HIWIN®

DATORKER®

Strain wave gear

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Note:
The technical data in this catalogue may
be changed without prior notice.

DATORKER® strain wave gears

DATORKER® strain wave gears

DATORKER® strain wave gears are characterised by high precision, high efficiency, high torsional rigidity and low starting torque. They are widely used in robotics, automation, semiconductor technology, machine tools and many other sectors of industry.

Assembly instructions and catalogue for download

Here you can download the corresponding assembly instructions and the current catalogue as PDF files.

Contents

1 Product overview 6

2 General information 8
2.1 Characteristics DATORKER® strain wave gears 8

3 Selection principle 11
3.1 Process for selecting a DATORKER® shaft gear unit 11
3.2 Confirmation of application condition 11
3.3 Calculation of the load torque, the speed and the service life 12
3.4 Selection of DATORKER® shaft gear unit design and specification 13
3.5 Calculation of the service life of the crossed roller bearing 13
3.6 Calculation of efficiency 13
3.7 Order code DATORKER® strain wave gears 14
3.8 Models 14
3.9 Technical data 15

4 DSC-PO with motor 16
4.1 Technical data 16
4.2 Dimensions 17

5 DSC-PO 18
5.1 DSC-PO design 19

6 DSC-CO 22
6.1 DSC-CO design 23

7 DSH-PO 26
7.1 DSH-PO design 27

8 DSH-PH 29
8.1 DSH-PH design 30

9 DSH-AH 32
9.1 DSH-AH design 33

10 DSH-AJ 37
10.1 DSH-AJ design 38

11 DSC-PO-M 42
11.1 DSC-PO-M design 43

12 DSC-AJ-M 45
12.1 DSC-AJ-M design 46

1. Product overview

DSC-PO Page 18

- Connection by oldham coupling
- Withstands axial and radial load
- Reduced play

DSC-CO Page 22

- Connection by oldham coupling
- Reduced play

DSH-PO Page 26

- Connection by oldham coupling
- Withstands axial and radial load
- Reduced play

DSH-PH Page 29

- Input hollow shaft design
- Withstands axial and radial load
- Zero play

DSH-AH Page 32

- Input hollow shaft design
- Withstands axial and radial load
- Zero play
- Completely sealed design
- User friendly design

DSH-AJ Page 37

- Input solid shaft design
- Withstands axial and radial load
- Completely sealed design
- User friendly design

DSC-PO-M Page 42

- Connection by oldham coupling
- Withstands increased axial and radial load
- Reduced play

DSC-AJ-M Page 45

- Input solid shaft design
- Withstands increased axial and radial load
- Completely sealed design
- User friendly design

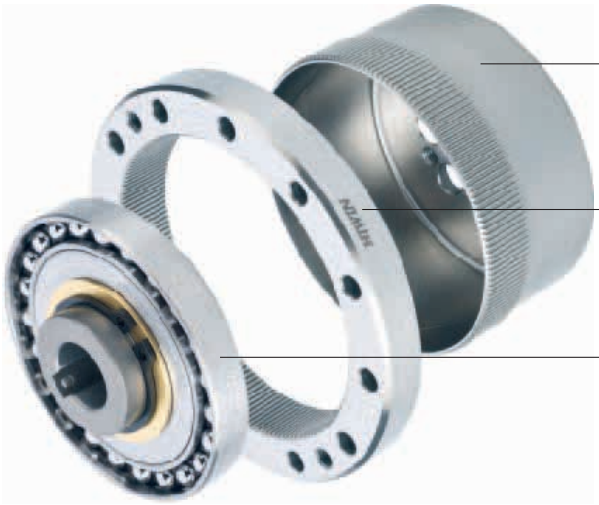
2. General information

2.1 Characteristics DATORKER® strain wave gears

DATORKER® strain wave gears has the characteristics of high precision, high efficiency, high torsional rigidity and low starting torque. It is widely used in robots, automation equipment, semiconductor equipment, machine tools and other industries. HIWIN has developed a variety of different models with different gear ratios in order to be able to offer a wide selection.

Features DATORKER® strain wave gears

- Compact and light weight – easy for user to assemble and work with
- High accuracy – provides stable repeatability and positioning
- Improved lubricating properties
- High torque – widely used in automation and inspection equipment
- Wide reduction ratio – various choices available under same model



Flex spline
Slim and resilient metal with external teeth on the outer circle. Continuous elastic deformation when working; usually used as an output.

Circular spline
The rigid circular part has teeth on the inner bore side, and there are 2 teeth more than the external teeth of flex spline; it is usually used as the fixed end.

Wave generator
With an elliptical geometric feature, it makes the flex spline engaging with the circular spline. Usually used as an input.

2.1.1 Backlash-free

In a mechanical system, maximum backlash describes the maximum displacement or rotation in a given direction while a part is held stationary. The backlash of the HIWIN DATORKER® shaft gear unit is damped to "0" due to the mechanical construction.

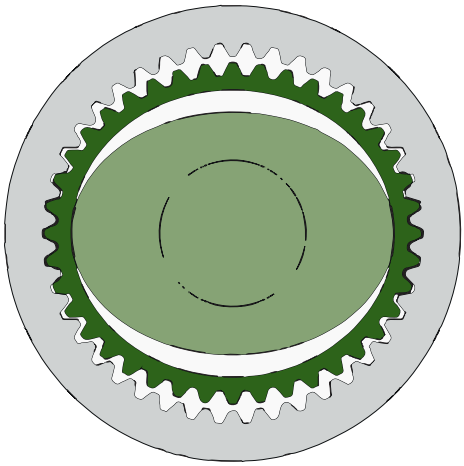


Fig. 1.1 **Mechanical engagement of the teeth of a DATORKER® shaft gear unit**

2.1.2 Positioning accuracy

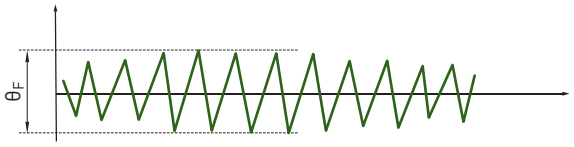
The positioning accuracy depends on several factors. On the one hand, the accuracy of the angular transmission plays a role; this indicates the basic accuracy of the gear unit. In addition, there is angular displacement due to the torsional rigidity; this depends on the applied torque and the resulting angular displacement is subject to a hysteresis loss.

2.1.2.1 Accuracy of angular transmission

With an input angle of rotation (θ_1), a theoretical output angle of rotation (θ_2) results based on the reduction ratio. The difference between the theoretical output rotation angle (θ_2) and the actual output rotation angle (θ_3) indicates the accuracy of the angular transmission (θ_F).

$$\theta_2 = \frac{\theta_1}{\text{Reduction ratio}}$$

$$\theta_F = \theta_3 - \theta_2$$



2.1.2.2 Torsional rigidity

The torsional rigidity indicates the factor of the change in angle of the gear unit output side as a function of the torque when the input side is stationary. The slope of the "torque torsion angle diagram" is expressed as a spring constant. The "torque torsion angle diagram" is divided into three parts and the spring constant of each section represents K_1, K_2 and K_3.

- K_1 refers to the spring constant from "0" to "T_1"
- K_2 refers to the spring constant from "T_1" to "T_2"
- K_3 refers to the spring constant with a torque over "T_2"

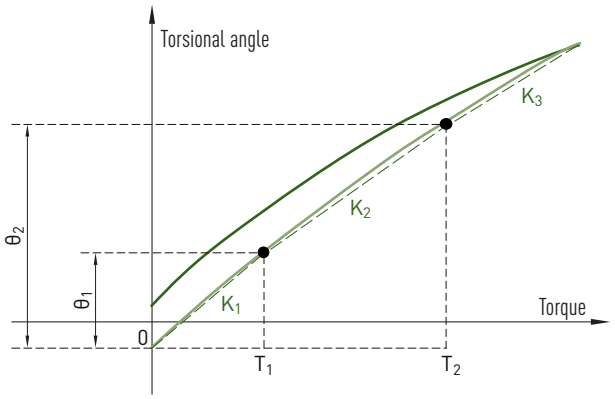


Fig. 2.1 **Torque–torsion angle diagram**

2.1.2.3 Hysteresis loss

After the torque is applied at the nominal value and reset to "0", the torsion angle is not completely "0" and has some displacement (B-B'), which is called hysteresis loss. The hysteresis loss is mainly caused by internal friction. When the torque is extremely small, it is almost non-existent.

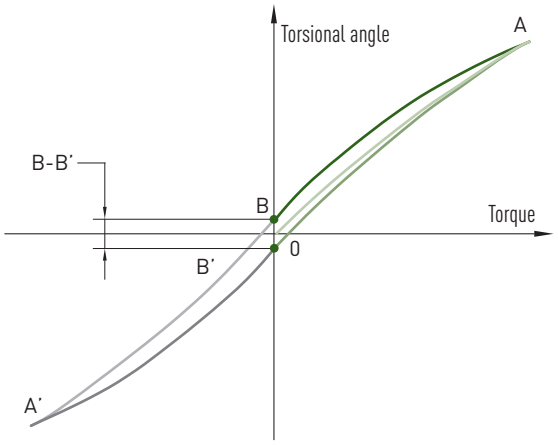


Fig. 2.2 **Hysteresis loss B-B'**

2.1.3 Low starting torque

The starting torque defines the torque required without load to set the gear unit in motion. Because the shaft generator is supported by balls, only the rolling friction has to be overcome, resulting in very low starting torques.

2.1.3.1 Starting torque

The starting torque defines the torque when the shaft generator is used as the drive side of the gear unit. It consists mainly of the rolling friction of the shaft generator and the radial bearings as well as the shaft sealing rings in the sealed series.

2.1.3.2 Reverse starting torque

The reverse starting torque defines the torque required when the shaft generator is used as the driven side. This is higher because the rotary movement is initiated via the tooth flanks, which creates additional sliding friction.

2.1.4 High tilting moments thanks to integrated crossed roller bearing

HIWIN crossed roller bearings consist of an inner ring, an outer ring, cylindrical rollers arranged at a 90° angle and spacers in between. Due to the cross arrangement of the cylindrical rollers, axial forces from both directions, radial forces, tilting moment loads and any load combinations can be absorbed with just one bearing. Thanks to the direct integration of the bearings into the gear units, DATORKER® shaft gear units are very compact.

3. Selection principle

3.1 Process for selecting a DATORKER® shaft gear unit

Definition of application condition
- Each movement should be specified as precisely as possible in the cycle description

↓

Calculation of the load torque, the output speed and the service life
- Calculate the load torques, the output speed and the service life using the movements given in the cycle description.

