

7. DSH-P0

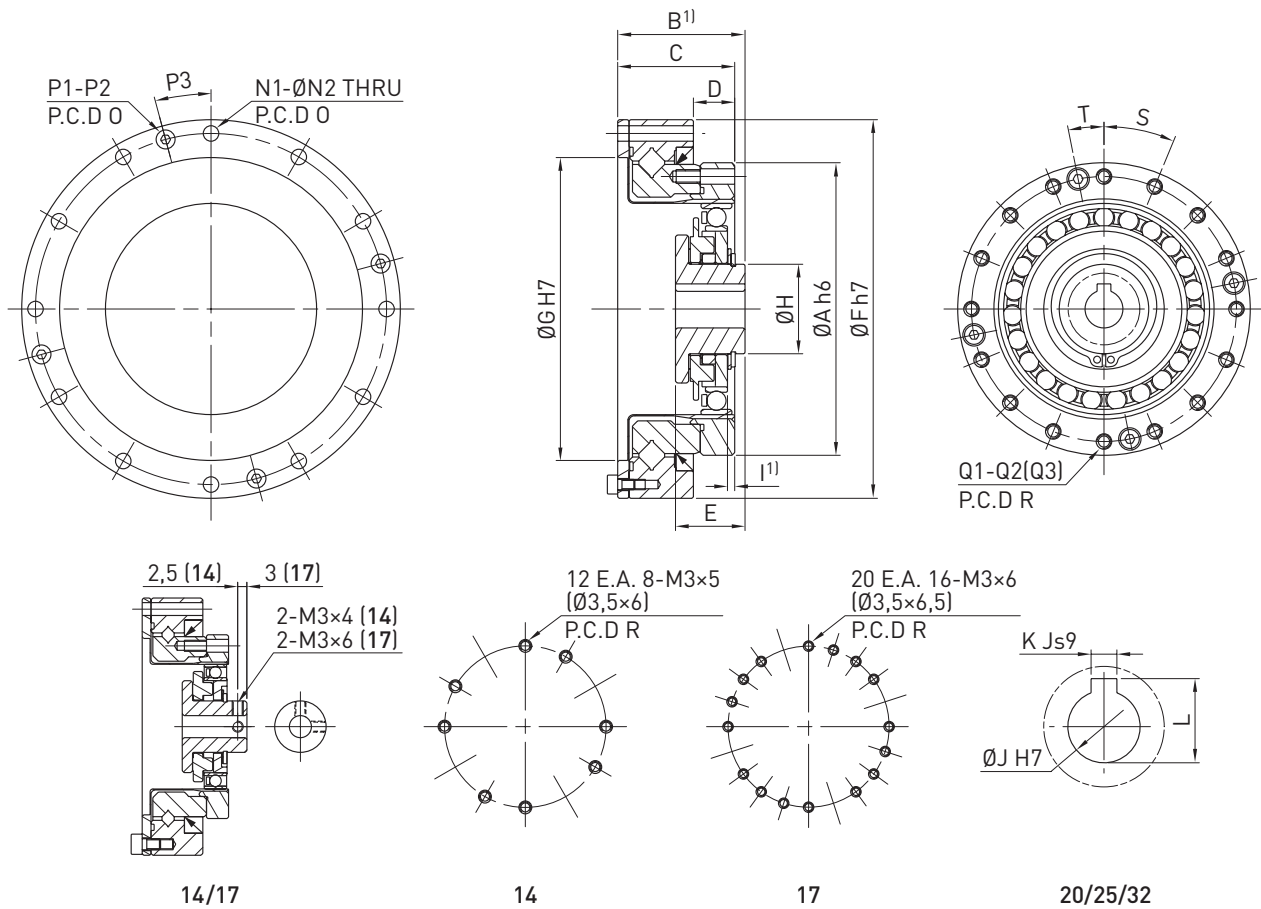


Table 7.1 Dimensions of DSH-P0 strain wave gears

	Unit	Model/size				
		14	17	20	25	32
ØA h6	mm	50	60	70	85	110
B ¹⁾	mm	28.5 ^{-0.8}	32.5 ^{-0.9}	33.5 ^{-1.0}	37.0 ^{-1.1}	44.0 ^{-1.1}
C	mm	23.5	26.5	29.0	34.0	42.0
D	mm	7.0	7.5	8.5	12.0	15.0
E	mm	17.6 ^{-0.1}	19.5 ^{-0.1}	20.1 ^{-0.1}	20.2 ^{-0.1}	22.0 ^{-0.1}
ØF h7	mm	70	80	90	110	142
ØG H7	mm	48	60	70	88	114
ØH	mm	14	18	21	26	26
I ¹⁾	mm	0.4	0.3	0.1	2.1	2.5
ØJ H7	mm	6	8	9	11	14
K Js9	mm	—	—	3	4	5
L	mm	—	—	10.4 ^{+0.1}	12.8 ^{+0.1}	16.3 ^{+0.1}
N1	mm	8	12	12	12	12
ØN2	mm	3.5	3.5	3.5	4.5	5.5
O (P.C.D)	mm	64	74	84	102	132
P1	mm	2	4	4	4	4
P2	mm	M3	M3	M3	M3	M4
P3	Degree	22.5	15.0	15.0	15.0	15.0
Q1	mm	12 E.A. 8	20 E.A. 16	16	16	16
Q2	mm	M3 × 5DP	M3 × 6DP	M3 × 6DP	M4 × 7DP	M5 × 8DP
Q3	mm	Ø3.5 × 6DP	Ø3.5 × 6.5DP	Ø3.5 × 7.5DP	Ø4.5 × 10DP	Ø5.5 × 14DP

¹⁾ B and I is the tolerance and the matching position of axial direction.

DATORKER® strain wave gears

DSH-PO

Table 7.1 Dimensions of DSH-PO strain wave gears

	Unit	Model/size				
		14	17	20	25	32
ØR	mm	44	54	62	77	100
S	Degree	30.0	18.0	22.5	22.5	22.5
T	Degree	30.00	18.00	11.25	11.25	11.25
Moment of inertia	$\times 10^{-4} \text{ kgm}^2$	0.033	0.079	0.193	0.413	1.690
Weight	kg	0.41	0.57	0.81	1.10	2.94

¹⁾ B and I is the tolerance and the matching position of axial direction.

