

Servo Motor Encoder Quick Reference

Common servo motor encoders, their interface and resolution, and the motors they are found on. Use it to identify an encoder from its label before ordering a test, repair or replacement. Figures are typical; always confirm against the encoder label.

Maker	Encoder	Interface	Counts per turn	Typical motors
Fanuc	Pulsecode alpha I8 / A8	Fanuc serial	8,192	alpha motors, 6-pole robot motors
Fanuc	alpha I64 / A64, alphai I64i / A64i	Fanuc serial	65,536	alpha, alphai servo
Fanuc	alpha 1000A, alphai 1000il / 1000iA	Fanuc serial	1,048,576	alpha, alphai high resolution
Fanuc	beta I32B / A32B, I64B / A64B, A128i	Fanuc serial	32,768 / 65,536 / 131,072	beta, betai
Fanuc	Pulsecode A / B / B2 / C	Fanuc serial	1,048,576 / 262,144 / 32,768 / 40,000	older serial motors
Mitsubishi	OBE12 / OBA13 / OSA14, OAH14B / OHE4096	Mitsubishi serial	4,096 / 8,192 / 16,384 / 4,096	HC series
Mitsubishi	OBA17, OSA17 / OBA18, OSA18	Mitsubishi serial	131,072 / 262,144	HC-MFS, HC-KFS, HC-SFS, HF-KP, HF-SP
Mitsubishi	OSA104, OSA105, OSA253 (and OSE)	Mitsubishi serial	20-bit (100,000 / 1,000,000 / 25,000 class)	HA, HC
Yaskawa	UTOPI	Incremental ABZ + UVW	various	SGM, SGMG, SGMS
Yaskawa	UTOPH-81AWF, UTOPH-81AUS (C-channel)	Incremental, multiplexed C	8,192 / 16,384 / 32,768	SGM, SGMG
Yaskawa	12-bit / 15-bit absolute	Absolute with battery	4,096 / 32,768	SGM, SGMG, SGMS, AB 8500
Tamagawa	TS5643N (SA35) / TS5645N (OAH59)	Serial + ABZ	2,048 / 8,192	Nachi / Meiden
Tamagawa	TS5647 / TS5648 (SA56)	Serial	65,536 / 1,048,576	Matsushita, Toshiba
Tamagawa	TS5667 (SA48), MFE0017	Serial	131,072	Panasonic MSMA, MSMD, Nachi, Rexroth MSM
Tamagawa	TS5669N220/N221, TS5778 (OAM74), TS5781N13	Serial	131,072 / 16,384 / 20,000	TBLi-II, Shinko, Kobelco, Toshiba
Panasonic	MFE2500	Serial, no multi-turn	10,000	MSM, Minas A
Sanyo Denki	INC-E (wire-saving)	Incremental, UVW at power-up	8,000 / 24,000	P series
Sanyo Denki	E07B111335 / E07B151103 / E10B171103	Absolute	2,048 / 32,768 / 131,072	Sanyo Denki, Absosyn
Sanyo Denki	R11G4113A / R11ABS	Serial absolute	16,384 / 8,192	R series
Sumtak	AEC / AEM / REC / REM 2048	Serial + ABZ	2,048	Nachi, Meiden
Kawasaki	H20/M21, HE-02	Serial	8,192	Kawasaki robots
Heidenhain	ECN 1313 / EQN 1325 (-512, -2048)	EnDat 2.1 (some SSI)	8,192 per turn; EQN 4,096 turns	Siemens, Bosch, B&R, Rexroth MSK, Baldor
Heidenhain	ECI 1317, EQI 1325 / 1327 / 1329	EnDat, inductive	131,072 / 8,192 / 32,768 / 131,072	B&R; 8LS/8MS, Siemens
Heidenhain	ERN 1387, ERN 1381	Incremental 1 Vpp + C/D tracks	2,048 lines (8,192 counts)	Siemens 1FT6, 1FK6, Lust/Stromag
Heidenhain	ROD 320 / 426 / 1424 / 1430, RON 350	Incremental	various	Siemens 1FT5, Indramat
Heidenhain (Indramat)	ECN 212 / EQN 224 / ECN 413 / EQN 425 (DSF/HSF)	Indramat digital	1,024 / 2,048	Indramat MDD, MHD
SICK Stegmann	SKS36 / SKM36	Hiperface	512 inc / 4,096 pos (/ 4,096 turns)	AB MPL/MPF, Rexroth MSK, Schneider BMH, Elau
SICK Stegmann	SRS50/60 / SRM50/60	Hiperface	4,096 inc / 32,768 pos (/ 4,096 turns)	AB MPL, MPF, 1326AB, H series, Baumuller
SICK Stegmann	SCS/SCM60/70, SNS50/60, SEL/SEK37/52	Hiperface	2,048 / 16,384; 4,096	Modicon, Fagor, Schneider
SICK Stegmann	AG100 MSS1, AG661	SSI	various	Indramat MAC, Stromag

Maker	Encoder	Interface	Counts per turn	Typical motors
Hengstler / Unico	RA58 (319-663), F14, S21	SSI / incremental	4,096 / various	MTS, Kollmorgen AKM
Renco	RHS21D, RCH20, N-2300 to N-5600	Incremental ABZ + UVW	various	AB MPL-H, Reliance, Electrocraft
Resolver	single and multi-speed	Excitation + sin/cos	analog	AB MPL/1326AB, Bosch SR, Indramat MKD, Kollmorgen, Parker

Reading the label

- Heidenhain: EC = single-turn, EQ = multi-turn; third letter N = optical, I = inductive.
- SICK Stegmann: SKS/SRS = single-turn, SKM/SRM = multi-turn; the number is the housing size.
- Fanuc: I = incremental, A = absolute (for example alpha A64).
- Incremental: line count x 4 = counts per turn (2,048 lines = 8,192 counts).
- Hiperface encoders need about 7 to 12 V; most others 5 V. Never power a 5 V encoder from a higher supply.

Need it tested, aligned or repaired? Send a photo of the motor nameplate and the encoder label on WhatsApp +91 97866 22233. Emergency same day where the fault and parts allow; urgent 3 working days; standard 7 working days. Printed test report with every motor.