↓

Selection of design and specifications of the DATORKER® shaft gear unit
- Select the version based on the motor connection and the ambient conditions
- The specifications can be selected on the basis of the calculated load torques and speeds

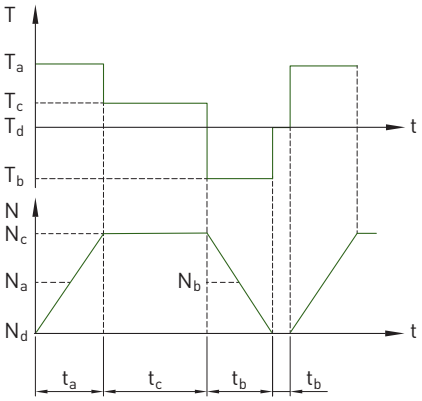
↓

Calculation of the service life of the HIWIN crossed roller bearing
- Calculate the necessary service life taking into account all axial forces, radial forces and tilting moment loads.

↓

Selection finished

3.2 Confirmation of application condition



T Load torque
N Output speed
t Time

Table 3.1 **Confirmation of application condition**

	Load torque	Time	Output speed	Maximum output speed	Maximum input speed
Start time (acceleration)	T_a	t_a	N_a	N_{max}	n_{max}
Operating time (constant)	T_c	t_c	N_c		
Stop time (deceleration)	T_b	t_b	N_b		
Switch-off time	T_d	t_d	N_d		
Impact effect	T_e	t_e	N_e		

3.3 Calculation of the load torque, the speed and the service life

Calculation of the load torque
- T_{av} ≤ Permissible maximum value of the average load torque

↓

Confirmation
- T_a, T_b ≤ Permissible peak torque during start/stop

↓

Confirmation
- T_e ≤ Permissible maximum instantaneous torque

↓

Calculation
- n_{av} ≤ Permissible average input speed
- n_{max} ≤ Permissible maximum input speed

↓

Calculation
- L_{10} ≤ Nominal service life of the gear unit 7,000 hours,
  Nominal service life of the gear unit at L_{50} 35,000 hours
- Determine the required service life, taking into account the load torque and the input speed

3.3.1 Maximum permissible value of the average load torque
When the input speed or load torque changes, please calculate the average load torque and confirm whether it is in accordance with the values in the nominal power table of each specification. Please note that a value exceeding the catalogue value may cause premature ageing of the lubricant and abnormal gear wheel wear due to heat.

F 3.1

$$T_{av} = \sqrt[3]{\frac{N_1 t_1 |T_1|^3 + N_2 t_2 |T_2|^3 + \cdots + N_n t_n |T_n|^3}{N_1 t_1 + N_2 t_2 + \cdots N_n t_n}}$$

3.3.2 Permissible peak torque during start/stop
During starting and stopping, a load greater than the average torque is applied to the gear unit due to the moment of inertia of the load.

3.3.3 Permissible maximum instantaneous torque
The permissible maximum instantaneous torque is the maximum permissible load torque in the event of an impact.

3.3.4 Permissible average input speed and permissible maximum input speed
When setting the operating conditions of the gear unit, do not exceed the value specified in the nominal power table.

Calculation of the average output speed

F 3.2

$$N_{av} = \frac{N_1 t_1 + N_2 t_2 + \cdots + N_n t_n}{t_1 + t_2 + \cdots + t_n}$$

Calculation of the average input speed

F 3.3 $n_{av} = N_{av} \times R$

R = Reduction ratio

Calculation of the maximum input speed

F 3.4 $n_{max} = N_{max} \times R$

3.3.5 Nominal service life of the gear unit

The service life of the gear unit depends on the flexible bearing of the shaft generator. The nominal service life of the shaft generator is 35,000 hours. The calculation formula is as follows:

F 3.5 $$L_{50} = 35.000 \times \left(\frac{T_r}{T_{av}}\right) \times \left(\frac{n_r}{n_{av}}\right)$$

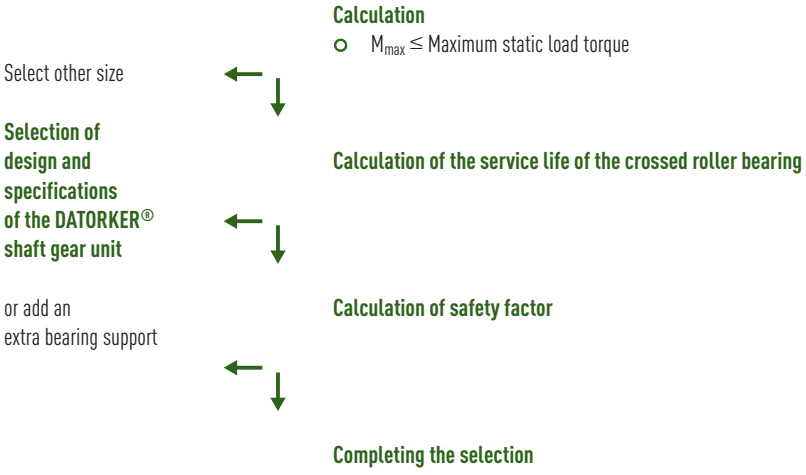
T_r = Nominal torque
n_r = Nominal speed

F 3.6 $$L_{10} = \frac{L_{50}}{5}$$

3.4 Selection of DATORKER® shaft gear unit design and specification

Select the DATORKER® shaft gear unit design according to the operating requirements and check the nominal power table of each unit according to the calculation results from the previous step to confirm whether the selected model specifications match the application. If the gear unit contains a crossed roller bearing, please proceed to the next step and calculate the service life of the crossed roller bearing.

3.5 Calculation of the service life of the crossed roller bearing



3.6 Calculation of efficiency

Due to the mechanical properties of the gear unit, the efficiency changes depending on various factors. These include, above all, the speed, the temperature and the load ratio under which the gear unit is used. To be sure that the motor is correctly dimensioned, always start from the most unfavourable conditions. The graphs for determining the efficiency can be found in the technical data of the respective series.

3.7 Order code DATORKER® strain wave gears

D	S	H	25	80	P	H

DATORKER® strain wave gear

Series:
S: Standard

Type of flex spline:
C: Cup type
H: Hollow type

Model/size:
14, 17, 20, 25, 32

Reduction ratio:
50, 80, 100, 120

Module type :
C: Component type with gear without bearing
P: Combination type with gear and bearing
A: Sealed type with gear, bearing and seal

Input type:
O: Oldham coupling
H: Hollow shaft
J: Shaft journal

3.8 Models

DSC-PO
- Combination type (P) with gear and bearing
- Connection by oldham coupling
- Withstands axial and radial load
- Reduced play

DSC-CO
- Component type (C) with gear without bearing
- Connection by oldham coupling
- Self-assembly of parts required: flex spline and circular spline are not screwed together
- Reduced play

DSH-PH
- Combination type (P) with gear and bearing
- Input hollow shaft design
- Withstands axial and radial load
- Zero play

DSH-AH
- Sealed type (A) with gear, bearing and seal
- Input hollow shaft design
- Withstands axial and radial load
- Zero play
- Completely sealed design
- User friendly design

DSH-PO
- Combination type (P) with gear and bearing
- Connection by oldham coupling
- Withstands axial and radial load
- Reduced play

DSH-AJ
- Sealed type (A) with gear, bearing and seal
- Input solid shaft design
- Withstands axial and radial load
- Completely sealed design
- User friendly design

DSC-PO-M
- Combination type (P) with gear and bearing
- Connection by oldham coupling
- Withstands increased axial and radial load
- Reduced play

DSC-AJ-M
- Sealed type (A) with gear, bearing and seal
- Input solid shaft design
- Withstands increased axial and radial load
- Completely sealed design
- User friendly design

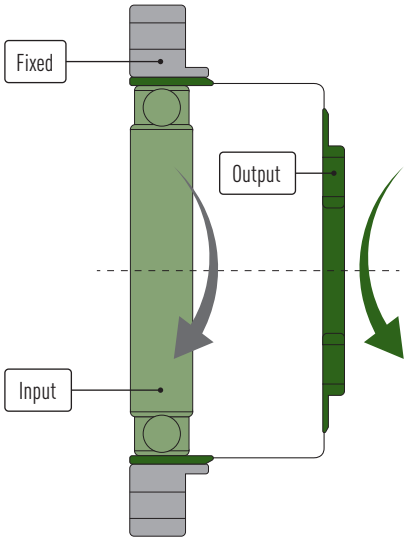
3.9 Technical data

3.9.1 Specification Table

Table 3.2 **Specification Table**

Model/size	Reduction Ratio	Rated torque at input 2000 r/min [Nm]	Peak torque at start/ stop [Nm]	Permissible max. of value of average load torque [Nm]	Permissible impact torque [Nm]	Permissible maximum input speed [rpm]	Permissible average input speed [rpm]
14	50	5.4	18.0	6.9	35.0	8,500	3,500
	80	7.8	23.0	11.0	47.0		
	100	7.8	28.0	11.0	54.0		
17	50	16.0	34.0	26.0	70.0	7,300	3,500
	80	22.0	43.0	27.0	87.0		
	100	24.0	54.0	39.0	108.0		
	120	24.0	54.0	39.0	86.0		
20	50	25.0	56.0	34.0	98.0	6,500	3,500
	80	34.0	74.0	47.0	127.0		
	100	40.0	82.0	49.0	147.0		
	120	40.0	87.0	49.0	147.0		
25	50	39.0	98.0	55.0	186.0	5,600	3,500
	80	63.0	137.0	87.0	255.0		
	100	67.0	157.0	108.0	284.0		
	120	67.0	167.0	108.0	304.0		
32	50	76.0	216.0	108.0	382.0	4,800	3,500
	80	118.0	304.0	167.0	568.0		
	100	137.0	333.0	216.0	647.0		
	120	137.0	353.0	216.0	686.0		

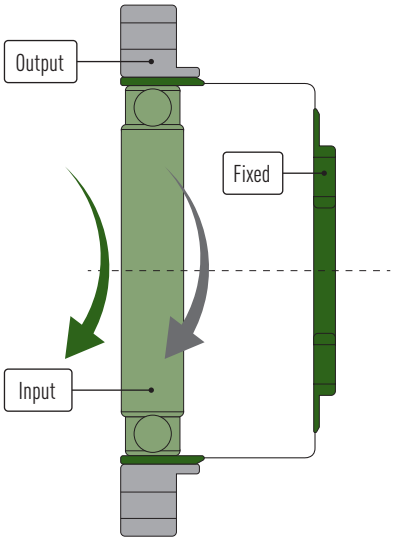
3.9.2 Reduction ratio and rotation direction



Input and Output with reverse direction rotation

Effective reduction ratio = (−1) × R

(R = Reduction ratio from data sheet)

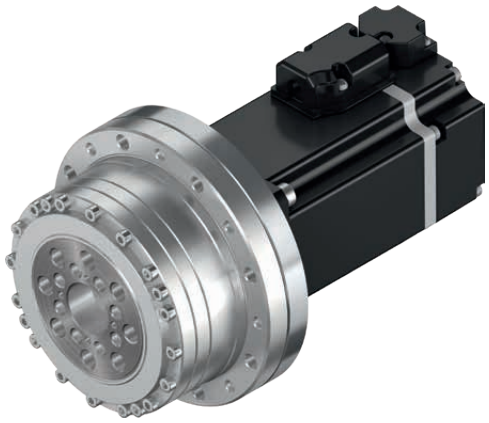


Input and Output with the same direction rotation

Effective reduction ratio = R + 1

4. DSC-P0 with motor

The motor adapters for the DATORKER® strain wave gear type DSC-P0 allow a simple and compact connection of the HIWIN servo motors together with the HIWIN drive amplifiers and all necessary cables.