7.1 DSH-PO design

7.1.1 Technical data

Table 7.2 Crossed roller bearing specifications

Model/size	Centre circle diameter of the rollers	Offset	Basic load ratings		Permitted torque	Moment rigidity
	Dpw	R	Dynamic load C_{dyn}	Static load C_0		
	m	m	kN	kN		
14	0.050	0.0217	5.8	8.6	74	8.5
17	0.060	0.0239	10.4	16.3	124	15.4
20	0.070	0.0255	14.6	22.0	187	25.2
25	0.085	0.0296	21.8	35.8	258	39.2
32	0.111	0.0364	38.2	65.4	580	100.0

Table 7.3 Accuracy of angular transmission

Reduction ratio		Model/size				
		14	17	20	25	32
50 – 160	$\times 10^{-4} \text{ rad}$	4.4	4.4	2.9	2.9	2.9

Table 7.4 Hysteresis loss

Reduction ratio		Model/size				
		14	17	20	25	32
50	$\times 10^{-4} \text{ rad}$	5.8	5.8	5.8	5.8	5.8
80 – 160	$\times 10^{-4} \text{ rad}$	2.9	2.9	2.9	2.9	2.9

Table 7.5 Starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		4.1	6.1	7.8	15.0	31.0
80		2.8	4.0	4.9	9.2	19.0
100		2.5	3.4	4.3	8.0	18.0
120		—	3.1	3.8	7.3	15.0
160		—	—	3.3	4.3	14.0

Unit: cNm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

Table 7.6 Reverse starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		1.6	3.0	4.7	9.0	18.0
80		1.6	3.0	4.8	9.1	19.0
100		1.8	3.3	5.1	9.8	20.0
120		—	3.5	5.5	11.0	22.0
160		—	—	6.4	13.0	26.0

Unit: Nm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

Table 7.7 Torsional rigidity

Reduction ratio			Model/size				
			14	17	20	25	32
T1		Nm	2.0	3.9	7.0	14.0	29.0
T2		Nm	6.9	12.0	25.0	48.0	108.0
50	K ₁	×10 ⁴ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K ₂	×10 ⁴ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K ₃	×10 ⁴ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ ₁	×10 ⁻⁴ rad	5.8	4.9	5.2	5.5	5.5
	θ ₂	×10 ⁻⁴ rad	16.0	12.0	15.4	15.7	15.7
80 – 160	K ₁	×10 ⁴ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K ₂	×10 ⁴ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K ₃	×10 ⁴ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ ₁	×10 ⁻⁴ rad	4.1	3.9	4.4	4.4	4.4
	θ ₂	×10 ⁻⁴ rad	12.0	9.7	11.3	11.1	11.6

The values are for reference purposes only. The lower limit is 20 % below the value in this table.

