HIWIN®

DATORKER®
Strain Wave Gear

Technical Information

HIWIN Support

About HIWIN

HIWIN®

Semiconductor Subsystem

Semiconductor / LED / Panel
- EFEM (Equipment Front End Module)
- Wafer Robot
- Load Port
- Wafer Aligner

Multi-Axis Robot

Pick-and-Place / Assembly / Array and Packaging / Semiconductor / Electro-Optical Industry / Automotive Industry / Food Industry
- Articulated Robot
- SCARA Robot
- Electric Gripper
- Integrated Electric Gripper

Single-Axis Robot

Precision / Semiconductor / Medical / FPD
- KK, SK
- KS, KA
- KU, KE, KC
- KA B-TYPE
- KC B-TYPE

Torque Motor Rotary Table

Medical / Automotive Industry / Machine Tools / Machinery Industry
- RAB Series
- RAS Series
- RCV Series
- RCH Series

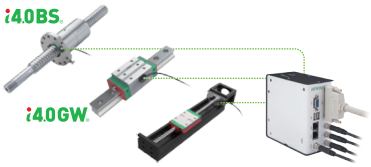
Wire-cut EDM / Die-sinker EDM / Small-hole Drilling EDM
- RAS-E Series
- RCV-E Series
- RCH-E Series

Ballscrew

Precision Ground / Rolled
- Super S Series
- Super T Series
- Mini Roller
- Ecological & Economical Lubrication Module E2
- Auxiliary Lubrication Module EL
- Rotating Nut (R1, R2)
- Energy-Saving & Thermal-Controlling (Cool Type)
- Heavy Load Series (RD)

Linear Guideway

Automation / Semiconductor / Medical
- Ball Type-HG, EG, WE, MG, CG
- Quiet Type-QH, QE, QW, QR
- Other-Stainless Steel, AG, RG, E2, EL, PG, SE, RC



i-Series

Semiconductor / Automation Equipment / Industrial Machines / Machine Tools
- Intelligent 4.0 Ballscrew
- Intelligent 4.0 Guideway
- Intelligent Single-Axis Robot

DATORKER® Strain Wave Gear

Robot / Automation / Semiconductor / Machine Tools
- Standard-DSC, DSH Type
- Heavy Load-DGC, DGH Type

Ball Spline

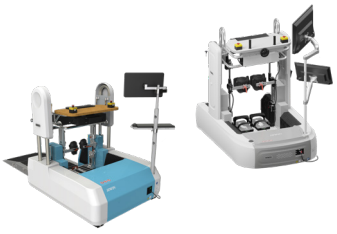
Robot / Medical / Automation Equipment / Industrial Machines / Machine Tools / Semiconductor
- Linear ball spline-RS Type, FS Type, FSR Type
- Compound ball spline-FBR Type

Bearing

Machine Tools / Robot / Industrial Machines / Automation
- Crossed Roller Bearing
- Support Unit

Controller / Drive/ AC Servo Motor

Semiconductor / SMT / 3C Electronics / Automation Equipment / New Energy Equipment / Industrial Machinery
- Controller-HIMC3
- Drives-E1, E2 ,D1, D2T/D2T-LM Series
- Motors-E, FR Series



Medical Equipment

Hospital / Rehabilitation Centers / Long-term Care Facility
- Robotic Gait Training System MRG-P110
- Robotic Gait Training System MRG-P100

Linear Motor / Linear Motor System

Automated Transport / AOI Application / Precision Positioning / Semiconductor Application
- Ironcore Linear Motor
- Ironless Linear Motor
- Tubular Motors
- Air Bearing Platform
- XY Stage • Gantry Systems
- Single-Axis Linear Motor Stage

Torque Motor / Direct Drive Motor

Machine Tools / Lithium-ion Battery / Gear Machining and Inspection
- Torque Motor-TM-5, IM-2, TMRW, TM-5(J0) Series

Display / Automation / Semiconductor / Lithium-ion Battery / Robot / Laser Cutting / AOI Inspection
- Direct Drive Motor-DMS, DMY, DMN, DMT, DMH Series

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DATORKER® Strain Wave Gear

Technical Information Index

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DATORKER® Strain Wave Gear

Preface

DATORKER® – Strain Wave Gear 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 various specifications and reduction ratios to provide customers with wide range of choice. HIWIN is able to provide customized services to meet customers' various design and requirement.