Main features:
- Compact
- High precision
- Easy assembly
- Complete system
- Motors with and without brake
- 23 bit absolute (multiturn encoder)
- Step direction, EtherCAT (CoE)

Typical applications:
- Rotary/swivel axis
- Rotary tables
- Robot axes

4.1 Technical data

4.1.1 Specification Table

Table 4.1 **Specification Table**

Model/size	Reduction Ratio	Peak torque at start/stop [Nm]	Maximum speed [rpm]	Rated speed [rpm]
DSC20 with 200 W motor	50	56	120	60
	80	74	75	37
	100	82	60	30
DSC25 with 400 W motor	50	98	112	60
	80	137	70	37
	100	157	56	30
DSC32 with 750 W motor	50	216	96	60
	80	304	60	37
	100	333	48	30

Table 4.2 **Specification Table (continued)**

Model/size	Maximum current [A]	Rated current [A]	Maximum tilting moment [Nm]	Moment rigidity [$\times 10^4$ Nm/rad]	Positioning accuracy [arcsec]	Repeating accuracy [arcsec]	Weight [kg]
DSC20 with 200 W motor	6.4	1.60	91	12.8	< 60	< ±6	2.3 (2.6)
DSC25 with 400 W motor	10.0	2.50	156	24.2			3.3 (3.9)
DSC32 with 750 W motor	18.6	4.65	313	53.9			6.9 (7.6)

Values in brackets apply to model with motor brake

4.2 Dimensions

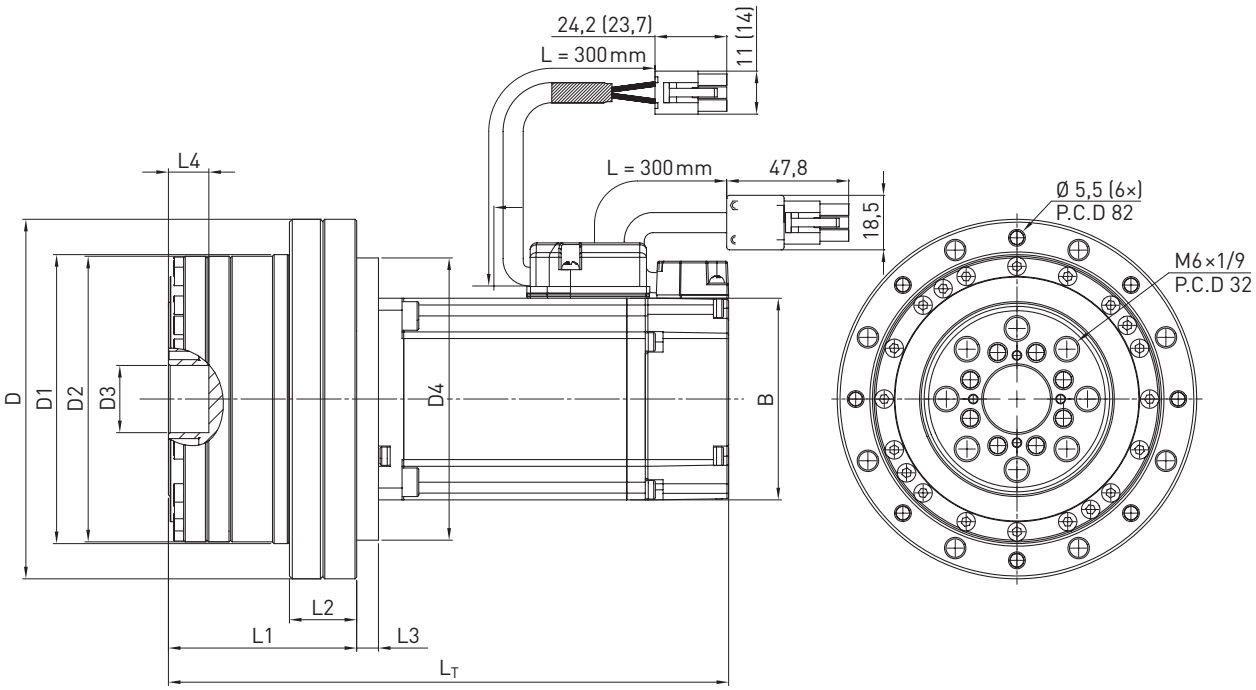


Table 4.3 **Dimensions**

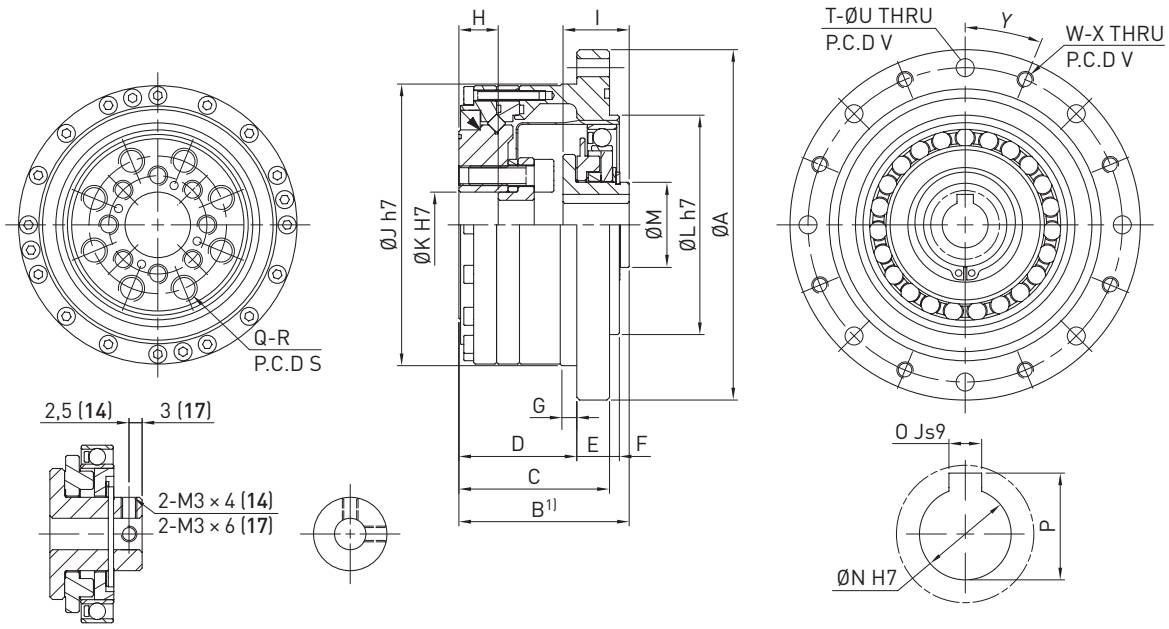
Model/size	L_T	L1	L2	L3	L4
DSC20 with 200 W motor	141.9 (171.9)	54.4	26.4	2.0	9
DSC25 with 400 W motor	166.7 (196.7	56.0	20.0	6.5	12
DSC32 with 750 W motor	203.3 (230.3)	77.5	32.5	3.5	15

Values in brackets apply to model with motor brake

Table 4.4 **Dimensions (continued)**

Model/size	D	D1	D2	D3	D4	B
DSC20 with 200 W motor	93	$72_{-0.03}^{0}$	70	$14_{0}^{+0.018}$	$80_{-0.03}^{-0.01}$	60
DSC25 with 400 W motor	107	$86_{-0.035}^{0}$	85	$20_{0}^{+0.021}$	$84_{-0.03}^{-0.01}$	60
DSC32 with 750 W motor	138	$113_{-0.035}^{0}$	112	$26_{0}^{+0.021}$	$108_{-0.03}^{-0.01}$	80

5. DSC-PO



14/17 20/25/32

Table 5.1 **Dimensions of DSC-PO strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
ØA	mm	73	79	93	107	138
B[1)]	mm	$41.0_{-0.9}$	$45.0_{-0.9}$	$45.5_{-1.0}$	$52.0_{-1.0}$	$62.0_{-1.1}$
C	mm	34	37	38	46	57
D	mm	27	29	28	36	45
E	mm	7.0	8.0	10.0	10.0	12.0
F	mm	2	2	3	3	3
G	mm	3.5	4.0	5.0	5.0	5.0
H	mm	9.4	9.5	9.0	12.0	15.0
I	mm	$17.6_{-0.1}$	$19.5_{-0.1}$	$20.1_{-0.1}$	$20.2_{-0.1}$	$22.0_{-0.1}$
ØJ h7	mm	56	63	72	86	113
ØK H7	mm	11	10	14	20	26
ØL h7	mm	38	48	56	67	90
ØM	mm	14	18	21	26	26
ØN H7	mm	6	8	12	14	14
O Js9	mm	—	—	4	5	5
P	mm	—	—	$13.8^{+0.1}$	$16.3^{+0.1}$	$16.3^{+0.1}$
Q	mm	6	6	8	8	8
R	mm	M4 × 8DP	M5 × 10DP	M6 × 9DP	M8 × 12DP	M10 × 15DP
S (P.C.D)	mm	23	27	32	42	55
T	mm	6	6	6	8	12
ØU	mm	4.5	4.5	5.5	5.5	6.6
V (P.C.D)	mm	65	71	82	96	125
W	mm	6	6	6	8	12
X	mm	M4	M4	M5	M5	M6
Y	Degree	30	30	30	22.5	15
Moment of inertia	$\times 10^{-4}$ kgm^2	0.033	0.079	0.193	0.413	1.690
Weight	kg	0.52	0.68	0.98	1.50	3.20

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

5.1 DSC-PO design

5.1.1 Technical data

Table 5.2 **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	×10^4 Nm/rad
14	0.0350	0.0095	4.7	6.1	41	4.38
17	0.0425	0.0095	5.3	7.6	64	7.75
20	0.0500	0.0095	5.8	9.0	91	12.80
25	0.0620	0.0115	9.6	15.1	156	24.20
32	0.0800	0.0130	15.0	25.0	313	53.90

Table 5.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	×10^{-4} rad	4.4	4.4	2.9	2.9	2.9

Table 5.4 **Hysteresis loss**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50	×10^{-4} rad	5.8	5.8	5.8	5.8	5.8
80 – 120	×10^{-4} rad	2.9	2.9	2.9	2.9	2.9

Table 5.5 **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

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 5.6 **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

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 5.7 **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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ rad	12.0	9.7	11.3	11.1	11.6

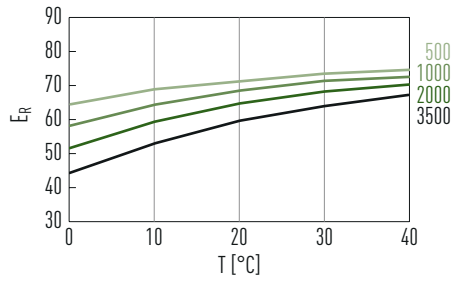
The values are for reference purposes only. The lower limit is 20 % below the value in this table.