DATORKER® strain wave gears

DSH-PH

8. DSH-PH

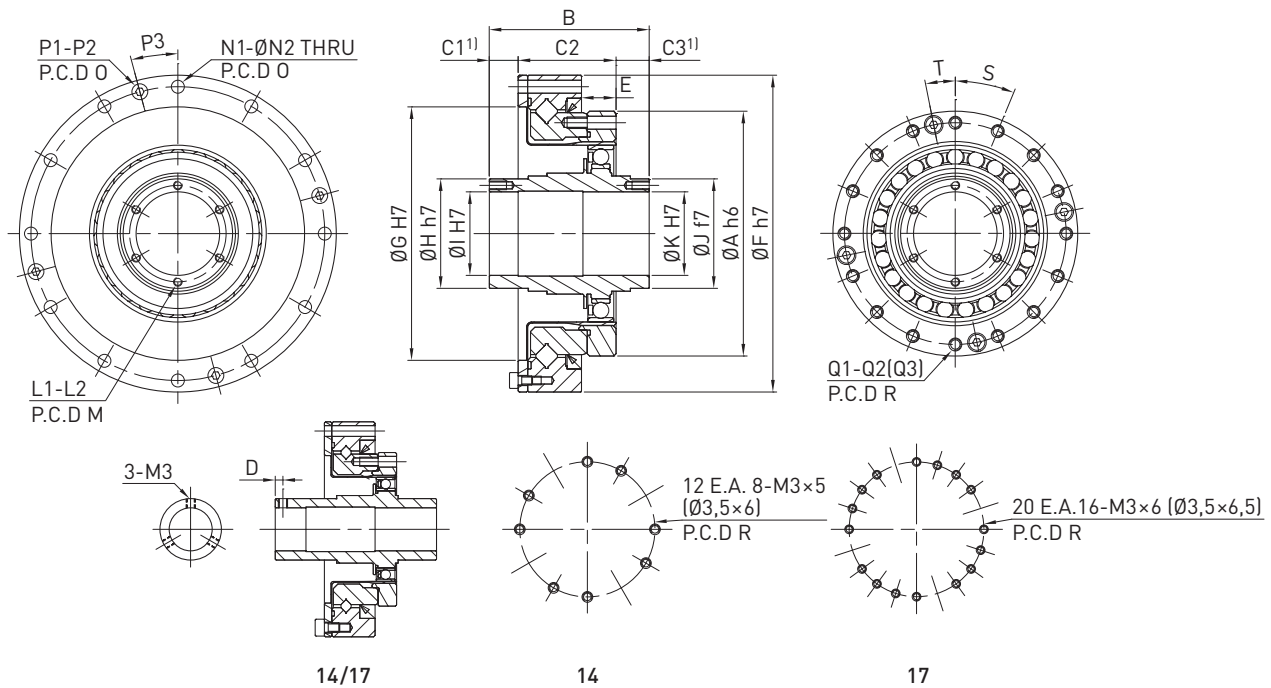


Table 8.1 Dimensions of DSH-PH strain wave gears

Model/size	Unit	Model/size				
		14	17	20	25	32
ØA h6	mm	50	60	70	85	110
B	mm	52.5 ^{-0.1}	56.5 ^{-0.1}	51.5 ^{-0.1}	52.0 ^{-1.0}	62.0 ^{-1.1}
C1 ¹⁾	mm	16.0 ^{+0.8}	16.0 ^{+0.9}	9.5 ^{+1.0}	10.0 ^{+1.1}	12.0 ^{+1.1}
C2	mm	23.5	26.5	29.0	34.0	42.0
C3 ¹⁾	mm	13.0	14.0	13.0	11.5	11.5
D	mm	2.5	2.5	—	—	—
E	mm	7.0	7.5	8.5	12.0	15.0
ØF h7	mm	70	80	90	110	142
ØG H7	mm	48	60	70	88	114
ØH h7	mm	20	25	30	38	45
ØI H7	mm	14	19	21	29	36
ØJ f7	mm	20	25	30	38	45
ØK H7	mm	14	19	21	29	36
L1	mm	3	3	2×6	2×6	2×6
L2	mm	M3	M3	M3×DP6	M3×DP6	M3×DP6
M (P.C.D)	mm	—	—	25.5	33.5	40.5
N1	mm	8	12	12	12	12
ØN2	mm	3.5	3.5	3.5	4.5	5.5
O (P.C.D)	mm	64	74	84	102	132
P1	mm	2	4	4	4	4
P2	mm	M3	M3	M3	M3	M4
P3	Degree	22.5	15	15	15	15
Q1	mm	12 E.A. 8	20 E.A. 16	16	16	16
Q2	mm	M3×5DP	M3×6DP	M3×6DP	M4×7DP	M5×8DP
Q3	mm	Ø3.5×6DP	Ø3.5×6.5DP	Ø3.5×7.5DP	Ø4.5×10DP	Ø5.5×14DP
ØR	mm	44	54	62	77	100

¹⁾ C1, C3 is the tolerance and the matching position of axial direction.

Table 8.1 Dimensions of DSH-PH strain wave gears

Model/size	Unit	Model/size				
		14	17	20	25	32
S	Degree	30.0	18.0	22.5	22.5	22.5
T	Degree	30.00	18.00	11.25	11.25	11.25
Moment of inertia	$\times 10^{-4} \text{ kgm}^2$	0.033	0.079	0.193	0.413	1.690
Weight	kg	0.45	0.63	0.89	1.44	3.10

¹⁾ C1, C3 is the tolerance and the matching position of axial direction.

8.1 DSH-PH design

8.1.1 Technical data

Table 8.2 Crossed roller bearing specifications

Model/size	Centre circle diameter of the rollers	Offset	Basic load ratings		Permitted torque	Moment rigidity
	Dpw	R	Dynamic load C_{dyn}	Static load C_0		
	m	m	kN	kN		
14	0.050	0.0217	5.8	8.6	74	8.5
17	0.060	0.0239	10.4	16.3	124	15.4
20	0.070	0.0255	14.6	22.0	187	25.2
25	0.085	0.0296	21.8	35.8	258	39.2
32	0.111	0.0364	38.2	65.4	580	100.0

Table 8.3 Accuracy of angular transmission

Reduction ratio		Model/size				
		14	17	20	25	32
50 – 160	$\times 10^{-4} \text{ rad}$	4.4	4.4	2.9	2.9	2.9

Table 8.4 Hysteresis loss

Reduction ratio		Model/size				
		14	17	20	25	32
50	$\times 10^{-4} \text{ rad}$	5.8	5.8	5.8	5.8	5.8
80 – 160	$\times 10^{-4} \text{ rad}$	2.9	2.9	2.9	2.9	2.9

Table 8.5 Starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		4.1	6.1	7.8	15.0	31
80		2.8	4.0	4.9	9.2	19
100		2.5	3.4	4.3	8.0	18
120		—	3.1	3.8	7.3	15
160		—	—	3.3	6.3	14

Unit: cNm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

DATORKER® strain wave gears

DSH-PH

Table 8.6 Reverse starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		1.6	3.0	4.7	9.0	18
80		1.6	3.0	4.8	9.1	19
100		1.8	3.3	5.1	9.8	20
120		—	3.5	5.5	11.0	22
160		—	—	6.4	13	26

Unit: Nm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20% above the value in this table.

Table 8.7 Torsional rigidity

Reduction ratio			Model/size				
			14	17	20	25	32
T1		Nm	2.0	3.9	7.0	14.0	29.0
T2		Nm	6.9	12.0	25.0	48.0	108.0
50	K ₁	×10 ⁴ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K ₂	×10 ⁴ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K ₃	×10 ⁴ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ ₁	×10 ⁻⁴ rad	5.8	4.9	5.2	5.5	5.5
	θ ₂	×10 ⁻⁴ rad	16.0	12.0	15.4	15.7	15.7
80 – 160	K ₁	×10 ⁴ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K ₂	×10 ⁴ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K ₃	×10 ⁴ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ ₁	×10 ⁻⁴ rad	4.1	3.9	4.4	4.4	4.4
	θ ₂	×10 ⁻⁴ rad	12.0	9.7	11.3	11.1	11.6

The values are for reference purposes only. The lower limit is 20 % below the value in this table.