1. Basic Information

1-1 Features

- Compact and light weight – Easy for user to assemble and work with.
- High accuracy – Provides stable repeatability and positioning.
- Customization – Can be customized according to requirements.
- High torque – Widely used in automation and inspection equipment.
- Wide reduction ratio – Various choices available under same model.

1-2 Structure

Flex Spline

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

Wave Generator

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

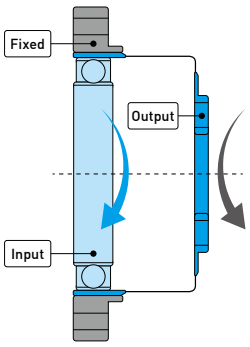
Circular Spline

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.

1-3 Reduction ratio and rotation direction

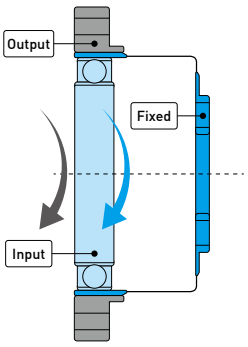
(R = No. of external teeth ÷ difference between no. of external and internal teeth)

DSC/DGC/DTC



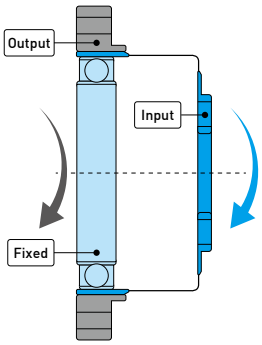
Input and Output with reverse direction rotation

$$\text{Reduction ratio} = \frac{-1}{R}$$



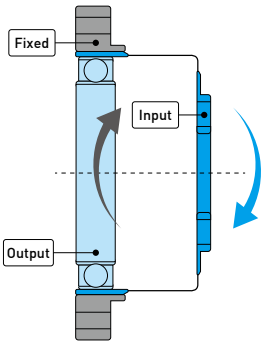
Input and Output with the same direction rotation

$$\text{Reduction ratio} = \frac{1}{R+1}$$



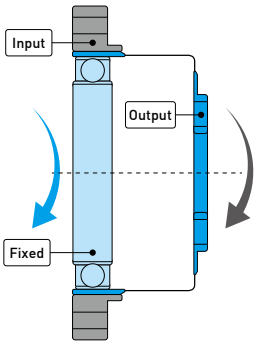
Input and Output with the same direction rotation

$$\text{Reduction ratio} = \frac{R}{R+1}$$



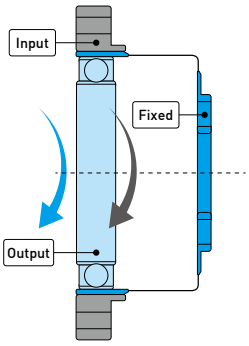
Input and Output with reverse direction rotation

$$\text{Reduction ratio} = -R$$



Input and Output with same direction rotation

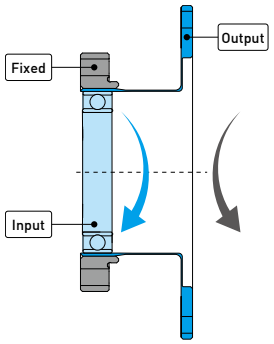
$$\text{Reduction ratio} = \frac{R+1}{R}$$