5.1.2 Efficiency E_R

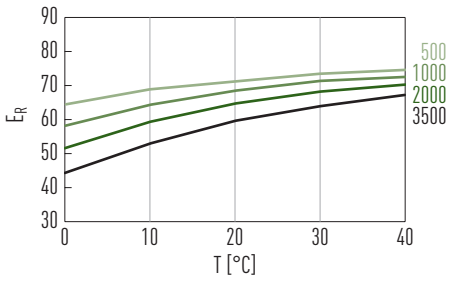
The efficiency of DATORKER® shaft gear units changes depending on the specification, load ratio, operating conditions (speed/load) and lubrication (lubricant type/amount).

E_R Efficiency at nominal torque
T Temperature
Unit: rpm

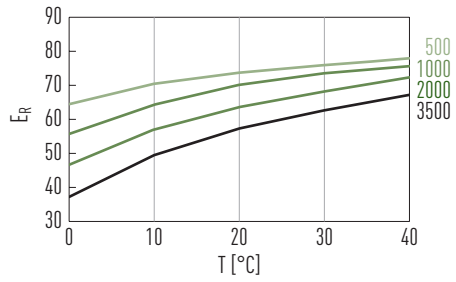
Model: 14
Ratio: 50



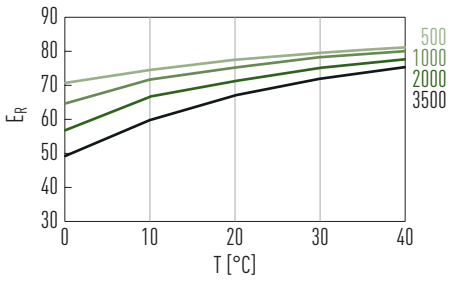
Model: 14
Ratio: 80



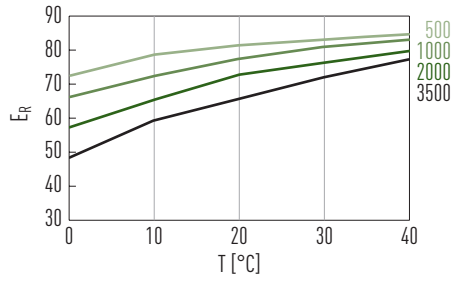
Model: 14
Ratio: 100



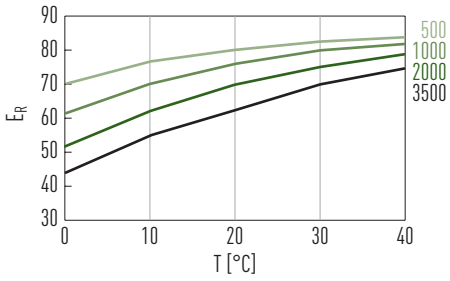
Model: 17–32
Ratio: 50



Model: 17–32
Ratio: 80, 100



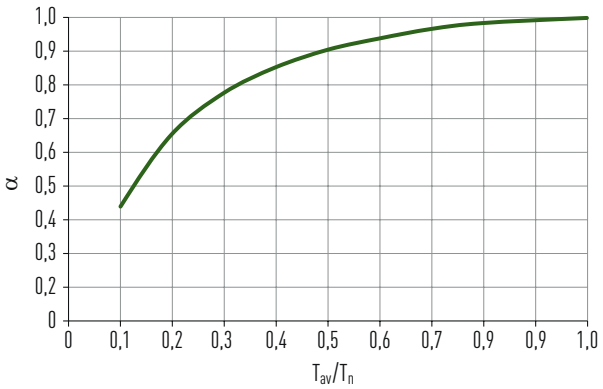
Model: 17–32
Ratio: 120



Correction coefficient α

Efficiency = $\alpha \times E_R$

α Correction coefficient
E_R Efficiency at nominal torque
T_{av} Average load torque
T_n Rated torque
T_{av}/T_n Torque ratio



5.1.3 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 5.8 **Idling operating torque**

Reduction ratio	Input speed [rpm]	Model/size				
		14	17	20	25	32
50	500	3.2	5.1	7.3	12.8	26.1
	1,000	3.9	6.1	9.1	17.8	33.1
	2,000	4.6	7.6	11.8	21.8	44.1
	3,500	5.9	9.6	12.7	28.8	57.1
80	500	2.3	3.8	5.5	9.7	20.3
	1,000	3.0	4.8	7.3	14.7	27.3
	2,000	3.7	6.3	10.0	18.7	38.3
	3,500	5.0	8.3	10.9	25.7	51.3
100	500	2.1	3.5	5.0	9.0	19.0
	1,000	2.8	4.5	6.8	14.0	26.0
	2,000	3.5	6.0	9.5	18.0	37.0
	3,500	4.8	8.0	10.4	25.0	50.0
120	500	—	3.3	4.7	8.5	18.1
	1,000	—	4.3	6.5	13.5	25.1
	2,000	—	5.8	9.2	17.5	36.1
	3,500	—	7.8	10.1	24.5	17.2

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.

6. DSC-CO

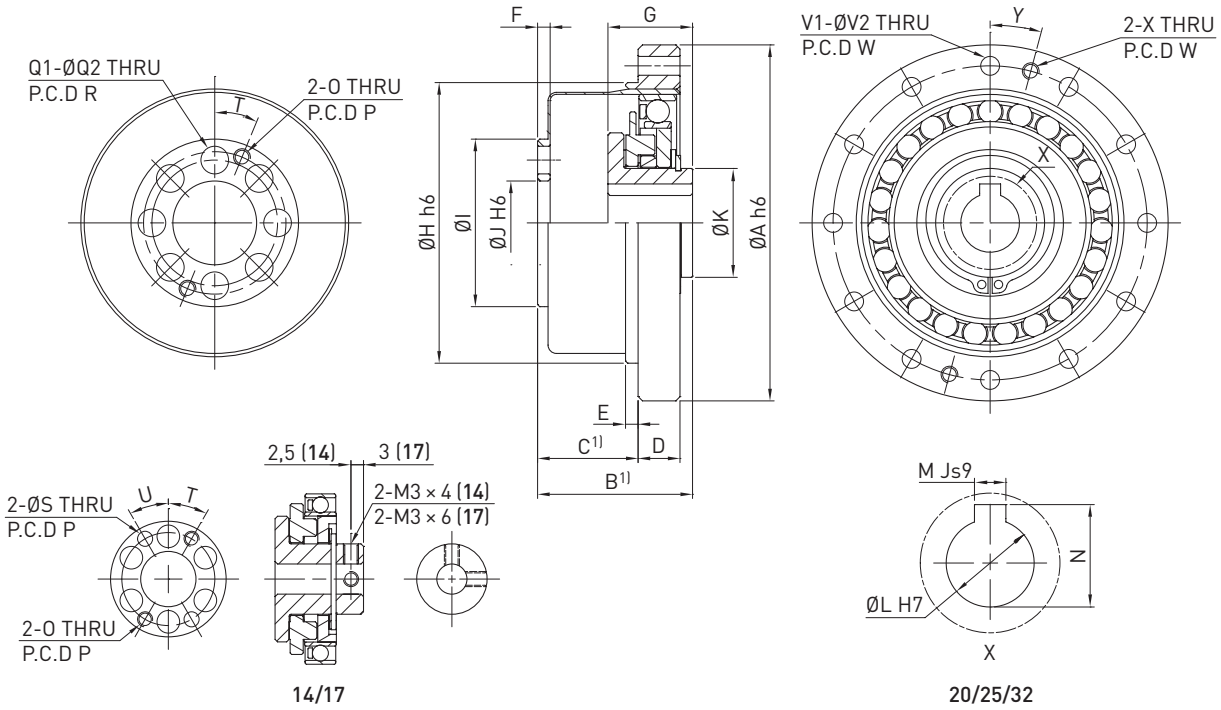


Table 6.1 **Dimensions of DSC-CO strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
ØA h6	mm	50	60	70	85	110
B 1)	mm	$28.5_{-0.8}$	$32.5_{-0.9}$	$33.5_{-1.0}$	$37.0_{-1.0}$	$44.0_{-1.1}$
C 1)	mm	$17.5^{+0.4}$	$20.0^{+0.5}$	$21.5^{+0.6}$	$24.0^{+0.6}$	$28.0^{+0.6}$
D	mm	6.0	6.5	7.5	10.0	14.0
E	mm	2.0	2.5	3.0	3.0	3.0
F	mm	2.4	3.0	3.0	3.0	3.2
G	mm	$17.6_{-0.1}$	$19.5_{-0.1}$	$20.1_{-0.1}$	$20.2_{-0.1}$	$22.0_{-0.1}$
ØH h6	mm	38	48	54	67	90
ØI	mm	23.0	27.2	32.0	40.0	52.0
J H6	mm	11	10	16	20	26
ØK	mm	14	18	21	26	26
ØL H7	mm	6	8	9	11	14
M Js9	mm	—	—	3	4	5
N	mm	—	—	$10.4^{+0.1}$	$12.8^{+0.1}$	$16.3^{+0.1}$
O	mm	M3	M3	M3	M4	M5
P (P.C.D)	mm	18.5	21.5	27.0	34.0	45.0
Q1	mm	6	6	8	8	8
ØQ2	mm	4.5	5.5	5.5	6.6	9.0
R (P.C.D)	mm	17	19	24	30	40
S	mm	$3.0^{+0.015}$	$3.0^{+0.015}$	—	—	—
T	Degree	30	30	22.5	22.5	22.5
U	Degree	30	30	—	—	—
V1	mm	6	12	12	12	12
ØV2	mm	3.5	3.5	3.5	4.5	5.5
W (P.C.D)	mm	44	54	62	75	100

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

Table 6.1 **Dimensions of DSC-CO strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
X	mm	M3	M3	M3	M4	M5
Y	Degree	30	15	15	15	15
Moment of inertia	$\times 10^{-4}$ kgm^2	0.033	0.079	0.193	0.413	1.690
Weight	kg	0.09	0.15	0.28	0.45	0.89

[1] B and C is the tolerance and the matching position of axial direction

6.1 DSC-CO design

6.1.1 Technical data

Table 6.2 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9

Table 6.3 **Hysteresis loss**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9

Table 6.4 **Starting torque**

Reduction ratio	Model/size				
	14	**17**	**20**	**25**	**32**
50	3.3	5.1	6.6	12.0	26
80	2.4	3.3	4.1	7.7	16
100	2.1	2.9	3.7	6.9	15
120	—	2.7	3.3	6.3	13

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 6.5 **Reverse starting torque**

Reduction ratio	Model/size				
	14	**17**	**20**	**25**	**32**
50	1.4	2.5	4.0	7.5	16
80	1.4	2.5	4.2	7.7	16
100	1.7	2.8	4.5	8.4	18
120	—	3.1	4.9	9.2	19

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 6.6 **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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ rad	12.0	9.7	11.3	11.1	11.6

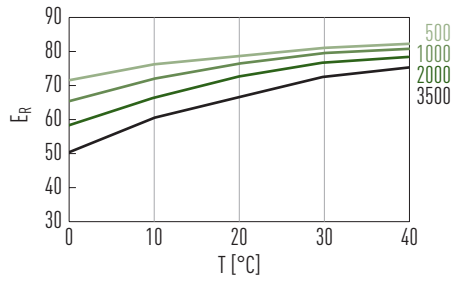
The values are for reference purposes only. The lower limit is 20 % below the value in this table.

