

ACTILINK-JP **PRECISION ACTUATOR**

STRAIN-WAVE GEAR ACTUATOR

WITH HIGH RELIABILITY AND PRECISION, FULL ETHERCAT & FSOE SUPPORT



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- **High-precision joint actuators** for industrial and collaborative robots

 - **Five frame sizes** — 14 / 17 / 20 / 25 / 32

 - **Strain-wave gearing** — 10 arcsec backlash, high torsional stiffness

 - **Hollow shaft** — for easy cable and tool routing

 - **High moment, radial & axial load capacity** at the output

 - **SOMANET™ software** — easy-to-use, EtherCAT, high-performance motion control

 - **Functional safety** — STO + SBC standard, Safe Motion via FSoE option (SIL 3, PL e, Cat. 3)



OVERVIEW

The ACTILINK-JP series pairs a strain-wave gear with a high-torque motor and integrated servo electronics in a compact package. A hollow shaft routes cables and tooling through the center, while 10 arcsec backlash, high torsional stiffness, and high output-load capacity deliver the precision and torque sensitivity required by industrial and collaborative robots and medical devices.

	ACTILINK-JP14	ACTILINK-JP17	ACTILINK-JP20	ACTILINK-JP25	ACTILINK-JP32
Product variant	AJP-I-14-101	AJP-I-17-101	AJP-I-20-101	AJP-I-25-101	AJP-I-32-101
Supply voltage	24–48 V, 48 V nominal, 60 V peak				
Torque density (peak)	27.9 Nm/kg	36.9 Nm/kg	44.5 Nm/kg	50.1 Nm/kg	63.2 Nm/kg
Max. acceleration torque	34 Nm	66 Nm	102 Nm	194 Nm	411 Nm
Rated torque *	9.6 Nm	22 Nm	34 Nm	64 Nm	137 Nm
Baseline motor speed	2000 rpm	2000 rpm	2000 rpm	2000 rpm	1000 rpm
No-load speed (output)	70 rpm	46 rpm	45 rpm	38 rpm	27 rpm
Permissible moment load	67 Nm	112 Nm	169 Nm	233 Nm	522 Nm
Outer diameter	72 mm	80 mm	90 mm	110 mm	142 mm
Hollow shaft diameter	11 mm	11 mm	11 mm	18 mm	18 mm
Length †	117.7 mm	128.2 mm	141 mm	154.1 mm	162.8 mm
Weight †	1220 g	1790 g	2290 g	3870 g	6500 g
Gear type	Strain-wave, 10 arcsec backlash				
Reduction ratio	101 : 1 standard · 51 / 81 / 121 / 161 subject to gear size				
Integrated drive	Circulo 7	Circulo 7	Circulo 7	Circulo 9	Circulo 9
Feedback	19/20 bit single-turn motor + multi-turn output encoder (D1)				
Communication	EtherCAT (DS402)				
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)				

* Rated torque at baseline motor speed. † Length and weight are for the ECD1SS build; the ECD1SM (Safe Motion) build adds ~18 g (JP14–20) / ~24 g (JP25/32).

MANUFACTURER PART NUMBER (MPN)

AJP	I	14	101	EC	D1	SM	S	N	00	XXXX
SERIES	TYPE	GEAR SIZE	REDUCTION RATIO	FIELDBUS	FEEDBACK	SAFETY	BRAKE	TORQUE SENSOR	VERSION	CUSTOM
AJP Actilink Joint Precision	I I-Type	14 Ø 72 mm	051 1:51	EC EtherCAT	D1 Internal encoder, motor + output	SS STO + SBC	S Spring-applied friction	N No torque sensor	00 Default version	blank Standard
		17 Ø 80 mm	081 1:81			SM Safe Motion (SIL 3, PL e, Cat. 3)	M Microcoil (solenoid pin)	tbd Torque sensor		
		20 Ø 90 mm	101 1:101 (standard)				N No brake			
		25 Ø 110 mm	121 1:121							
		32 Ø 142 mm	161 1:161							

Standard option Possible custom option

Example: **AJP-I-14-101-ECD1SM-S-N-00-XXXX**. Reduction-ratio availability (051 / 081 / 101 / 121 / 161) depends on gear size; 101:1 is standard. Contact Synapticon for custom configurations, lead times, and MoQs.

