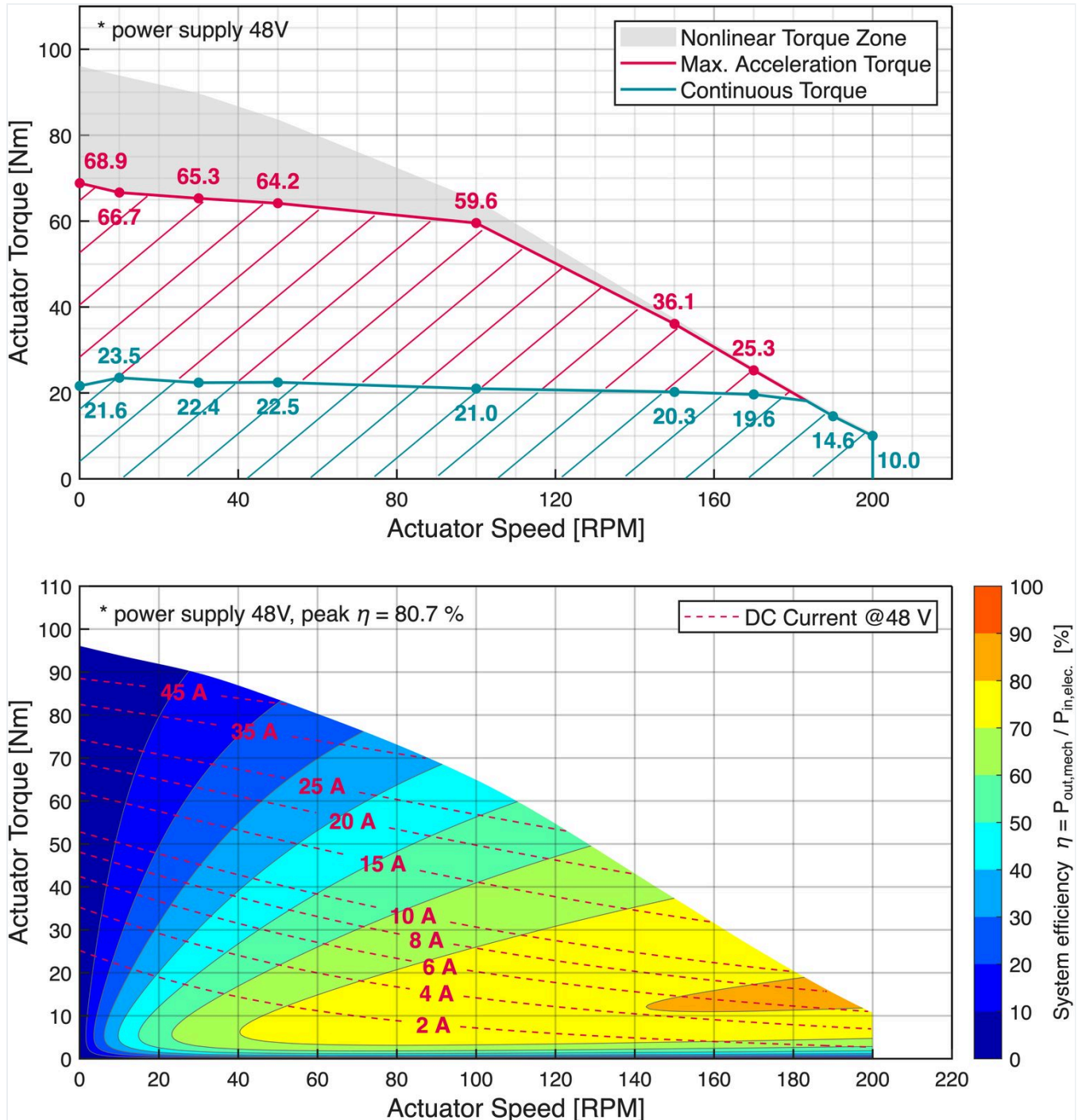
Operating temperature 0–50 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JD10

TORQUE-SPEED CAPABILITY & POWER EFFICIENCY



Three curves are shown: continuous torque (limit without overheating at 25 °C ambient), max. acceleration torque (max torque with permissible current-torque linearity), and the nonlinear torque zone (usable with robust controllers). The lower chart maps system efficiency and DC current at 48 V. The nonlinear zone requires additional drive configuration and should be used only when current-torque nonlinearity and heating are carefully accounted for in the control policy.