6.1.2 Efficiency E_R

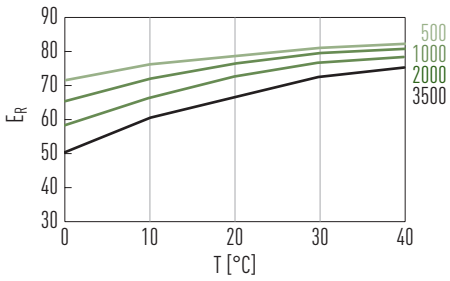
The efficiency of DATORKER® shaft gear units changes depending on the specification, load ratio, operating conditions (speed/load) and lubrication (lubricant type/amount).

E_R Efficiency at nominal torque
T Temperature
Unit: rpm

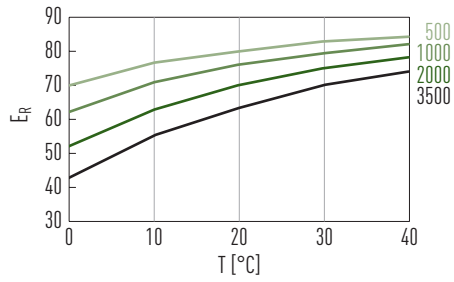
Model: 14
Ratio: 50



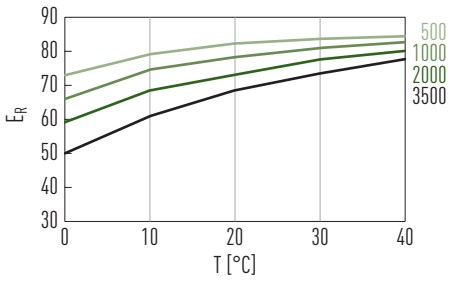
Model: 14
Ratio: 80



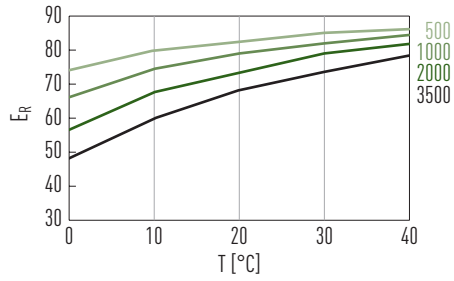
Model: 14
Ratio: 100



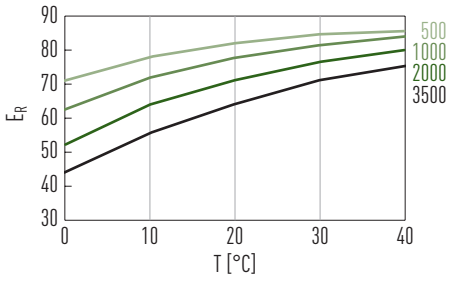
Model: 17–32
Ratio: 50



Model: 17–32
Ratio: 80, 100



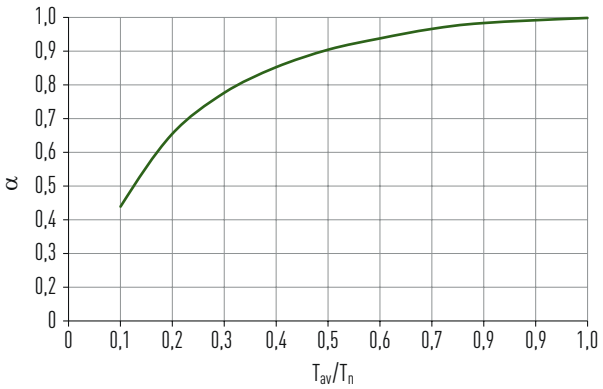
Model: 17–32
Ratio: 120



Correction coefficient α

Efficiency = $\alpha \times E_R$

α Correction coefficient
E_R Efficiency at nominal torque
T_{av} Average load torque
T_n Rated torque
T_{av}/T_n Torque ratio



6.1.3 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 6.7 **Idling operating torque**

Reduction ratio	Input speed [rpm]	Model/size				
		14	**17**	**20**	**25**	**32**
50	500	1.8	3.4	5.1	9.7	21.2
	1,000	2.3	4.4	6.9	12.5	27.2
	2,000	3.1	5.8	9.4	18.5	37.2
	3,500	4.2	7.9	13.4	25.5	50.2
80	500	1.4	2.6	3.9	7.6	16.8
	1,000	1.9	3.6	5.7	10.4	22.8
	2,000	2.7	5.0	8.2	16.4	32.8
	3,500	3.8	7.1	12.2	23.4	45.8
100	500	1.3	2.5	3.7	7.2	16.0
	1,000	1.8	3.5	5.5	10.0	22.0
	2,000	2.6	4.9	8.0	16.0	32.0
	3,500	3.7	7.0	12.0	23.0	45.0
120	500	—	2.4	3.5	6.9	15.4
	1,000	—	3.4	5.2	9.7	21.4
	2,000	—	4.8	7.8	15.7	31.4
	3,500	—	6.9	11.8	22.7	44.4

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.

7. DSH-PO

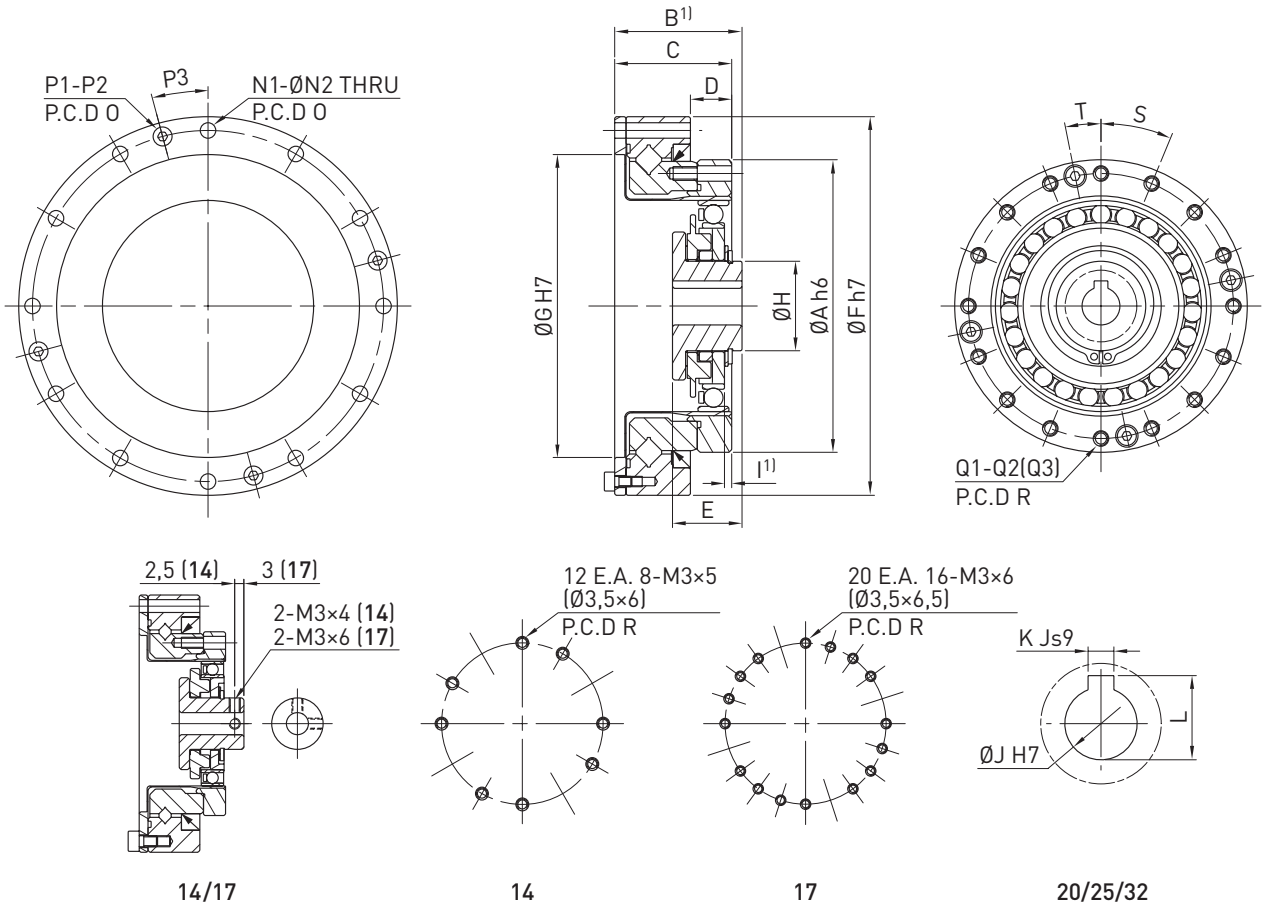


Table 7.1 **Dimensions of DSH-PO strain wave gears**

	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.

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	$\times 10^{-4}$ 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**	**Nm**	**$\times 10^4$ 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 7.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ 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	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ 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

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

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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ 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.