ACTILINK-JP14

ACTILINK-JP · AJP-I-14-101



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Rated torque @ baseline speed	9.6 Nm
Max. acceleration torque	34 Nm
Baseline motor speed	2000 rpm
No-load speed (output)	70 rpm
Torque density (peak)	27.9 Nm/kg

Gear	
Gear type	Strain-wave
Reduction ratio	101 : 1
Backlash	10 arcsec
Hysteresis loss	1 arcmin
Torsional stiffness †	3.1 / 5.5 / 6.8
Buckling torque	180 Nm
Ratchet torque	100 Nm

Motor	
Torque constant	39.2 mNm/A _{rms}
Phase resistance	185 mΩ
Phase inductance	80 μH @ 1 kHz

Brake	
Equipped brake	Spring-applied friction
Brake torque (at motor)	0.5 Nm
Brake release / engage	20 / 80 ms

Mechanical	
Weight †	1220 g
Outer diameter	72 mm
Hollow shaft diameter	11 mm
Length †	117.7 mm
Rotary inertia (after gear)	0.30 kg·m ²

Output cross-roller bearing	
Permissible moment load	67 Nm
Basic rated dynamic load	5220 N
Basic rated static load	7740 N
Roller pitch circle diameter	50 mm
Bearing center to output	21.1 mm
Rated lifetime	1,000,000 rev

Electrical	
Integrated drive	SOMANET™ Circulo 7 (CR7-48-24)
Supply voltage	24–48 V, 60 V peak
Communication	EtherCAT (DS402)
Motor encoder	19 bit single-turn
Output encoder	19 bit multi-turn (battery)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

STANDARD CONFIGURATIONS

AJP-I-14...ECD1SS Motor + output encoder, STO-SBC

AJP-I-14...ECD1SM + Safe Motion via FSoE

† ECD1SS build; ECD1SM (Safe Motion) build 1238 g. ‡ Torsional stiffness K1 / K2 / K3 in 10⁴ Nm/rad (load bands 0–2.0 / 2.0–6.9 / >6.9 Nm).