Input and Output with same direction rotation

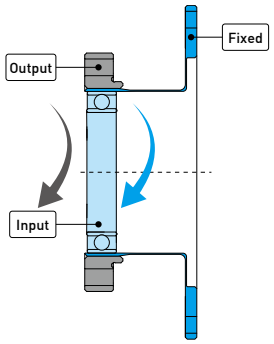
$$\text{Reduction ratio} = R+1$$

DSH/DGH/DTH



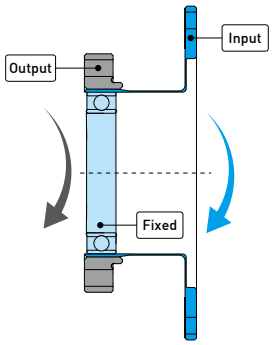
Input and Output with reverse direction rotation

$$\text{Reduction ratio} = \frac{-1}{R}$$



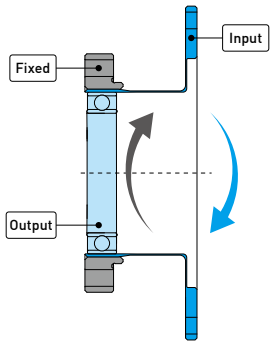
Input and Output with the same direction rotation

$$\text{Reduction ratio} = \frac{1}{R+1}$$



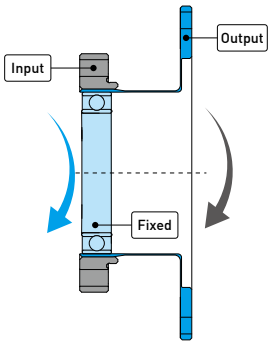
Input and Output with the same direction rotation

$$\text{Reduction ratio} = \frac{R}{R+1}$$



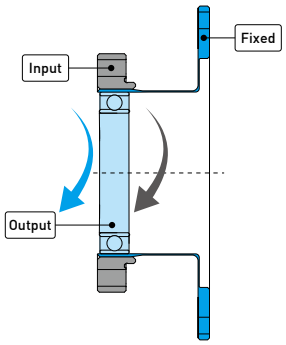
Input and Output with reverse direction rotation

$$\text{Reduction ratio} = -R$$



Input and Output with the same direction rotation

$$\text{Reduction ratio} = \frac{R+1}{R}$$



Input and Output with same direction rotation

$$\text{Reduction ratio} = R+1$$

1-4 Specification

DSC — 25 — 80 — PO — C

Type	
First code	Product code — DATORKER
Second code	Series code — S:Standard G: Heavy load T: Thin
Third code	The type of flex spline — C:Cup type H:Hollow type

Model
11/14/17/20/25/32/40

Reduction ratio
50/80/100/120/160

Module type	
C	Component type
P	Combination type
A	Sealed type

Input type	
O	Oldham coupling
H	Hollow shaft
J	Solid shaft
E	Flat
R	Rigidity
Q	Quick installation

Customized	
M	High tilting moment
L	Lightweight
S	Surface treatment
C	Customized

1-5 Type / Function

Standard series-DSC type

Oldham Component Type (CO)

- Input shaft self-aligning.
- Self-assembly of parts required.

Lightweight Type (CE-L)

- Self-assembly of parts required.
- Reduced weight compare to CO type.

Oldham Combination Type (PO)

- Input shaft self-aligning.
- Withstand axial and radial load.

Oldham Combination Type (PO-M)

- Input shaft self-aligning.
- Withstand axial and radial load.
- High loading capacity of output bearing.

Solid Shaft Type (AJ-M)

- Input solid shaft design.
- Withstand axial and radial load.
- High loading capacity of output bearing.

Standard series-DSH type

Oldham Combination Type (PO)

- Input shaft self-aligning.
- Withstand axial and radial load.

Hollow Combination Type (PH)

- Input hollow shaft design.
- Withstand axial and radial load.

Hollow Sealed Type (AH)

- Input hollow shaft design.
- Withstand axial and radial load.
- Completely sealed design.
- User friendly design.

Solid Shaft Type (AJ)

- Input solid shaft design.
- Withstand axial and radial load.

Heavy load series-DGC type (Higher torque load and life compare with DSC type)

Oldham Component Type (CO)

- Input shaft self-aligning.
- Self-assembly of parts required.

Lightweight Type (CE-L)

- Self-assembly of parts required.
- Reduced weight compare to CO type.

Oldham Combination Type (PO)

- Input shaft self-aligning.
- Withstand axial and radial load.