9. DSH-AH

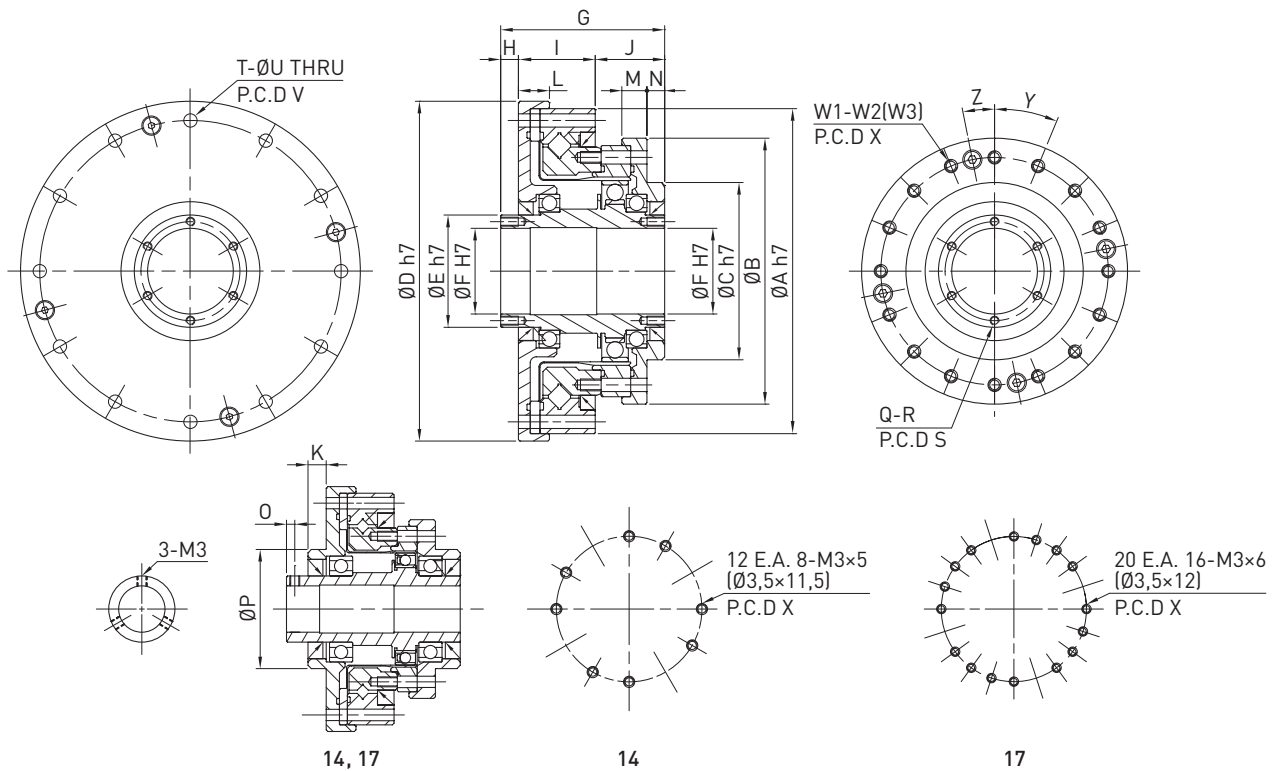


Table 9.1 Dimensions of DSH-AH strain wave gears

	Unit	Model/size				
		14	17	20	25	32
ØA h7	mm	70	80	90	110	142
ØB	mm	54	64	75	90	115
ØC h7	mm	36	45	50	60	85
ØD h7	mm	74	84	95	115	147
ØE h7	mm	20	25	30	38	45
ØF H7	mm	14	19	21	29	36
G	mm	52.5	56.5	51.5	55.5	65.5
H	mm	12	12	5	6	7
I	mm	20	23	25	26	32
J	mm	20.0	21.5	21.5	23.5	26.5
K	mm	5.5	5.5	—	—	—
L	mm	9.0	10.0	10.5	10.5	12.0
M	mm	8.0	8.5	9.0	8.5	9.5
N	mm	7.5	8.5	7.0	6.0	5.0
O	mm	2.5	2.5	—	—	—
P	mm	36	45	—	—	—
Q	mm	3	3	2 × 6	2 × 6	2 × 6
R	mm	M3	M3	M3 × 6DP	M3 × 6DP	M3 × 6DP
S (P.C.D)	mm	—	—	25.5	33.5	40.5
T	mm	8	12	12	12	12
ØU	mm	3.5	3.5	3.5	4.5	5.5
V (P.C.D)	mm	64	74	84	102	132
W1	mm	12 E.A. 8	20 E.A. 16	16	16	16
W2	mm	M3 × 5DP	M3 × 6DP	M3 × 6DP	M4 × 7DP	M5 × 8DP
W3	mm	Ø3.5 × 11.5DP	Ø3.5 × 12DP	Ø3.5 × 13.5DP	Ø4.5 × 15.5DP	Ø5.5 × 20.5DP

DATORKER® strain wave gears

DSH-AH

Table 9.1 Dimensions of DSH-AH strain wave gears

	Unit	Model/size				
		14	17	20	25	32
X (P.C.D)	mm	44	54	62	77	100
Y	Degree	30.0	18.0	22.5	22.5	22.5
Z	Degree	30.00	18.00	11.25	11.25	11.25
Moment of inertia	$\times 10^{-4} \text{ kgm}^2$	0.091	0.193	0.404	1.070	2.850
Weight	kg	0.71	1.00	1.38	2.10	4.50

9.1 DSH-AH design

9.1.1 Technical data

Table 9.2 Crossed roller bearing specifications

Model/size	Centre circle diameter of the rollers	Offset	Basic load ratings		Permitted torque	Moment rigidity
	Dpw	R	Dynamic load C_{dyn}	Static load C_0		
	m	m	kN	kN	Nm	$\times 10^4 \text{ Nm/rad}$
14	0.050	0.0217	5.8	8.6	74	8.5
17	0.060	0.0239	10.4	16.3	124	15.4
20	0.070	0.0255	14.6	22.0	187	25.2
25	0.085	0.0296	21.8	35.8	258	39.2
32	0.111	0.0364	38.2	65.4	580	100.0

Table 9.3 Accuracy of angular transmission

Reduction ratio		Model/size				
		14	17	20	25	32
50 – 160	$\times 10^{-4} \text{ rad}$	4.4	4.4	2.9	2.9	2.9

Table 9.4 Hysteresis loss

Reduction ratio		Model/size				
		14	17	20	25	32
50	$\times 10^{-4} \text{ rad}$	5.8	5.8	5.8	5.8	5.8
80 – 160	$\times 10^{-4} \text{ rad}$	2.9	2.9	2.9	2.9	2.9

Table 9.5 Starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		8.8	27	36	56	85
80		7.5	25	33	50	74
100		6.9	24	32	49	72
120		—	24	31	48	68
160		—	—	31	67	67

Unit: cNm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20% above the value in this table.