ENVIRONMENTAL

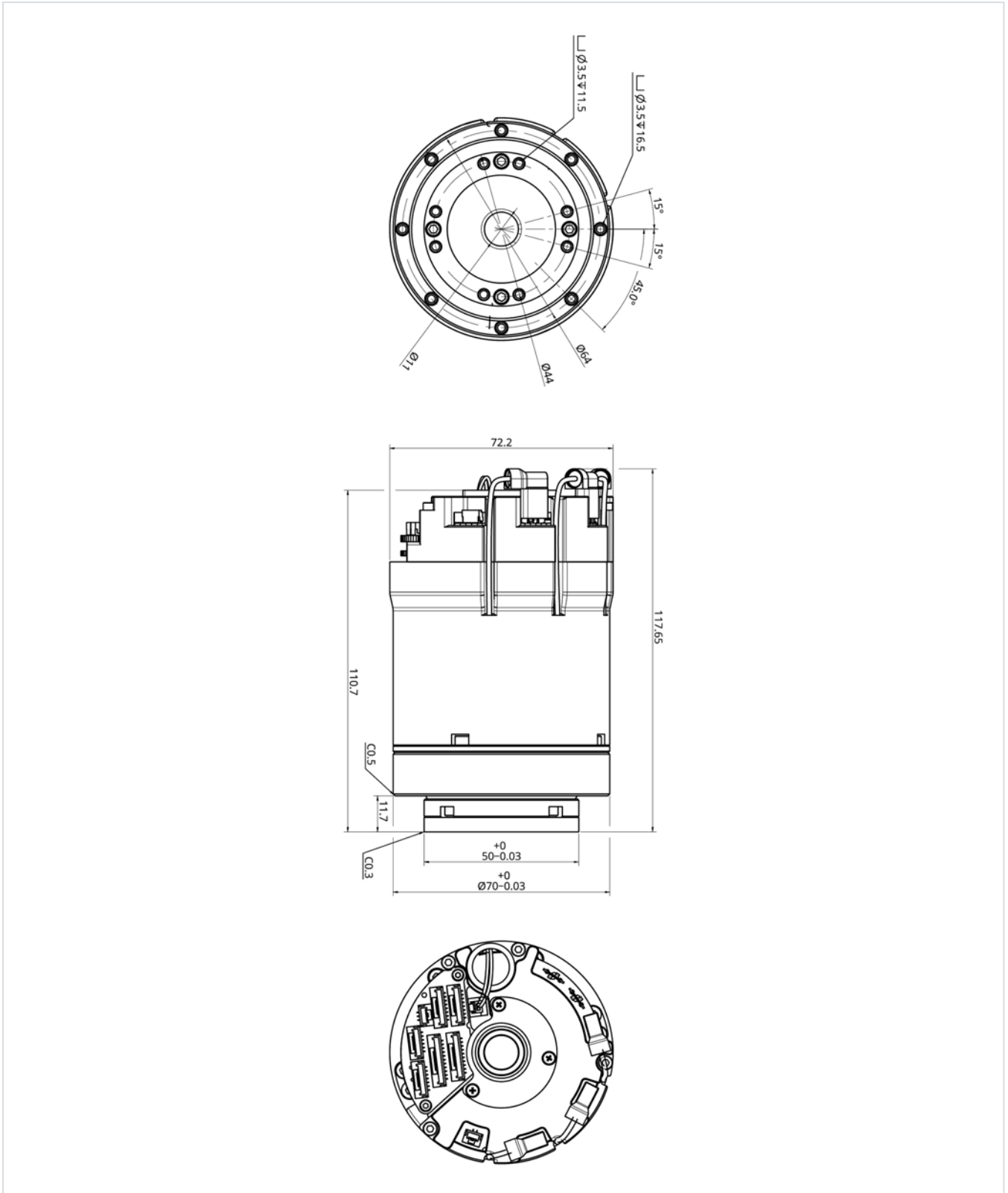
Operating temperature 0–40 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JP14

DIMENSIONS — 2D DRAWING



ECD1 — internal encoder on motor + output



All dimensions in mm.

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

ACTILINK-JP17

ACTILINK-JP · AJP-I-17-101



ESSENTIAL SPECIFICATIONS

Performance @ 48 V

Rated torque @ baseline speed	22 Nm
Max. acceleration torque	66 Nm
Baseline motor speed	2000 rpm
No-load speed (output)	46 rpm
Torque density (peak)	36.9 Nm/kg

Gear

Gear type	Strain-wave
Reduction ratio	101 : 1
Backlash	10 arcsec
Hysteresis loss	1 arcmin
Torsional stiffness †	6.4 / 10.0 / 13.0
Buckling torque	350 Nm
Ratchet torque	200 Nm

Motor

Torque constant	103.8 mNm/A _{rms}
Phase resistance	130 mΩ
Phase inductance	80 μH @ 1 kHz

Brake

Equipped brake	Spring-applied friction
Brake torque (at motor)	1.3 Nm
Brake release / engage	20 / 80 ms

Mechanical

Weight †	1790 g
Outer diameter	80 mm
Hollow shaft diameter	11 mm
Length †	128.2 mm
Rotary inertia (after gear)	0.82 kg·m ²

Output cross-roller bearing

Permissible moment load	112 Nm
Basic rated dynamic load	9360 N
Basic rated static load	14670 N
Roller pitch circle diameter	60 mm
Bearing center to output	23.5 mm
Rated lifetime	1,000,000 rev

Electrical

Integrated drive	SOMANET™ Circulo 7 (CR7-48-24)
Supply voltage	24–48 V, 60 V peak
Communication	EtherCAT (DS402)
Motor encoder	19 bit single-turn
Output encoder	19 bit multi-turn (battery)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

STANDARD CONFIGURATIONS

AJP-I-17...ECD1SS Motor + output encoder, STO-SBC

AJP-I-17...ECD1SM + Safe Motion via FSoE

† ECD1SS build; ECD1SM (Safe Motion) build 1808 g. ‡ Torsional stiffness K1 / K2 / K3 in 10⁴ Nm/rad (load bands 0–3.9 / 3.9–12.0 / >12.0 Nm).