Heavy load series-DGH type (Higher torque load and life compare with DSH type)

Oldham Combination Type (PO)

- Input shaft self-aligning.
- Withstand axial and radial load.

Hollow Combination Type (PH)

- Input hollow shaft design.
- Withstand axial and radial load.

Hollow Sealed Type (AH)

- Input hollow shaft design.
- Withstand axial and radial load.
- Completely sealed design.
- User friendly design.

Solid Shaft Type (AJ)

- Input solid shaft design.
- Withstand axial and radial load.

Thin series-DTC type (Thinner compare with DSC type)

Component Type (CE)

- Self-assembly of parts required.

Combination Type (PE)

- Withstand axial and radial load.

Component Type (PE-M)

- High loading capacity of output bearing compare with PE.

Thin series-DTH type (Thinner compare with DSH type)

Component Type (PE)

- Ultra-thin hollow structure.

Hollow Sealed Type (AH)

- Completely sealed design.
- Ultra-thin hollow structure.

2. Selection Procedure

2-1 Confirm Application Condition

↓

2-2 Calculation of the Load Torque, Output Rotational Speed and Service Life

↓

2-3 Select DATORKER® Strain Wave Gear Type and Specifications

↓

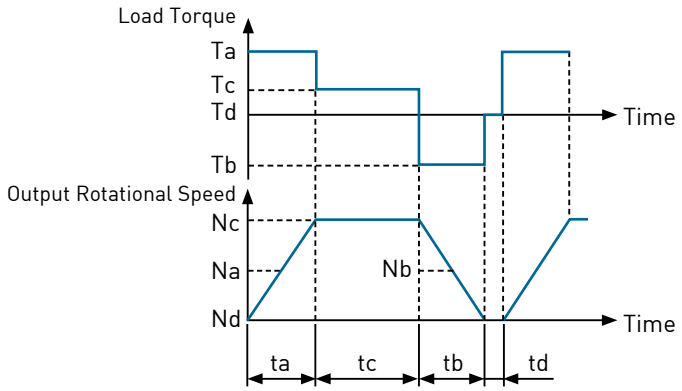
2-4 Calculation of HIWIN Crossed Roller Bearing Service Life

NG

↓ OK

Completion of selection

2-1 Confirm Application Condition



Model \ Item	Load Torque	Time	Output Rotational Speed	Maximum Output Rotational Speed	Maximum Input Rotational Speed
Start Time (Acceleration)	T_a	t_a	N_a		
Operation Time (Constant)	T_c	t_c	N_c		
Stop Time (Deceleration)	T_b	t_b	N_b	N_{max}	n_{max}
Break Time	T_d	t_d	N_d		
Impact	T_e	t_e	N_e		

2-2 Calculation of Load Torque, Rotational Speed and Service Life

2-2-1 Calculate load torque
T_{av} ≦ Permissible maximum value of average load torque

↓

2-2-2 Confirm
T_a 、T_b ≦ Permissible peak torque at start/stop

↓

2-2-3 Confirm
T_e ≦ Permissible maximum instantaneous torque

↓

2-2-4 Calculate
n_{av} ≦ Permissible average input rotational speed
n_{max} ≦ Permissible maximum input rotational speed

↓

2-2-5 Calculate
L_h ≧ Reducer rated service life 7000 hours (L_{10}:10% damage probability)
35000 hours (L_{50}:average life)

2-2-1 Permissible maximum value of average load torque

When the input rotational speed or load torque changes, please calculate the average load torque and confirm whether it meets the rated performance table values of each specification. Please pay attention that if the value exceeds the catalog value, it may cause premature lubricant deterioration and abnormal gear wear due to heat.

Calculate average load torque $T_{av} = \sqrt[3]{\dfrac{N_1 t_1 |T_1|^3 + N_2 t_2 |T_2|^3 + \cdots + Nn\, tn |Tn|^3}{N_1 t_1 + N_2 t_2 + \cdots + Nn\, tn}}$

2-2-2 Permissible peak torque at start/stop

During start and stop, due to the moment of inertia of the load, a load greater than the average torque will act on the reducer.

2-2-3 Permissible maximum instantaneous torque

The maximum allowable load torque when an impact occurs.