[illegible][LINK TO THE ONLINE PUBLICATION OF 2D/3D DRAWINGS ↗](#)

ACTILINK-JD12

ACTILINK-JD · AJD-12-120-200



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Continuous torque	29 Nm
Max. acceleration torque	102 Nm
Peak power	1036 W
Rated speed	100 rpm
No-load speed	200 rpm
Torque density (peak)	64.6 Nm/kg
Emergency-stop operation	
Emergency-stop torque	210 Nm
Emergency-stop deceleration	4200 rad/s ²
Drivetrain & electronics	
Motor	21 pole-pairs (42 poles)
Torque constant	233.9 mNm/A _{rms}
Phase resistance	85 mΩ
Phase inductance	90 μH @ 1 kHz
Integrated drive	SOMANET™ Circulo 9 (CR9-48-60)
Supply voltage	24–48 V, 60 V peak

STANDARD CONFIGURATIONS

AJD-12...	Motor encoder, STO-SBC
ECS1SS	
AJD-12...	+ output encoder, STO-SBC
ECD2SS	
AJD-12...	+ output encoder, Safe Motion
ECD2SM	

† ECS1SS build; ECD2SS 1845 g / 85.5 mm, ECD2SM 1870 g / 85.5 mm. ‡ Permissible load uses constant K — K = 1 at rated speed and 10 000 h lifetime; $K = (10000 \cdot \text{rated-speed} / t / v)^{1/3}$ for speed v rpm and lifetime t hours.

Mechanical	
Weight †	1580 g
Outer diameter	120 mm
Length †	72.8 mm
Rotary inertia (after reduction)	0.04 kg·m ²
Gear type	Single-stage planetary
Reduction ratio	9 : 1
Backlash	< 11 arcmin
Permissible load ‡	
Tilting moment	K · 30.6 Nm
Radial load (S1 / D2)	K · 1331.0 / 850.4 N
Axial load	K · 900.4 N
K for static load	1.72
Feedback & safety	
Motor encoder	20 bit absolute, MT (battery)
Output encoder (option)	20 bit absolute on gear output
Communication	EtherCAT (DS402)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