ENVIRONMENTAL

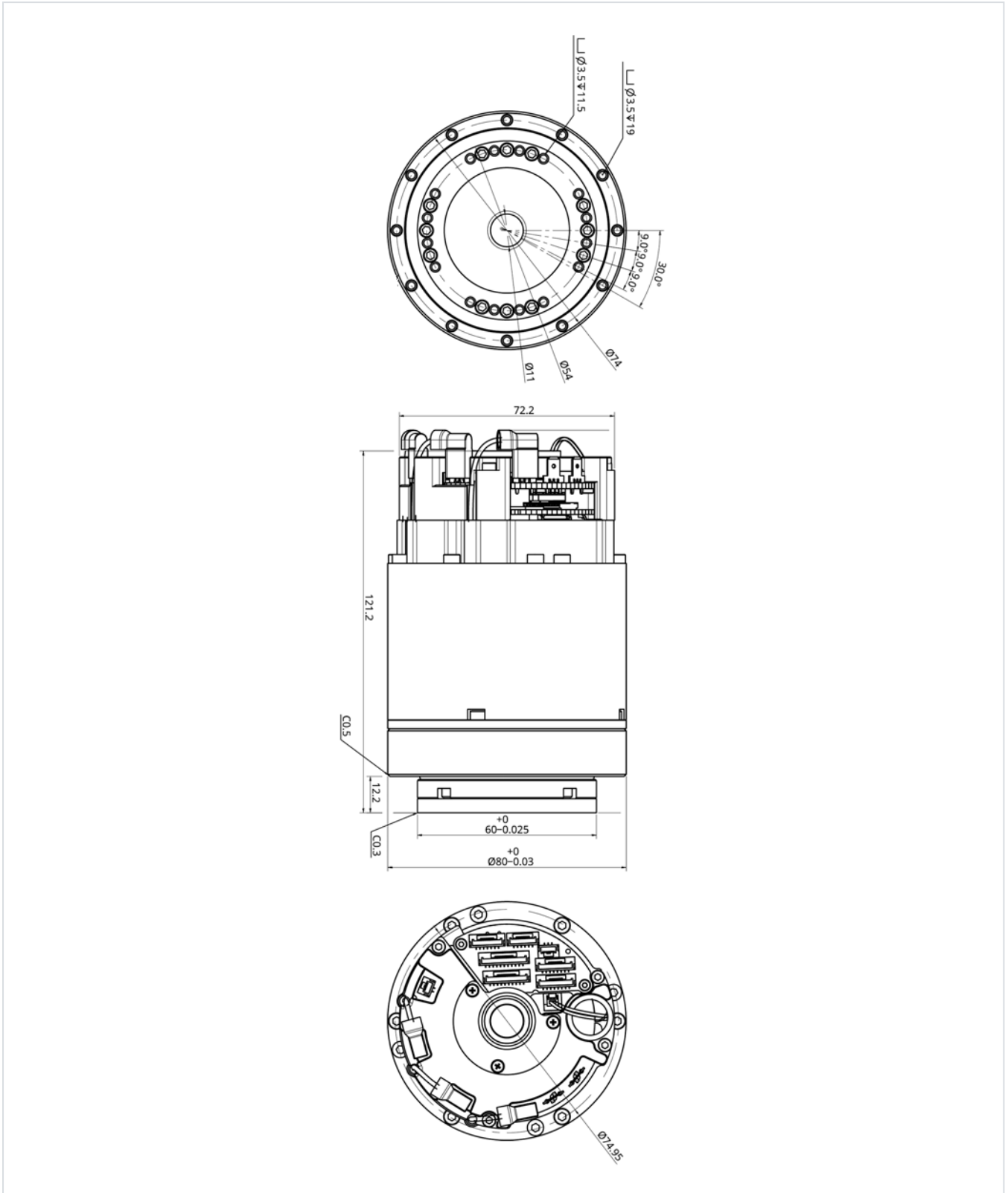
Operating temperature 0–40 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JP17

DIMENSIONS — 2D DRAWING



ECD1 — internal encoder on motor + output



All dimensions in mm.