Table 9.6 Reverse starting torque

Reduction ratio	Model/size				
	14	17	20	25	32
50	5.3	16	22	34	51
80	7.2	24	31	48	70
100	8.2	29	38	59	86
120	—	34	45	69	97
160	—	—	59	90	128

Unit: Nm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

Table 9.7 Torsional rigidity

Reduction ratio			Model/size				
			14	17	20	25	32
T1		Nm	2.0	3.9	7.0	14.0	29.0
T2		Nm	6.9	12.0	25.0	48.0	108.0
50	K ₁	×10 ⁴ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K ₂	×10 ⁴ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K ₃	×10 ⁴ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ ₁	×10 ⁻⁴ rad	5.8	4.9	5.2	5.5	5.5
	θ ₂	×10 ⁻⁴ rad	16.0	12.0	15.4	15.7	15.7
80 – 160	K ₁	×10 ⁴ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K ₂	×10 ⁴ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K ₃	×10 ⁴ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ ₁	×10 ⁻⁴ rad	4.1	3.9	4.4	4.4	4.4
	θ ₂	×10 ⁻⁴ rad	12.0	9.7	11.3	11.1	11.6

The values are for reference purposes only. The lower limit is 20 % below the value in this table.

9.1.2 Efficiency E_R

The efficiency of DATORKER® shaft gear units changes depending on the specification, load ratio, operating conditions (speed/load) and lubrication (lubricant type/amount).

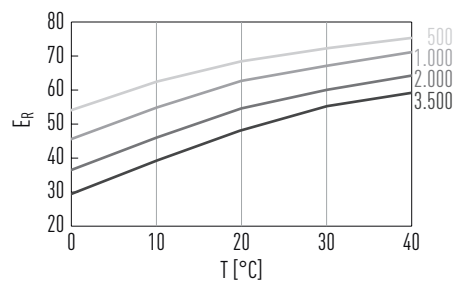
E_R Efficiency at nominal torque

T Temperature

Unit: rpm

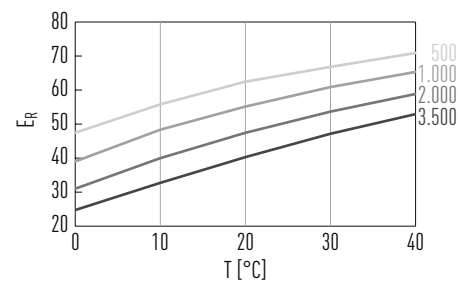
Model: 14–32

Ratio: 50, 80, 100, 120



Model: 20–32

Ratio: 160



DATORKER® strain wave gears

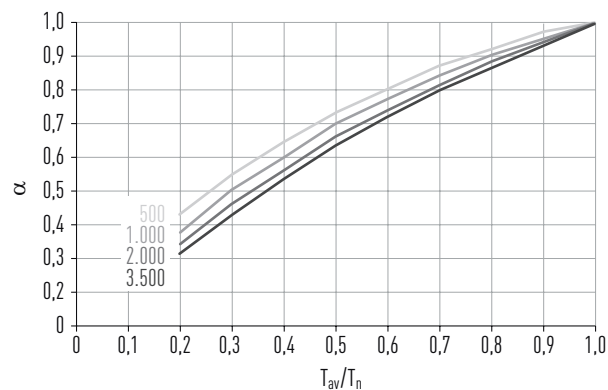
DSH-AH

Correction coefficient α

Coefficient for correcting the efficiency α according to torque ratio T_{av}/T_n

Correction coefficient as a function of size and reduction ratio

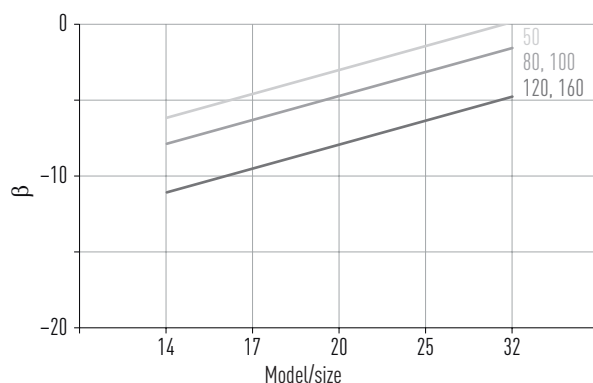
Unit: rpm



Correction coefficient β

Coefficient for correcting the efficiency β according to specification

Efficiency = $\alpha \times (E_R + \beta)$



9.1.3 Idling operating torque

The idling operating torque is the torque required to drive the DATORKER® shaft gear input (high speed end) after more than 2 hours at an input speed of 2,000 rpm at an average ambient temperature of 25 °C without load.

Table 9.8 Idling operating torque

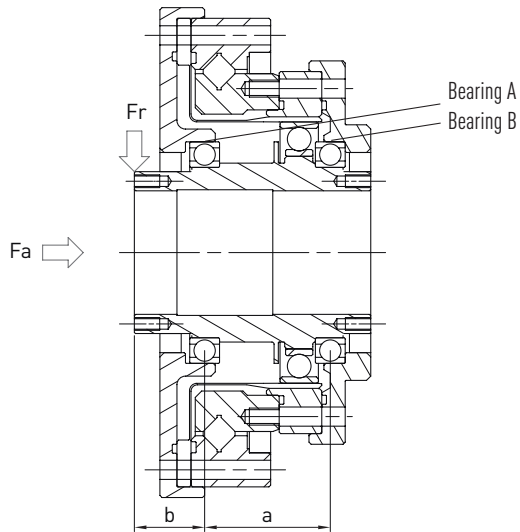
Reduction ratio	Input speed [rpm]	Model/size				
		14	17	20	25	32
50	500	6.3	17.8	23.6	37.2	58.0
	1,000	7.8	21.8	28.6	49.2	76.0
	2,000	10.1	27.8	37.6	62.2	98.0
	3,500	14.1	36.8	48.6	89.2	138.0
80	500	5.4	16.4	21.5	33.8	51.5
	1,000	6.9	20.4	26.5	45.8	69.5
	2,000	9.2	26.4	35.5	58.8	91.5
	3,500	13.2	35.4	46.5	85.8	131.5
100	500	5.2	16.0	21.0	33.0	50.0
	1,000	6.7	20.0	26.0	45.0	68.0
	2,000	9.0	26.0	35.0	58.0	90.0
	3,500	13.0	35.0	46.0	85.0	130.0
120	500	—	15.8	20.6	32.4	48.9
	1,000	—	19.8	25.6	44.4	66.9
	2,000	—	25.8	34.6	57.4	88.9
	3,500	—	34.8	45.6	84.4	128.9
160	500	—	—	20.2	31.7	47.5
	1,000	—	—	25.2	43.7	65.5
	2,000	—	—	34.2	56.7	87.5
	3,500	—	—	45.2	83.7	127.5