2-2-4 Permissible average input rotational speed & permissible maximum input rotational speed

When setting the operating conditions of the reducer, do not exceed the values indicated in the rated performance table.

Calculate average output rotational speed $N_{av} = \dfrac{N_1 t_1 + N_2 t_2 + \cdots + N_n t_n}{t_1 + t_2 + \cdots + t_n}$

Calculate average input rotational speed $n_{av} = N_{av} \times R$

Calculate maximum input rotational speed $n_{max} = N_{max} \times R$

R is Reduction Ratio

2-2-5 Reducer rated service life

The operating service life of the reducer depends on the flex bearing of the wave generator. The nominal service life of the wave generator is 7000 hours. The calculation formula is as follows:

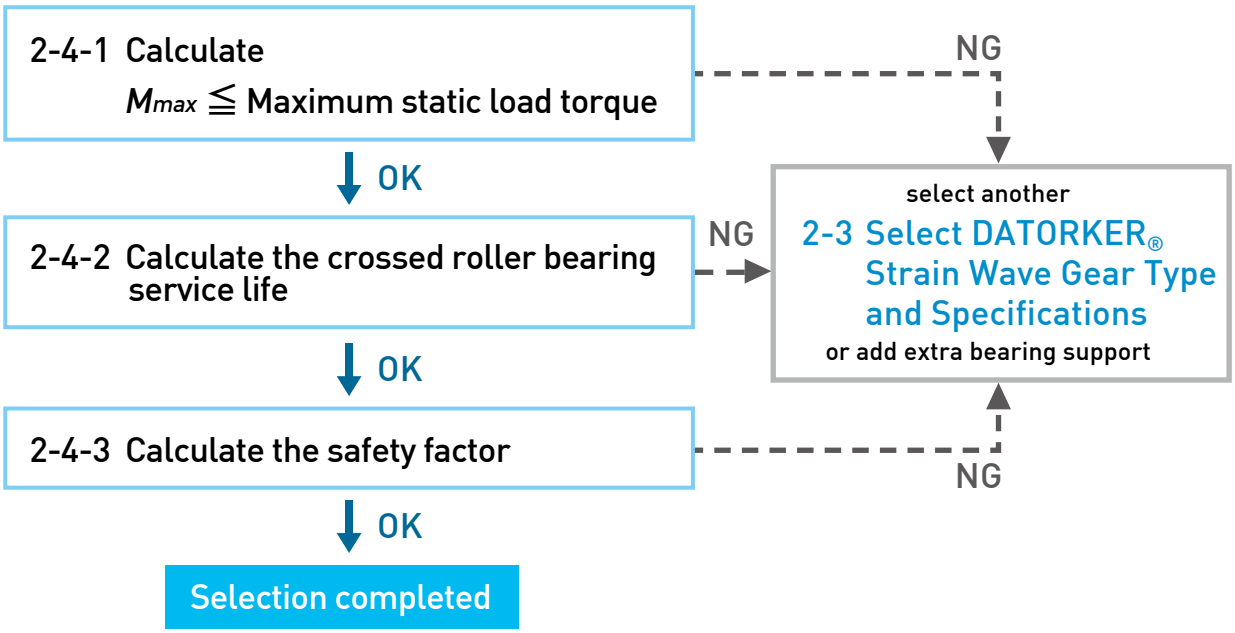
Calculate service life $L_h = 7000 \times \left(\dfrac{T_r}{T_{av}}\right)^3 \times \left(\dfrac{n_r}{n_{av}}\right)$

T_r is Rated torque (Nm)
n_r is Rated rotational speed (rpm)

2-3 DATORKER® Type and Specification Selection

Select the DATORKER® model according to the operation requirements, and check the Rated performance table of each unit according to the calculation results from the previous step, to confirm if the selected model specifications will meet the application. If the reducer is installed with a crossed roller bearing, please proceed to the next step and calculate the service life of the crossed roller bearing.