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

ACTILINK-JP20

ACTILINK-JP · AJP-I-20-101



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Rated torque @ baseline speed	34 Nm
Max. acceleration torque	102 Nm
Baseline motor speed	2000 rpm
No-load speed (output)	45 rpm
Torque density (peak)	44.5 Nm/kg

Gear	
Gear type	Strain-wave
Reduction ratio	101 : 1
Backlash	10 arcsec
Hysteresis loss	1 arcmin
Torsional stiffness ‡	11.0 / 17.0 / 21.0
Buckling torque	590 Nm
Ratchet torque	330 Nm

Motor	
Torque constant	115.0 mNm/A _{rms}
Phase resistance	65 mΩ
Phase inductance	70 μH @ 1 kHz

Brake	
Equipped brake	Spring-applied friction
Brake torque (at motor)	1.3 Nm
Brake release / engage	20 / 80 ms

Mechanical	
Weight †	2290 g
Outer diameter	90 mm
Hollow shaft diameter	11 mm
Length †	141 mm
Rotary inertia (after gear)	1.26 kg·m ²

Output cross-roller bearing	
Permissible moment load	169 Nm
Basic rated dynamic load	13140 N
Basic rated static load	19800 N
Roller pitch circle diameter	70 mm
Bearing center to output	25.5 mm
Rated lifetime	1,000,000 rev

Electrical	
Integrated drive	SOMANET™ Circulo 7 (CR7-48-24)
Supply voltage	24–48 V, 60 V peak
Communication	EtherCAT (DS402)
Motor encoder	19 bit single-turn
Output encoder	19 bit multi-turn (battery)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

STANDARD CONFIGURATIONS

AJP-I-20...ECD1SS Motor + output encoder, STO-SBC

AJP-I-20... ECD1SM + Safe Motion via FSoE

† ECD1SS build; ECD1SM (Safe Motion) build 2308 g. ‡ Torsional stiffness K1 / K2 / K3 in 10⁴ Nm/rad (load bands 0–7.0 / 7.0–25.0 / >25.0 Nm).