Unit: cNm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

9.1.4 Permissible input load

The hollow shaft is supported by two deep groove bearings. To ensure proper operation of the reducer, please check the load applied to the input section. As shown below:



The following figure shows the average input speed of 2,000 rpm and the basic nominal service life $L_{10} = 7,000$ hours.

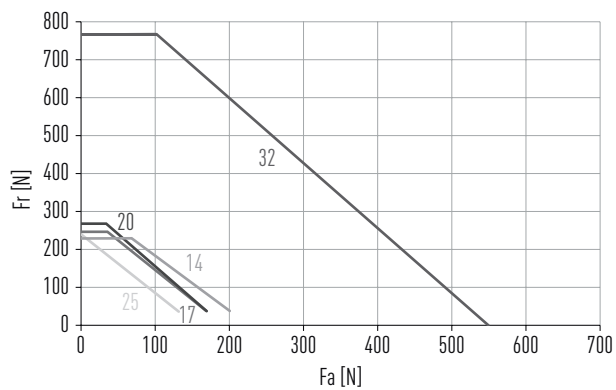


Table 9.9 Specifications of the deep groove ball bearings

Model/size	Bearing A		Bearing B		a [mm]	b [mm]	Maximum radial load Fr [N]
	Dynamic load C_{dyn} [kN]	Static load C_0 [kN]	Dynamic load C_{dyn} [kN]	Static load C_0 [kN]			
14	4.0	2.47	4.00	2.47	27.0	16.5	230
17	4.3	2.95	4.30	2.95	29.0	17.5	250
20	4.5	3.45	4.50	3.45	27.0	15.5	275
25	4.9	4.35	4.90	4.35	29.5	16.5	250
32	14.1	10.90	5.35	5.25	33.0	23.0	770