8. DSH-PH

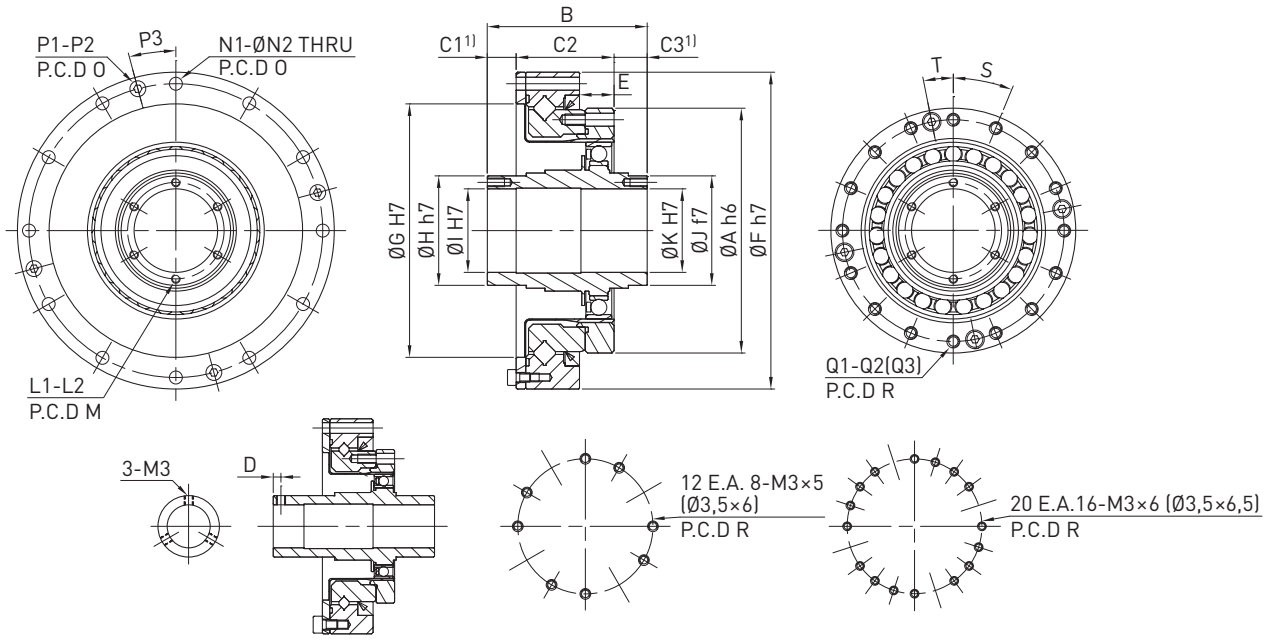


Table 8.1 **Dimensions of DSH-PH strain wave gears**

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	$\times 10^{-4}$ 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**	**Nm**	**$\times 10^4$ 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 8.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ 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	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ 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

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 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

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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ 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

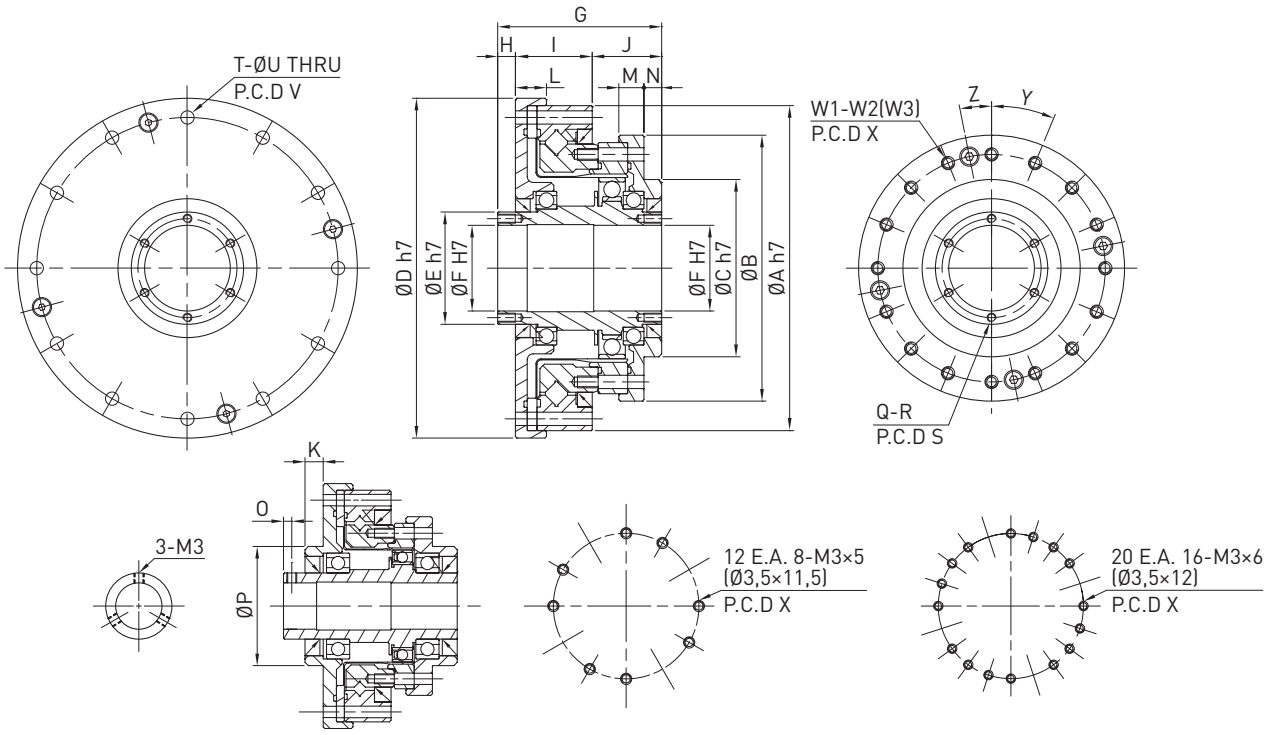


Table 9.1 **Dimensions of DSH-AH strain wave gears**

	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

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	$\times 10^{-4}$ 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**	**$\times 10^4$ 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 – 120	$\times 10^{-4}$ 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	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ 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

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

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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ rad	12.0	9.7	11.3	11.1	11.6

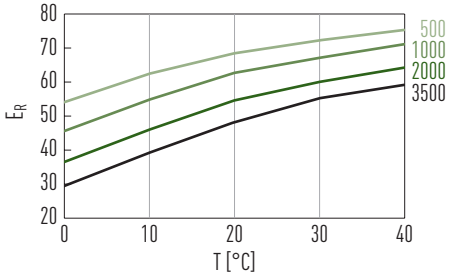
The values are for reference purposes only. The lower limit is 20 % below the value in this table.

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

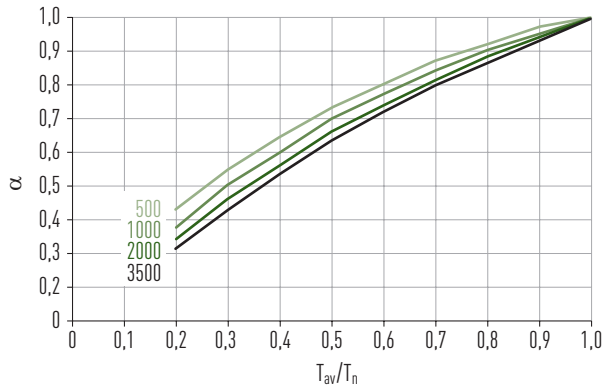
Model: 14–32
Ratio: 50, 80, 100, 120



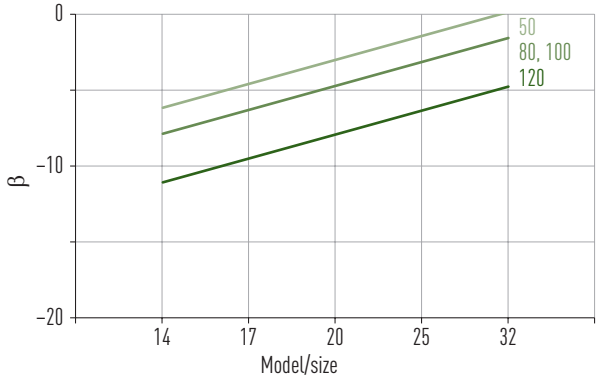
Correction coefficient α
Coefficient for correcting the efficiency α according to torque ratio T_{av}/T_n

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 = α × (E_R+β)



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.

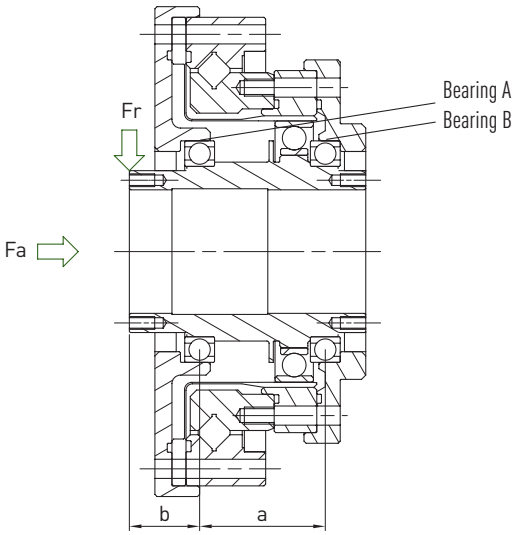
Table 9.8 **Idling operating torque**

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

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.

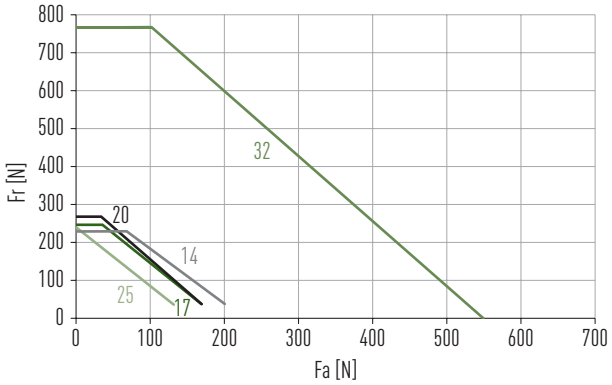


Table 9.9 **Specifications of the deep groove ball bearings**

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

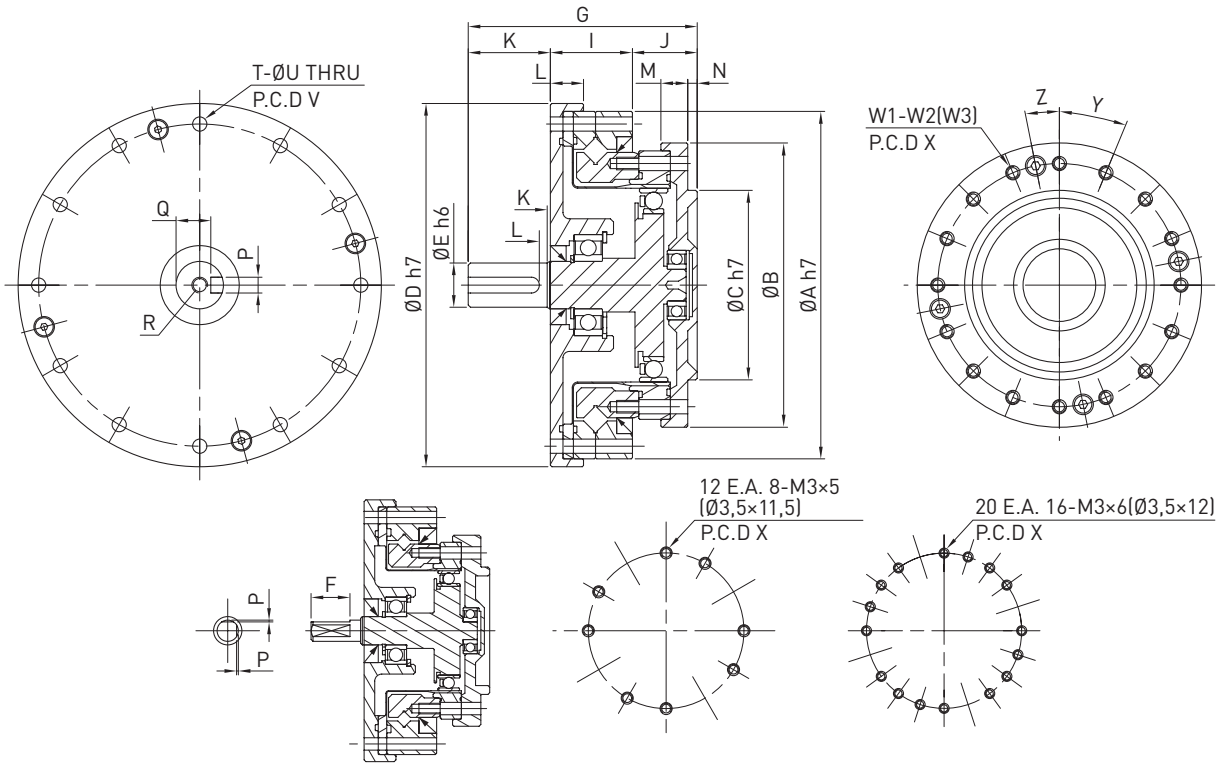


Table 10.1 **Dimensions of DSH-AJ strain wave gears**

	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	$\times 10^{-4}$ 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**	**Nm**	**$\times 10^4$ 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 10.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ 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	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ 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