ENVIRONMENTAL

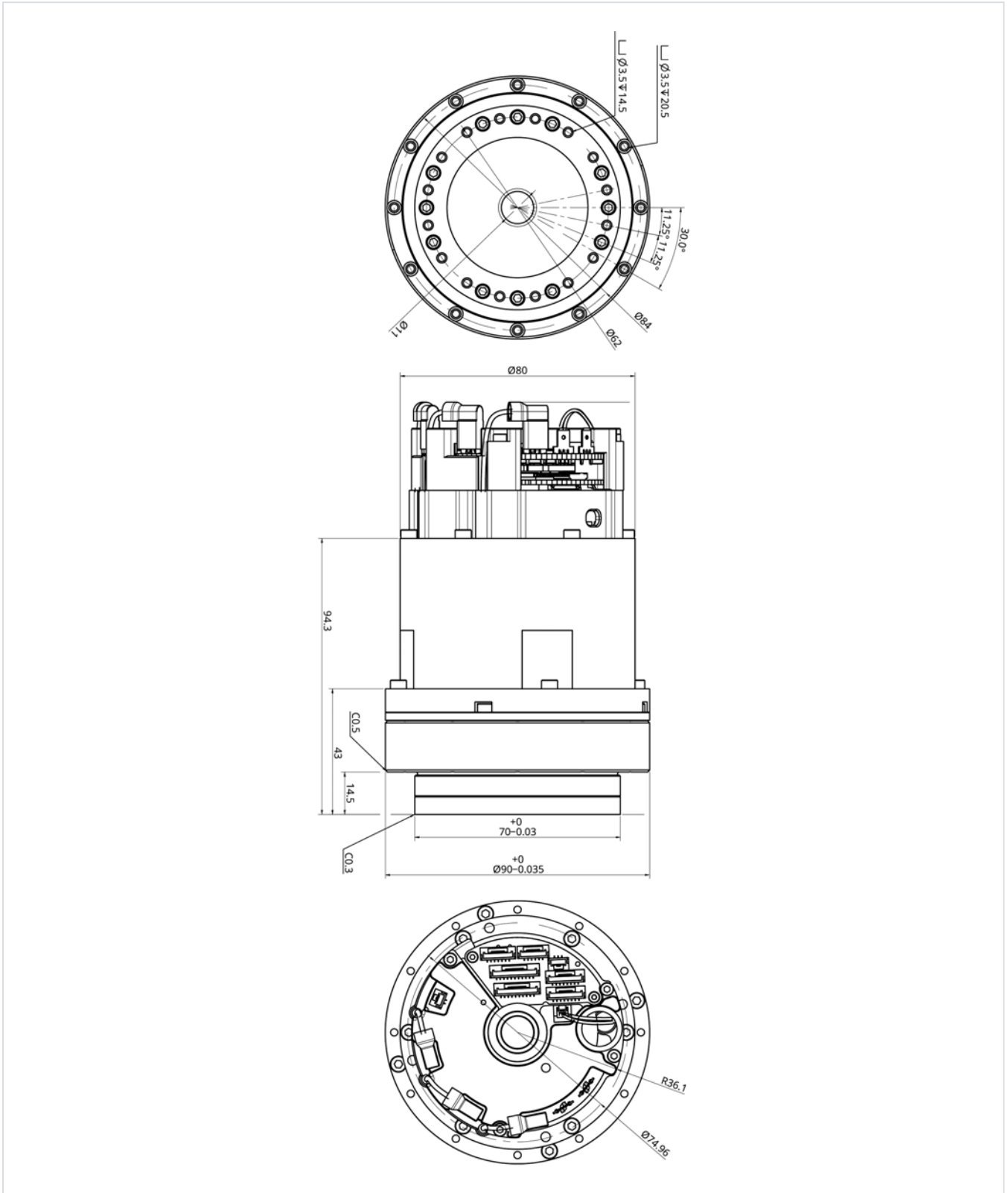
Operating temperature 0–40 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JP20

DIMENSIONS — 2D DRAWING



ECD1 — internal encoder on motor + output



All dimensions in mm.

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

ACTILINK-JP25

ACTILINK-JP · AJP-I-25-101



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Rated torque @ baseline speed	64 Nm
Max. acceleration torque	194 Nm
Baseline motor speed	2000 rpm
No-load speed (output)	38 rpm
Torque density (peak)	50.1 Nm/kg
Gear	
Gear type	Strain-wave
Reduction ratio	101 : 1
Backlash	10 arcsec
Hysteresis loss	1 arcmin
Torsional stiffness ‡	20.0 / 30.0 / 39.0
Buckling torque	1100 Nm
Ratchet torque	680 Nm
Motor	
Torque constant	131.2 mNm/A _{rms}
Phase resistance	34 mΩ
Phase inductance	61 μH @ 1 kHz
Brake	
Equipped brake	Spring-applied friction
Brake torque (at motor)	2.4 Nm
Brake release / engage	40 / 80 ms

STANDARD CONFIGURATIONS

AJP-I-25...ECD1SS Motor + output encoder, STO-SBC

**AJP-I-25...
ECD1SM** + Safe Motion via FSoE

† ECD1SS build; ECD1SM (Safe Motion) build 3894 g. ‡ Torsional stiffness K1 / K2 / K3 in 10⁴ Nm/rad (load bands 0–14.0 / 14.0–48.0 / >48.0 Nm).