ENVIRONMENTAL

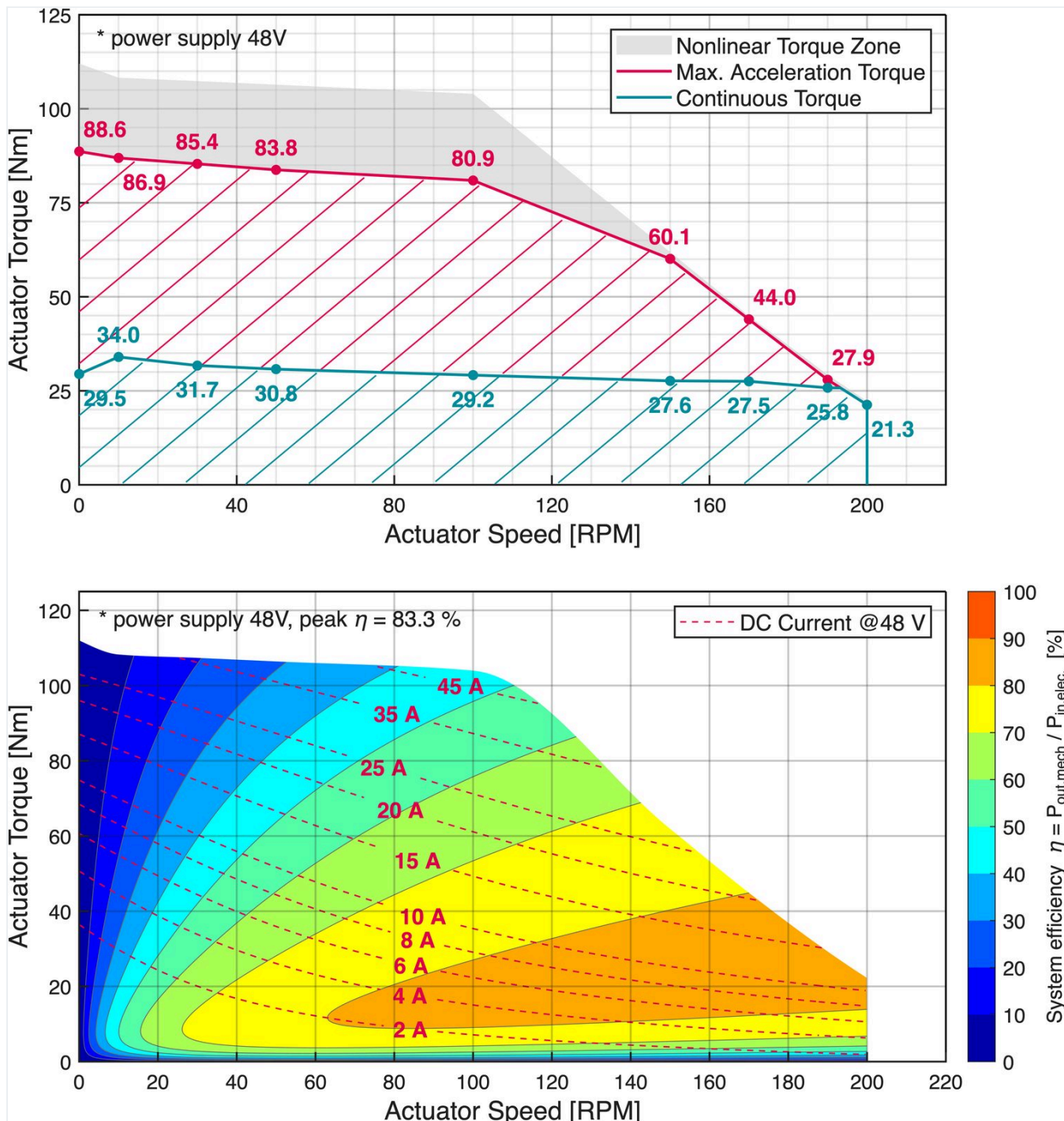
Operating temperature 0–50 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JD12

TORQUE-SPEED CAPABILITY & POWER EFFICIENCY



Three curves are shown: continuous torque (limit without overheating at 25 °C ambient), max. acceleration torque (max torque with permissible current-torque linearity), and the nonlinear torque zone (usable with robust controllers). The lower chart maps system efficiency and DC current at 48 V. The nonlinear zone requires additional drive configuration and should be used only when current-torque nonlinearity and heating are carefully accounted for in the control policy.

