

Description

Harmonic Drive gears mounted on Phytron stepping motors have the following advantages:

- High reduction ratio in a small volume
- Very low weight
- Very low mass inertia
- High permissible torque, in comparison to size
- High drive speed
- Very low backlash in comparison to conventional gears
- High efficiency

Standard version

Stepping motor ZSS 25 to 52 with 200 steps/rev. and standard winding (see motor data sheet)

Gear HD 05 with reduction ratio of 80:1
 Gear HD 08 to 14 with reduction ratio 50:1 or 100:1

Options

- Incremental encoder for size 25 or larger
- Motor brake for size 52 or larger
- Encoder and brake for size 52 or larger
- Stepping motor with integrated heat sink
- Gear HD 14 with reduction ratio 88:1, 110:1 or 206:1

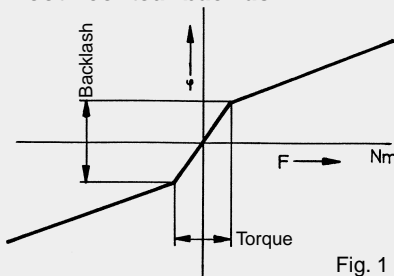
Gear	Stepping motor type	Gear reduction ratios	Max. off-drive Torque	Gear Inertia ¹⁾	Permissible loads		Tooth-contour backlash ²⁾	Resilient constant ³⁾
					Radial	Axial		K
			Nm (oz-in)	kg-cm ² (oz-in ²)	N (lb)	N (lb)	min	Nm/min (oz-in/min)
HD 05	ZSS 25 ZSS 26	80:1	0.3 (42.86)	2.5×10^{-4} (0.0014)	60 (13.5)	30 (6.75)	0.4 – 4	0.023 (3.29)
HD 08	ZSS 32 ZSS 33	50:1	1.5 (214.29)	0.003 (0.016)	200 (44.96)	100 (22.48)	0.4 – 4	0.16 (22.86)
		100:1	2.0 (285.71)	0.003 (0.016)	200 (44.96)	100 (22.48)	0.4 – 3	0.2 (28.57)
HD 11	ZSS 41 ZSS 41/1 ZSS 42 ZSS 42/1 ZSS 43 ZSS 43/1	50:1	2.5 (357.14)	0.012 (0.06)	250 (56.21)	200 (44.96)	0.4 – 3	0.3 (42.86)
		100:1	4.0 (571.43)	0.012 (0.06)	250 (56.21)	200 (44.96)	0.4 – 3	0.36 (51.43)
HD 14	ZSS 52	50:1	5.4 (771.43)	0.033 (0.18)	400 (89.93)	400 (89.93)	0.4 – 3	0.8 (114.29)
		100:1	7.8 (1114.29)	0.033 (0.18)	400 (89.93)	400 (89.93)	0.4 – 2	0.9 (128.57)

1) For motor inertia refer to motor data sheet

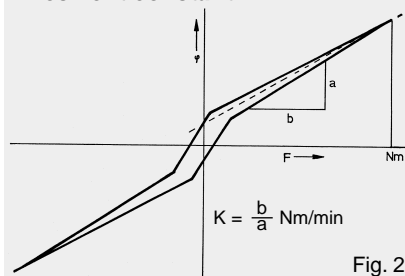
2) See fig. 1

3) See fig. 2

Tooth-contour backlash



Resilient constant K



Backlash and torsional Stiffness

Harmonic Drive gears have particularly low backlash. In practice, the tooth-contour backlash, as defined in Fig. 1, can be ignored.

The total gear torsion is equal to the sum of 1/2 backlash + torque/resilient constant.

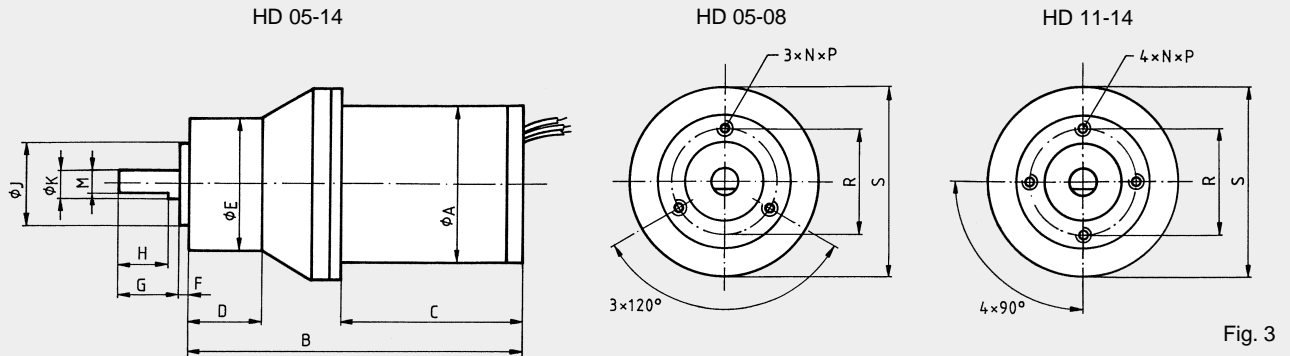
Harmonic Drive Geared Stepping Motors

HD 05 – HD 14

Backlash: 0.4' – 4'



Stepping Motor with HD Gear



Dimensions (mm) (refer to page 4 for motor dimensions)

Gear	Stepping motor ¹⁾																Mass ²⁾ (Motor & gear)	
		A	B	C	D	E	F	G	H	J	K	M	N	P	R	S	kg	(lb _m)
HD 05	ZSS 25	25	53.9	28.5	11.9	20	1	10	9	13.5 _{h6}	5 _{h6}	4.6	M2	6	16.4	32	0.09	(0.2)
	ZSS 26		69.9	44.5													0.15	(0.33)
HD 08	ZSS 32	32	81.2	35.5	26.7	33	1.8	20	18	21 _{h6}	8 _{h6}	7.5	M3	6	26	46	0.38	(0.84)
	ZSS 33			100.2													54.5	0.48
HD 11	ZSS 41 ZSS 41/1		99.5	42													0.53	(1.17)
	ZSS 42 ZSS 42/1	42	115.5	58	30.5	40	3	22	20	24 _{h7}	10 _{h6}	9.5	M4	7.5	34	58	0.59	(1.3)
	ZSS 43 ZSS 43/1		130.5	73													0.74	(1.63)
HD 14	ZSS 52	52	136	73.5	41	50	3	25	23	30 _{h7}	12 _{h6}	11.5	M5	11	40	69	1.15	(2.54)

1) For motor dimensions refer to motor data sheet

2) Motor and gear

Ordering Information

ZSS 25 . 200 . 0.6 - XXX - HD 05 / 80

Stepping motor type _____

Size _____

Number of steps/revolution _____

Winding _____

Motor options (Refer to motor data) _____

Gear type _____

Reduction ratio _____