Mechanical

Weight †	3870 g
Outer diameter	110 mm
Hollow shaft diameter	18 mm
Length †	154.1 mm
Rotary inertia (after gear)	4.26 kg·m ²
Output cross-roller bearing	
Permissible moment load	233 Nm
Basic rated dynamic load	19620 N
Basic rated static load	32220 N
Roller pitch circle diameter	85 mm
Bearing center to output	30.5 mm
Rated lifetime	1,000,000 rev

Electrical

Integrated drive	SOMANET™ Circulo 9 (CR9-48-60)
Supply voltage	24–48 V, 60 V peak
Communication	EtherCAT (DS402)
Motor encoder	20 bit single-turn
Output encoder	20 bit multi-turn (battery)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

ENVIRONMENTAL

Operating temperature 0–40 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JP32

ACTILINK-JP · AJP-I-32-101



ESSENTIAL SPECIFICATIONS

Performance @ 48 V	
Rated torque @ baseline speed	137 Nm
Max. acceleration torque	411 Nm
Baseline motor speed	1000 rpm
No-load speed (output)	27 rpm
Torque density (peak)	63.2 Nm/kg
Gear	
Gear type	Strain-wave
Reduction ratio	101 : 1
Backlash	10 arcsec
Hysteresis loss	1 arcmin
Torsional stiffness †	43.0 / 59.0 / 75.0
Buckling torque	2400 Nm
Ratchet torque	1300 Nm
Motor	
Torque constant	178.3 mNm/A _{rms}
Phase resistance	20 mΩ
Phase inductance	40 μH @ 1 kHz
Brake	
Equipped brake	Spring-applied friction
Brake torque (at motor)	4.0 Nm
Brake release / engage	20 / 70 ms

STANDARD CONFIGURATIONS

AJP-I-32...ECD1SS Motor + output encoder, STO-SBC

AJP-I-32...ECD1SM + Safe Motion via FSoE

† ECD1SS build; ECD1SM (Safe Motion) build 6524 g. ‡ Torsional stiffness K1 / K2 / K3 in 10⁴ Nm/rad (load bands 0–29.0 / 29.0–108.0 / >108.0 Nm).

Mechanical	
Weight †	6500 g
Outer diameter	142 mm
Hollow shaft diameter	18 mm
Length †	162.8 mm
Rotary inertia (after gear)	11.56 kg·m ²
Output cross-roller bearing	
Permissible moment load	522 Nm
Basic rated dynamic load	34380 N
Basic rated static load	58860 N
Roller pitch circle diameter	111 mm
Bearing center to output	37.5 mm
Rated lifetime	1,000,000 rev

Electrical	
Integrated drive	SOMANET™ Circulo 9 (CR9-48-60)
Supply voltage	24–48 V, 60 V peak
Communication	EtherCAT (DS402)
Motor encoder	20 bit single-turn
Output encoder	20 bit multi-turn (battery)
Safety functions	STO-SBC / Safe Motion via FSoE (SIL 3, PL e, Cat. 3)