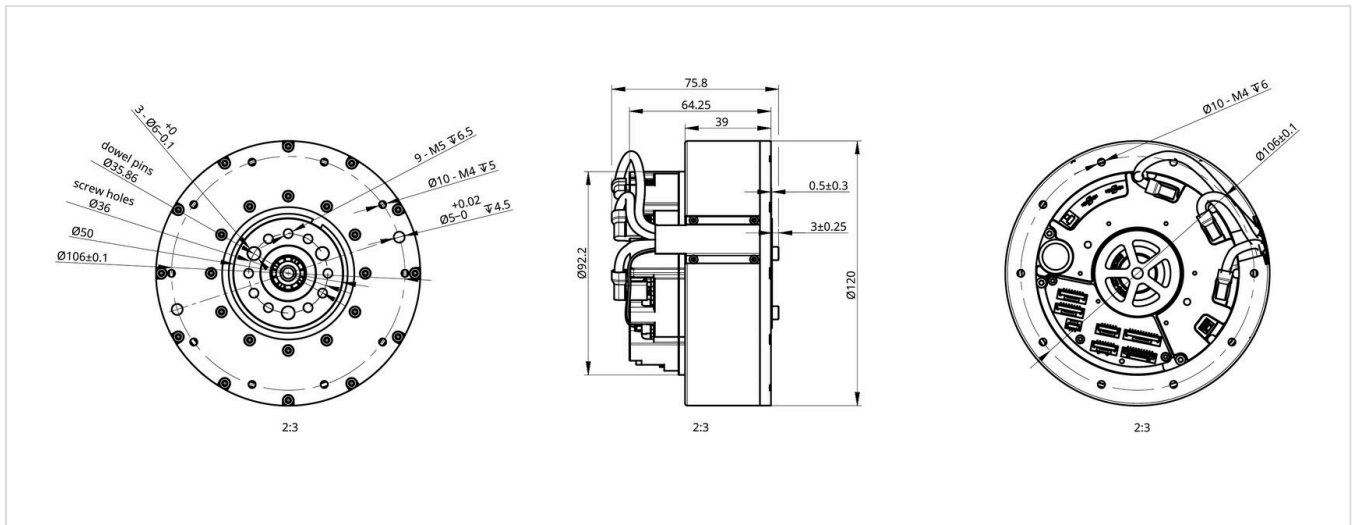


ACTILINK-JD12

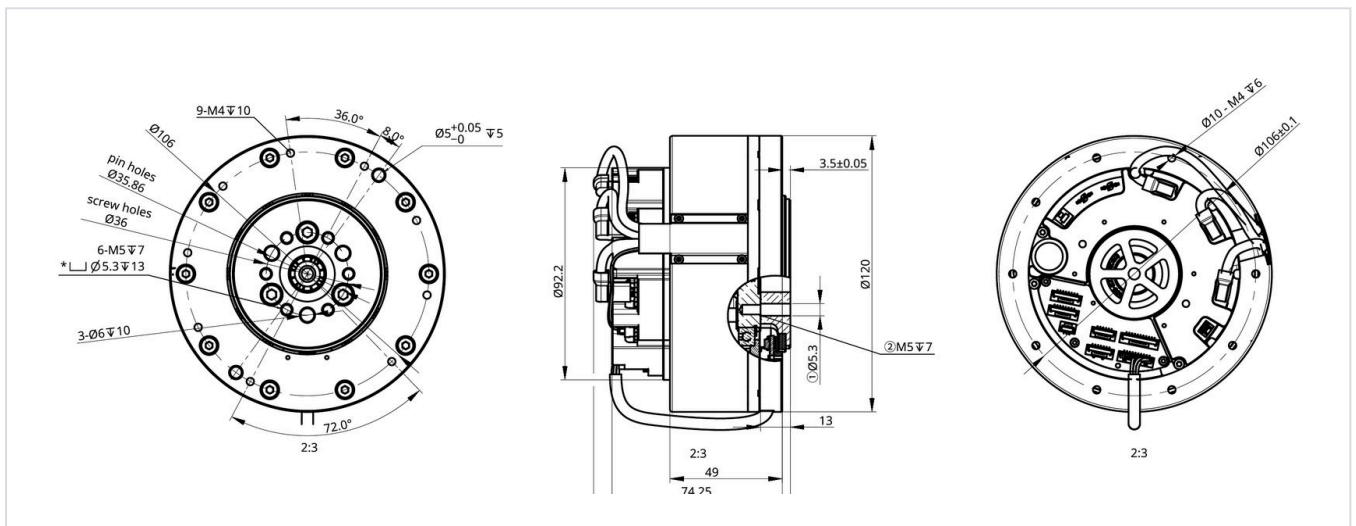
DIMENSIONS — 2D DRAWINGS



ECS1 — single integrated encoder



ECD2 — dual encoder (motor + output)



All dimensions in mm.

[LINK TO THE ONLINE PUBLICATION OF 2D/3D DRAWINGS ↗](#)

DESIGNED FOR DYNAMIC ROBOTICS



ACTILINK-JD actuators are ideal for dynamic applications — humanoid robots, robot dogs, and exoskeletons — where high torque density, low backlash, and backdriveability are decisive.



HUMANOID ROBOTS



QUADRUPED ROBOTS

4

frame sizes

08 / 09 / 10 / 12

17–102 Nm

peak torque

RANGE

Universal

SOMANET™ platform

PLUG & USE · HIGH
PERFORMANCE FOR THE LAST
STRENGTH BLOCK

FULL-STACK ROBOTICS SERVICE

Beyond the mechanics, Synapticon delivers drives, control and sensing through to whole-system control and safety — concepts, designs, feasibility and integration across the complete robot system.

CUSTOM OPTIONS

- Brake — friction brake or Synapticon Microcoil
- Integration-oriented mechanical design / interface
- Motor & gear selection (ratio, torque/speed class)
- Additional sensors — torque sensing, IMU
- Bearing & load-bearing structural design
- Thermal, e-stop and service-life tuning

Upon request; NRE fees may apply.