10. DSH-AJ

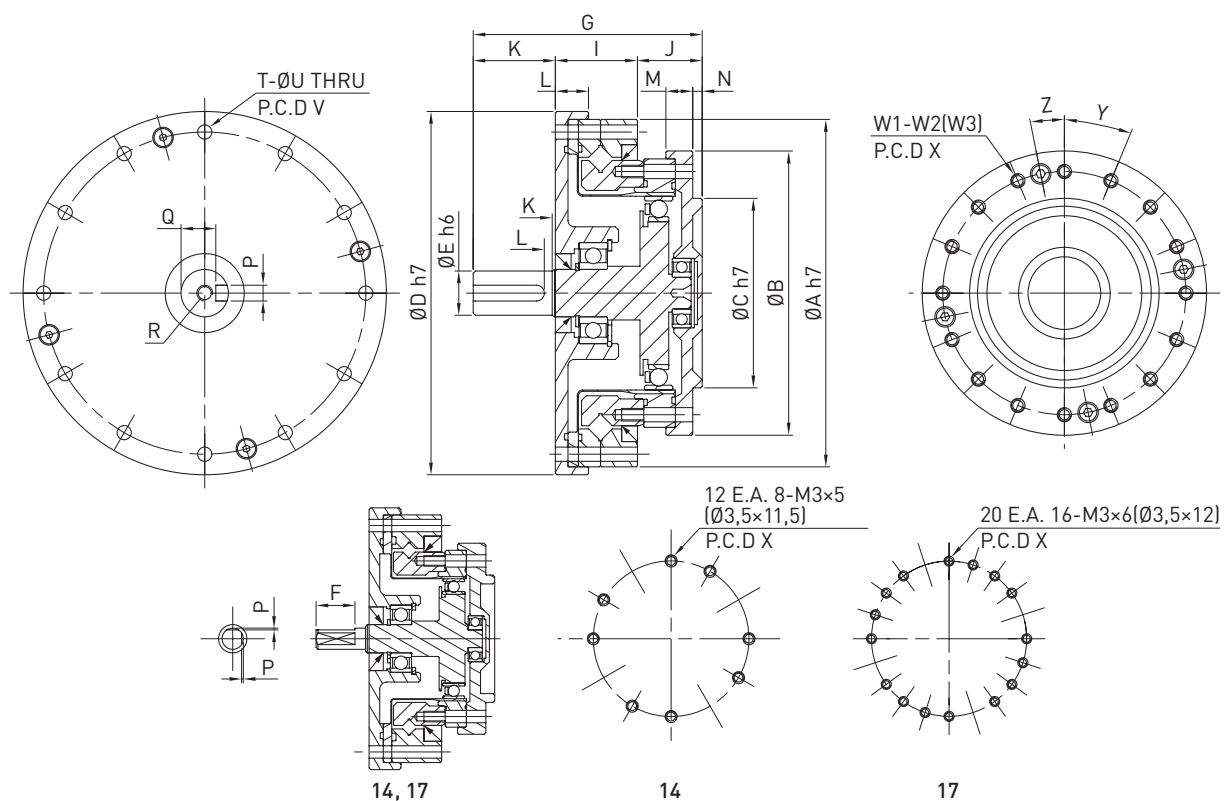


Table 10.1 Dimensions of DSH-AJ strain wave gears

	Unit	Model/size				
		14	17	20	25	32
ØA h7	mm	70	80	90	110	142
ØB	mm	54	64	75	90	115
ØC h7	mm	36	45	50	60	85
ØD h7	mm	74	84	95	115	147
ØE h6	mm	6	8	10	14	14
ØF	mm	11.0	12.0	16.5	22.5	22.5
G	mm	50.5	56.0	63.5	72.5	84.5
H	mm	15	17	21	26	26
I	mm	20.5	23.0	25.0	26.0	32.0
J	mm	15.0	16.0	17.5	20.5	26.5
K	mm	14	16	20	25	25
L	mm	9.0	10.0	10.5	10.5	12.0
M	mm	8.0	8.5	9.0	8.5	9.5
N	mm	2.5	3.0	3.0	3.0	5.0
P	mm	0.5	0.5	3 ^{+0.004} _{-0.029}	5 ⁰ _{-0.03}	5 ⁰ _{-0.03}
Q	mm	—	—	8.2 ⁰ _{-0.1}	11 ⁰ _{-0.1}	11 ⁰ _{-0.1}
R	mm	—	—	M3 × 6DP	M3 × 6DP	M3 × 6DP
T	mm	8	12	12	12	12
ØU	mm	3.5	3.5	3.5	4.5	5.5
V (P.C.D)	mm	64	74	84	102	132
W1	mm	12 E.A. 8	20 E.A. 16	16	16	16
W2	mm	M3 × 5DP	M3 × 6DP	M3 × 6DP	M4 × 7DP	M5 × 8DP
W3	mm	Ø3.5 × 11.5DP	Ø3.5 × 12DP	Ø3.5 × 13.5DP	Ø4.5 × 15.5DP	Ø5.5 × 20.5DP
X (P.C.D)	mm	44	54	62	77	100

Table 10.1 Dimensions of DSH-AJ strain wave gears

	Unit	Model/size				
		14	17	20	25	32
Y	Degree	30.0	18.0	22.5	22.5	22.5
Z	Degree	30.00	18.00	11.25	11.25	11.25
Moment of inertia	$\times 10^{-4} \text{ kgm}^2$	0.025	0.059	0.137	0.320	1.200
Weight	kg	0.66	0.94	1.38	2.10	4.40

10.1 DSH-AJ design

10.1.1 Technical data

Table 10.2 Crossed roller bearing specifications

Model/size	Centre circle diameter of the rollers	Offset	Basic load ratings		Permitted torque	Moment rigidity
	Dpw	R	Dynamic load C_{dyn}	Static load C_0		
	m	m	kN	kN		
14	0.050	0.0217	5.8	8.6	74	8.5
17	0.060	0.0239	10.4	16.3	124	15.4
20	0.070	0.0255	14.6	22.0	187	25.2
25	0.085	0.0296	21.8	35.8	258	39.2
32	0.111	0.0364	38.2	65.4	580	100.0

Table 10.3 Accuracy of angular transmission

Reduction ratio		Model/size				
		14	17	20	25	32
50 – 160	$\times 10^{-4} \text{ rad}$	4.4	4.4	2.9	2.9	2.9

Table 10.4 Hysteresis loss

Reduction ratio		Model/size				
		14	17	20	25	32
50	$\times 10^{-4} \text{ rad}$	5.8	5.8	5.8	5.8	5.8
80 – 160	$\times 10^{-4} \text{ rad}$	2.9	2.9	2.9	2.9	2.9

Table 10.5 Starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		5.7	9.7	14.0	22.0	41.0
80		4.4	7.2	11.0	15.0	29.0
100		3.7	6.5	9.9	14.0	27.0
120		—	6.2	9.3	13.0	24.0
160		—	—	8.6	12.0	23.0

Unit: cNm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

DATORKER® strain wave gears

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Table 10.6 Reverse starting torque

Reduction ratio		Model/size				
		14	17	20	25	32
50		3.4	5.8	8.4	13.0	25.0
80		4.2	6.9	10.0	15.0	28.0
100		4.5	7.8	12.0	17.0	33.0
120		—	8.9	13.0	19.0	34.0
160		—	—	17.0	23.0	43.0

Unit: Nm

Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

Table 10.7 Torsional rigidity

Reduction ratio			Model/size				
			14	17	20	25	32
T1		Nm	2.0	3.9	7.0	14.0	29.0
T2		Nm	6.9	12.0	25.0	48.0	108.0
50	K ₁	×10 ⁴ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K ₂	×10 ⁴ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K ₃	×10 ⁴ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ ₁	×10 ⁻⁴ rad	5.8	4.9	5.2	5.5	5.5
	θ ₂	×10 ⁻⁴ rad	16.0	12.0	15.4	15.7	15.7
80 – 160	K ₁	×10 ⁴ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K ₂	×10 ⁴ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K ₃	×10 ⁴ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ ₁	×10 ⁻⁴ rad	4.1	3.9	4.4	4.4	4.4
	θ ₂	×10 ⁻⁴ rad	12.0	9.7	11.3	11.1	11.6

The values are for reference purposes only. The lower limit is 20 % below the value in this table.

10.1.2 Efficiency E_R

The efficiency of DATORKER® shaft gear units changes depending on the specification, load ratio, operating conditions (speed/load) and lubrication (lubricant type/amount).