ENVIRONMENTAL

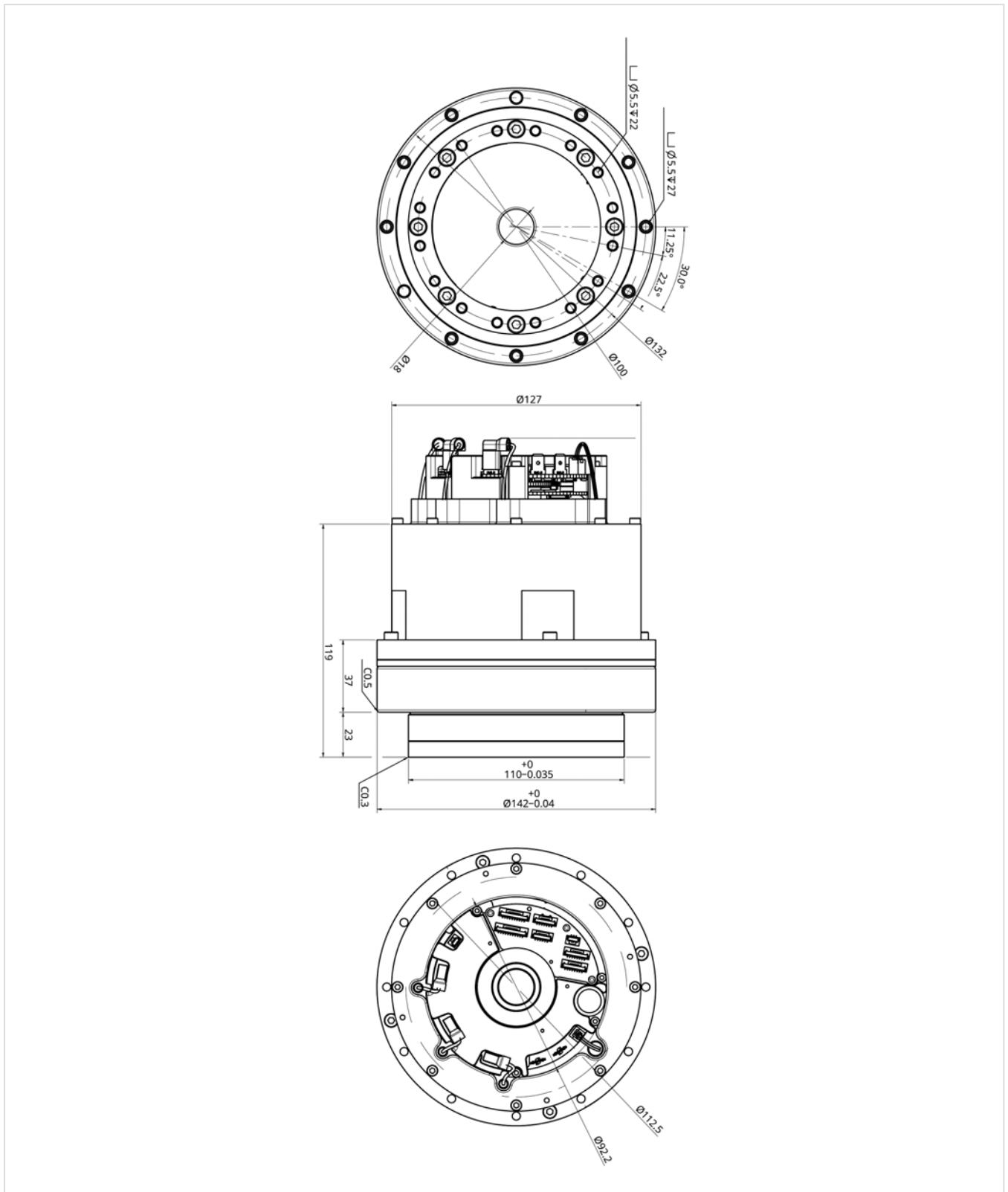
Operating temperature 0–40 °C (ambient air).
Storage temperature –30–70 °C.

ACTILINK-JP32

DIMENSIONS — 2D DRAWING



ECD1 — internal encoder on motor + output



All dimensions in mm.

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

DESIGNED FOR PRECISION ROBOTICS



ACTILINK-JP actuators target high-precision, torque-sensitive motion — industrial robot arms, collaborative robots, and medical devices — where strain-wave accuracy, high torsional stiffness, and a hollow shaft for cable routing are decisive.



COLLABORATIVE ROBOTS



MEDICAL & SURGICAL ROBOTICS



INDUSTRIAL ROBOTS

5 frame sizes 14 / 17 / 20 / 25 / 32	34–411 Nm peak torque RANGE	10 arcsec backlash STRAIN-WAVE PRECISION	Universal SOMANET™ platform PLUG & USE · HIGH PERFORMANCE FOR THE LAST STRENGTH BLOCK
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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

- Reduction ratio selection — 51 / 81 / 101 / 121 / 161
- Brake — Synapticon Microcoil option
- Torque-sensing option
- Integration-oriented mechanical design / interface
- Light-weight design
- Output multiturn battery & encoder configuration
- Thermal, brake and service-life tuning

Upon request; NRE fees may apply.