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 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

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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ rad	12.0	9.7	11.3	11.1	11.6

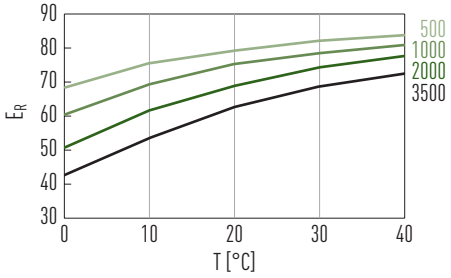
The values are for reference purposes only. The lower limit is 20 % below the value in this table.

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

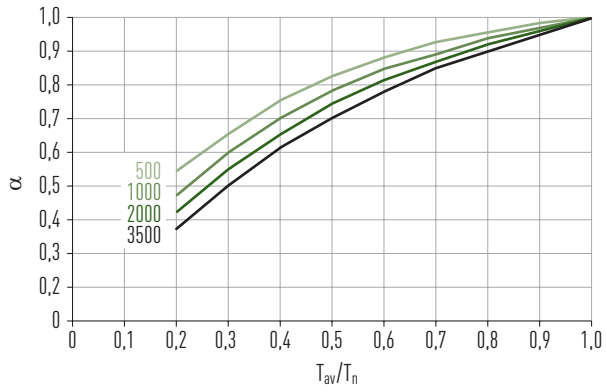
Model: 14–32
Ratio: 50, 80, 100, 120



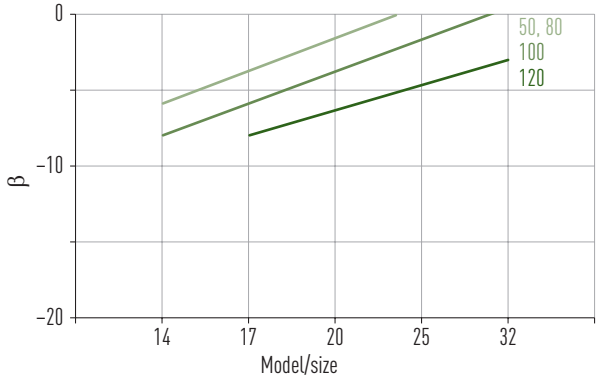
Correction coefficient α
Coefficient for correcting the efficiency α according to torque ratio T_{av}/T_n

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 = α × (E_R+β)



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.

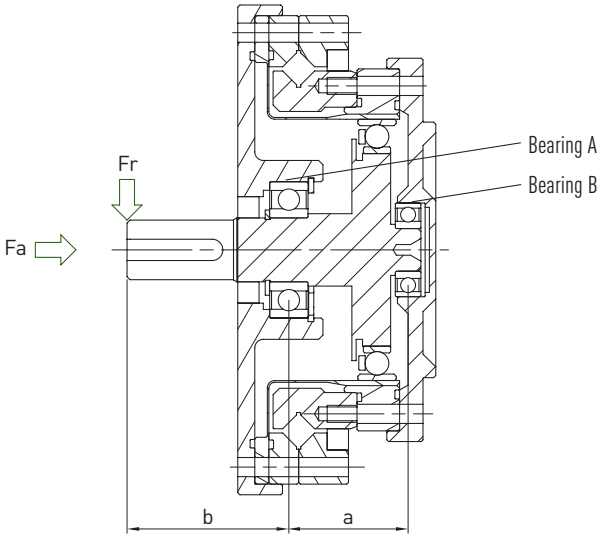
Table 10.8 **Idling operating torque**

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

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.

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.

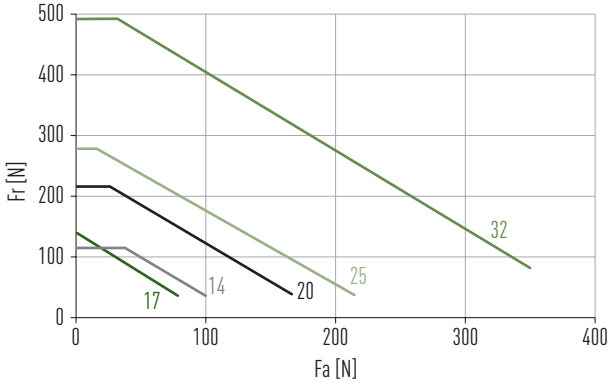
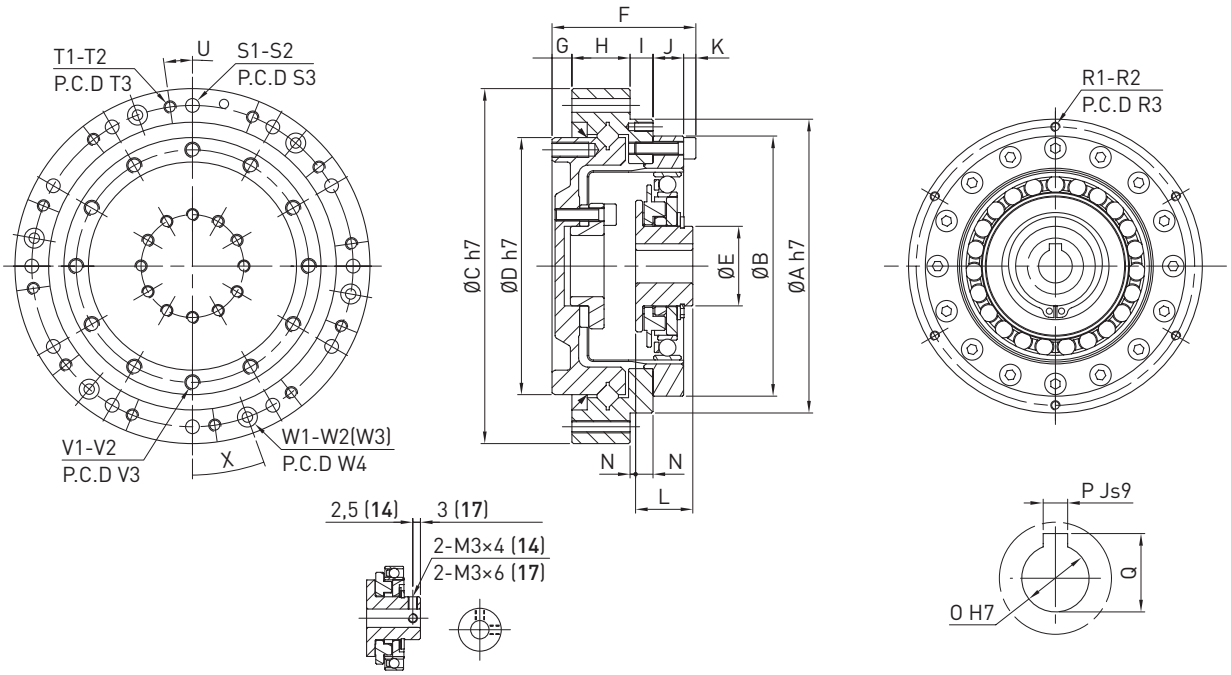


Table 10.9 **Specifications of the deep groove ball bearings**

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

11. DSC-PO-M



14/17 20/25/32

Table 11.1 **Dimensions of DSC-PO-M strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
ØA h7	mm	60	72	82	96	125
ØB	mm	$50^{+0.01}_{-0.015}$	$60^{+0.01}_{-0.02}$	$70^{+0.01}_{-0.02}$	$85^{+0.01}_{-0.025}$	$110^{+0.01}_{-0.025}$
ØC h7	mm	78	88	98	116	148
ØD h7	mm	49	59	69	84	110
ØE	mm	14	18	21	26	26
F	mm	30	34	40	47	59
G	mm	5.0	5.0	5.7	6.5	6.5
H	mm	12.0	13.5	17.2	19.0	24.0
I	mm	4.0	6.0	6.6	7.5	9.5
J	mm	6.0	6.5	7.5	10.0	14.0
K	mm	3	3	$3^{\ 0}_{-0.1}$	4	5
L	mm	$17.6^{\ 0}_{-0.1}$	$19.5^{\ 0}_{-0.1}$	20.1	$20.2^{\ 0}_{-0.1}$	$22.0^{\ 0}_{-0.1}$
M (flange type A)	mm	$6.6^{+0.4}_{\ 0}$	$7.0^{+0.45}_{\ 0}$	$8.1^{+0.5}_{\ 0}$	$7.2^{+0.5}_{\ 0}$	$6.0^{+0.55}_{\ 0}$
N (flange type B)	mm	$2.6^{+0.4}_{\ 0}$	$1.0^{+0.45}_{\ 0}$	$1.5^{+0.5}_{\ 0}$	$0.3^{\ 0}_{-0.5}$	$3.5^{\ 0}_{-0.55}$
ØO H7	mm	6	8	9	11	14
P Js9	mm	—	—	3	4	5
Q	mm	—	—	$10.4^{+0.1}_{\ 0}$	$12.8^{+0.1}_{\ 0}$	$16.3^{+0.1}_{\ 0}$
R1	mm	6	6	6	6	6
R2	mm	M2.5 × 4DP	M3 × 6DP	M3 × 6DP	M3 × 6DP	M4 × 8DP
R3 (P.C.D)	mm	55	66	76	91	118
S1	mm	8	12	12	12	12
ØS2	mm	3.4	3.4	3.4	4.5	5.5
S3 (P.C.D)	mm	68	80	89	105	135
T1	mm	8	12	12	12	12
T2	mm	M3 × 7.8DP	M3	M3	M4	M4
T3 (P.C.D)	mm	68	80	89	105	135
U	Degree	15	10	10	8	10