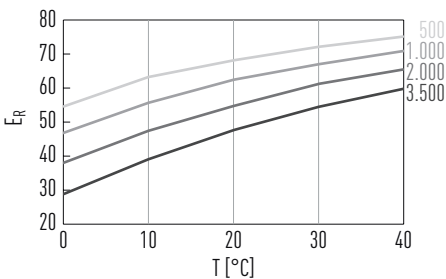
E_R Efficiency at nominal torque

T Temperature

Unit: rpm

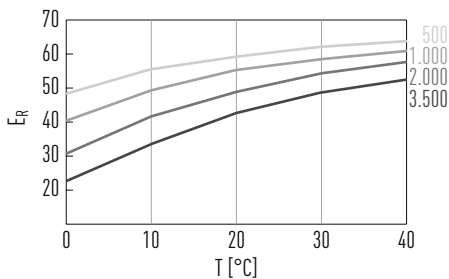
Model: 14–32

Ratio: 50, 80, 100, 120



Model: 20–32

Ratio: 160

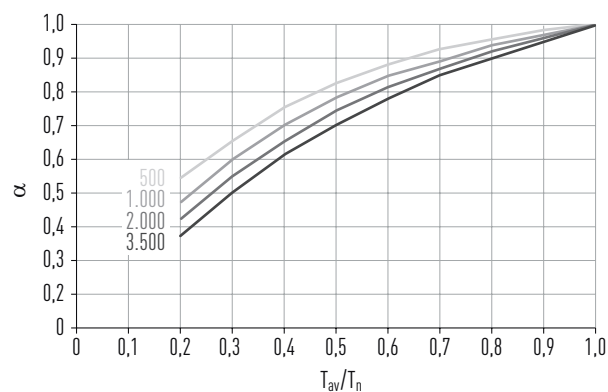


Correction coefficient α

Coefficient for correcting the efficiency α according to torque ratio T_{av}/T_n

Correction coefficient as a function of size and reduction ratio

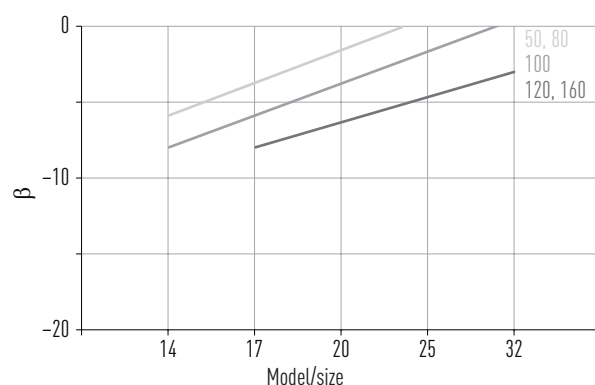
Unit: rpm



Correction coefficient β

Coefficient for correcting the efficiency β according to specification

Efficiency = $\alpha \times (E_R + \beta)$



10.1.3 Idling operating torque

The idling operating torque is the torque required to drive the DATORKER® shaft gear input (high speed end) after more than 2 hours at an input speed of 2,000 rpm at an average ambient temperature of 25 °C without load.

Table 10.8 Idling operating torque

Reduction ratio	Input speed [rpm]	Model/size				
		14	17	20	25	32
50	500	3.9	8.0	11.6	18.2	31.0
	1,000	4.7	9.8	14.6	22.2	38.0
	2,000	5.8	12.8	19.6	28.2	53.0
	3,500	7.0	14.8	22.6	35.2	68.0
80	500	3.0	6.6	9.5	14.8	24.5
	1,000	3.8	8.4	12.5	18.8	31.5
	2,000	4.9	11.4	17.5	24.8	46.5
	3,500	6.1	13.4	20.5	31.8	61.5
100	500	2.8	6.2	9.0	14.0	23.0
	1,000	3.6	8.0	12.0	18.0	30.0
	2,000	4.7	11.0	17.0	24.0	45.0
	3,500	5.9	13.0	20.0	31.0	60.0
120	500	—	6.0	8.6	13.4	21.9
	1,000	—	7.8	11.6	17.4	28.9
	2,000	—	10.8	16.6	23.4	43.9
	3,500	—	12.8	19.6	30.4	58.9
160	500	—	—	8.2	12.7	20.5
	1,000	—	—	11.2	16.7	27.5
	2,000	—	—	16.2	22.7	42.5
	3,500	—	—	19.2	29.7	57.5

Unit: cNm

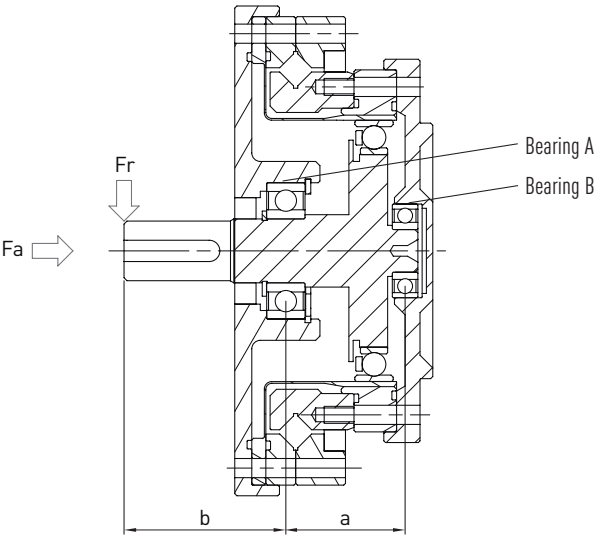
Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

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10.1.4 Permissible input load

The solid shaft input section is supported by two deep groove bearings. To ensure proper operation of the reducer, please check the load applied to the input section. As shown below:



The following figure shows the average input speed of 2,000 rpm and the basic nominal service life $L_{10} = 7,000$ hours.

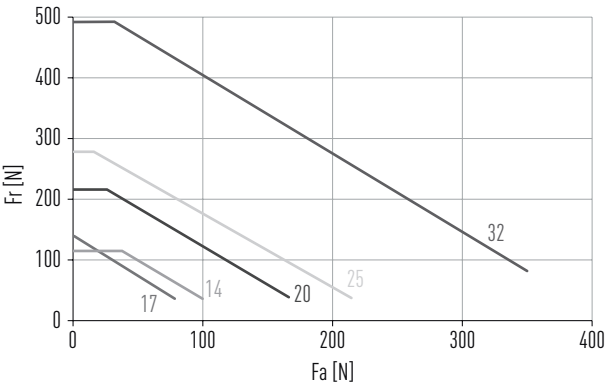


Table 10.9 Specifications of the deep groove ball bearings							
Model/size	Bearing A		Bearing B		a [mm]	b [mm]	Maximum radial load Fr [N]
	Dynamic load C_{dyn} [kN]	Static load C_0 [kN]	Dynamic load C_{dyn} [kN]	Static load C_0 [kN]			
14	2.24	0.91	1.08	0.43	20.0	14.0	110
17	2.70	1.27	1.61	0.71	23.5	21.0	135
20	4.35	2.26	2.24	0.91	26.5	23.3	210
25	5.60	2.83	2.70	1.27	28.0	28.0	270
32	9.40	5.00	4.35	2.26	36.0	27.0	490