Table 11.1 **Dimensions of DSC-PO-M strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
V1	mm	12	12	12	12	12
V2	mm	M3 × 6DP	M4 × 8DP	M4 × 8DP	M5 × 10DP	M6 × 10DP
V3 (P.C.D)	mm	43	52	62	76	96
W1	mm	4	6	6	6	6
W2	mm	Ø5.5 × 3DP	Ø5.5 × 3DP	Ø5.5 × 3DP	Ø6.5 × 3.4DP	Ø8 × 4.4DP
ØW3	mm	2.9	2.9	2.9	3.4	4.5
W4 (P.C.D)	mm	68	78	88	105	135
X	Degree	30	20	20	20	20
Moment of inertia	$\times 10^{-4}$ kgm^2	0.033	0.079	0.193	0.413	1.690
Weight	kg	0.54	0.79	1.30	1.95	3.90

11.1 DSC-PO-M design

11.1.1 Technical data

Table 11.2 **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**	**$\times 10^4$ Nm/rad**
14	0.0465	0.014	8.25	11.4	73	7.9
17	0.0590	0.014	10.70	14.8	114	13.7
20	0.0700	0.016	21.00	27.0	172	24.0
25	0.0880	0.018	21.80	35.8	254	39.2
32	0.1140	0.020	34.50	59.0	578	120.3

Table 11.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9

Table 11.4 **Hysteresis loss**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9

Table 11.5 **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

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 11.6 **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

Unit: Nm

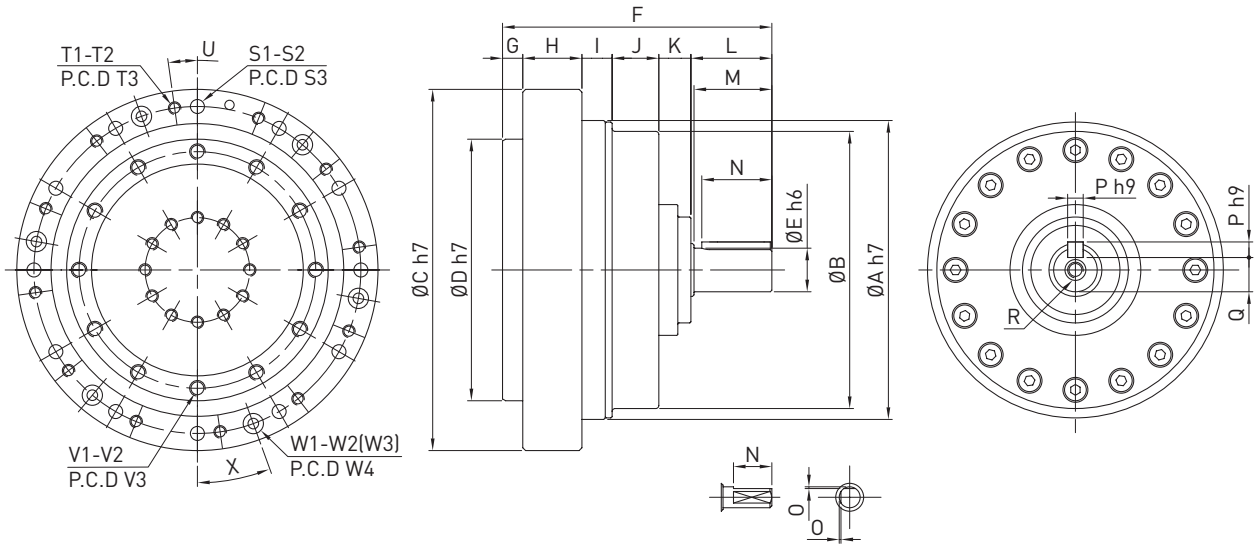
Note: The values in this table vary depending on the working conditions and are for reference purposes only. The upper limit is 20 % above the value in this table.

Table 11.7 **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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ 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.

12. DSC-AJ-M



14/17

Table 12.1 **Dimensions of DSC-AJ-M strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
ØA h7	mm	60	72	82	96	125
ØB	mm	53	64	74	89	116
ØC h7	mm	78	88	98	116	148
ØD h7	mm	49	59	69	84	110
ØE h6	mm	6	8	10	14	14
F	mm	55.0	61.0	73.5	86.5	100.5
G	mm	5.0	5.0	5.7	6.5	6.5
H	mm	12.0	13.5	17.2	19.0	24.0
I	mm	5.7	8.2	8.8	9.7	12.7
J	mm	9.8	9.8	11.5	15.0	20.0
K	mm	7.5	8.0	9.3	10.3	11.3
L	mm	15	17	21	26	26
M	mm	14	16	20	25	25
N	mm	11.0	12.0	16.5	22.5	22.5
ØO	mm	0.5	0.5	—	—	—
P h9	mm	—	—	3	5	5
Q	mm	—	—	$8.2^{\ 0}_{-0.1}$	$11.0^{\ 0}_{-0.1}$	$11.0^{\ 0}_{-0.1}$
R	mm	—	—	M3 × 6DP	M5 × 10DP	M5 × 10DP
S1	mm	8	12	12	12	12
ØS2	mm	3.4	3.4	3.4	4.5	5.5
S3 (P.C.D)	mm	68	80	89	105	135
T1	mm	8	12	12	12	12
T2	mm	M3 × 7.8DP	M3	M3	M4	M4
T3 (P.C.D)	mm	68	80	89	105	135
U	Degree	15	10	10	8	10
V1	mm	12	12	12	12	12
V2	mm	M3 × 6DP	M4 × 8DP	M4 × 8DP	M5 × 10DP	M6 × 10DP
V3 (P.C.D)	mm	43	52	62	76	96
W1	mm	4	6	6	6	6
W2	mm	Ø5.5 × 3DP	Ø5.5 × 3DP	Ø5.5 × 3DP	Ø6.5 × 3.4DP	Ø8 × 4.4DP

Table 12.1 **Dimensions of DSC-AJ-M strain wave gears**

	Unit	Model/size				
		14	**17**	**20**	**25**	**32**
ØW3	mm	2.9	2.9	2.9	3.4	4.5
W4 (P.C.D)	mm	68	78	88	105	135
X	Degree	30	20	20	20	20
Moment of inertia	$\times 10^{-4}$ kgm^2	0.025	0.059	0.137	0.320	1.200
Weight	kg	0.64	0.95	1.40	2.50	5.40

12.1 DSC-AJ-M design

12.1.1 Technical data

Table 12.2 **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**	**$\times 10^4$ Nm/rad**
14	0.0465	0.014	8.25	11.4	73	7.9
17	0.0590	0.014	10.70	14.8	114	13.7
20	0.0700	0.016	21.00	27.0	172	24.0
25	0.0880	0.018	21.80	35.8	254	39.2
32	0.1140	0.020	34.50	59.0	578	120.3

Table 12.3 **Accuracy of angular transmission**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50 – 120	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9

Table 12.4 **Hysteresis loss**

Reduction ratio		Model/size				
		14	**17**	**20**	**25**	**32**
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
80 – 120	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9

Table 12.5 **Starting torque**

Reduction ratio	Model/size				
	14	**17**	**20**	**25**	**32**
50	5.7	9.7	14.0	22	41
80	4.4	7.2	11.0	15	29
100	3.7	6.5	9.9	14	27
120	–	6.2	9.3	13	24

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 12.6 **Reverse starting torque**

Reduction ratio	Model/size				
	14	**17**	**20**	**25**	**32**
50	3.4	5.8	8.4	13	25
80	4.2	6.9	10.0	15	28
100	4.5	7.8	12.0	17	33
120	—	8.9	13.0	19	34

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.

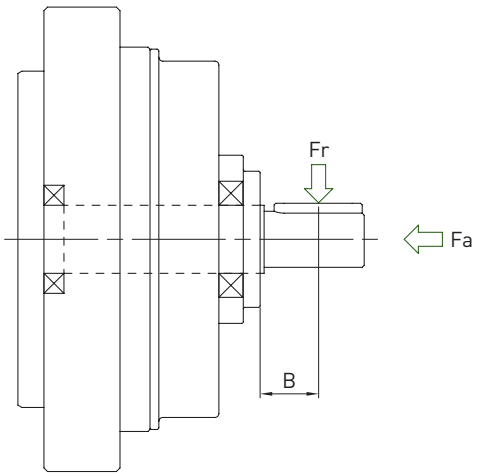
Table 12.7 **Torsional rigidity**

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	$\times 10^4$ Nm/rad	0.34	0.81	1.30	2.50	5.40
	K_2	$\times 10^4$ Nm/rad	0.47	1.10	1.80	3.40	7.80
	K_3	$\times 10^4$ Nm/rad	0.57	1.30	2.30	4.40	9.80
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
	θ_2	$\times 10^{-4}$ rad	16.0	12.0	15.4	15.7	15.7
80 – 120	K_1	$\times 10^4$ Nm/rad	0.47	1.00	1.60	3.10	6.70
	K_2	$\times 10^4$ Nm/rad	0.61	1.40	2.50	5.00	11.00
	K_3	$\times 10^4$ Nm/rad	0.71	1.60	2.90	5.70	12.00
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
	θ_2	$\times 10^{-4}$ 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.

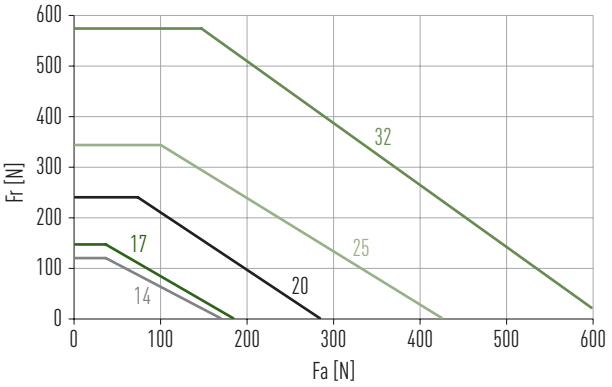
12.1.2 Permissible input load

To ensure proper operation of the reducer, please check the load applied to the input section. As shown below:



Fa Radial load
Fr Axial load
B Offset (see Table 12.8)

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



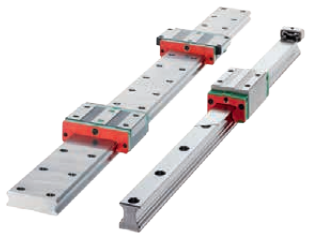
Fa Axial load
Fr Radial load

Table 12.8 **Maximum radial load and offset (B)**

		Model/size				
		14	**17**	**20**	**25**	**32**
Offset (B)	mm	7.0	8.0	10.0	12.5	12.5
Max. radial load	N	118	145	232	342	567

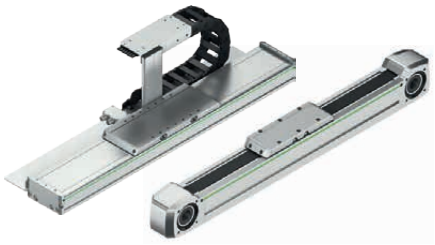
Notes

We live motion.

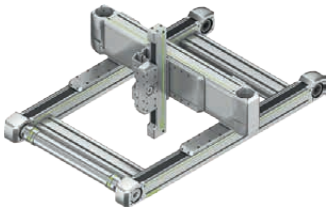


Linear Guideways

Ballscrews



Linear Axes



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