2-4 Calculation of the Crossed Roller Bearing Service Life

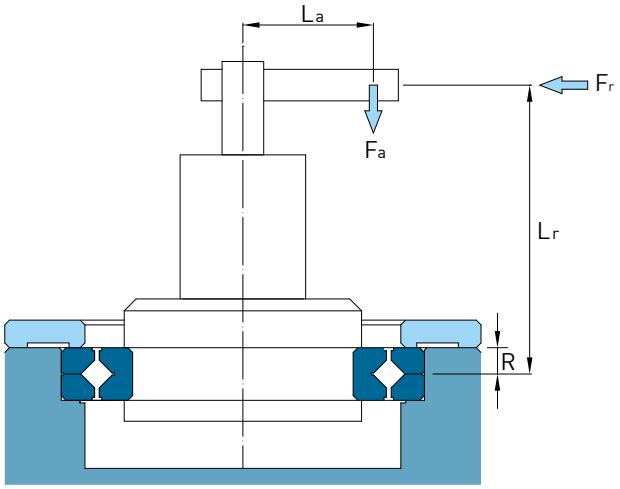


2-4-1 Maximum static load moment

The crossed roller bearing can withstand the maximum radial and maximum axial load.

Calculate maximum static load moment $M_{max} = Fr_{max} \times L_r + Fa_{max} \times L_a$

Fr is radial load (N)
Fa is axial load (N)



2-4-2 Calculation for service life of crossed roller bearings

Calculate basic service life $L = \left(\frac{C}{Fw \times P}\right)^{\frac{10}{3}}$

Load condition	Load factor (Fw)
No impact / vibration	1 ~ 1.2
Normal	1.2 ~ 1.5
With impact & vibration	1.5 ~ 3

P is dynamic equivalent load
C is basic dynamic load rating
Fw is load factor

Calculate dynamic equivalent load $P = X\left(Fr + \frac{2M}{Dpw}\right) + YFa$

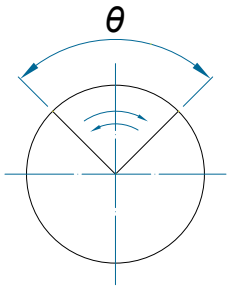
where $\frac{Fa}{Fr + 2M/Dpw} \leqq 1.5$for, X=1, Y=0.45. where $\frac{Fa}{Fr + 2M/Dpw} \geqq 1.5$for, X=0.67, Y=0.67.

M is Torque (Nm)
Dpw is pitch circle diameter (m)

In a reciprocating oscillation application, please calculate according to the following formula

Calculate service life of oscillating $L_{oc} = \frac{180°}{\theta} \times L$

θ is the angle of the oscillating



2-4-3 Calculate the safety factor

The safety factor is determined by the basic static load rating and the static equivalent load, as follows :

Calculate Safety factor $f_s = \frac{C_o}{P_o}$

Operation condition	Safety factor (f_s)
Standard operation	≧ 1.5
Bearing with vibrating load	≧ 2
High rotational speed and high accuracy	≧ 3

* The above table shows the lower limit of the static safety factor. If it is a dynamic situation, it is recommended to safety factor of 7 or more.

P_o is static equivalent load
C_o is basic static load rating

Calculate basic static equivalent load

$$P_o = F_r + \frac{2M}{Dpw} + 0.44F_a$$

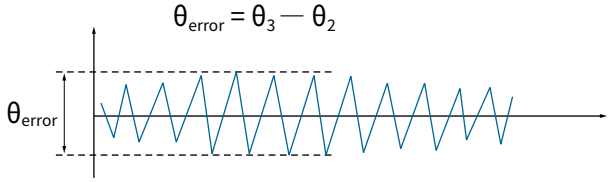
3. Definition

3-1 Angle Transmission Accuracy

When any rotation angle (θ_1) is input, the difference in the value (θ_{error}) between the theoretical output rotation angle (θ_2) and the actual output rotation angle (θ_3) is the angle transmission accuracy.

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

$$\theta_{error} = \theta_3 - \theta_2$$



3-2 Starting Torque

The maximum torque value required under no-load conditions, when the input (high speed) applies torque and the output (low speed) starts to operate.

3-3 Reversed Starting Torque

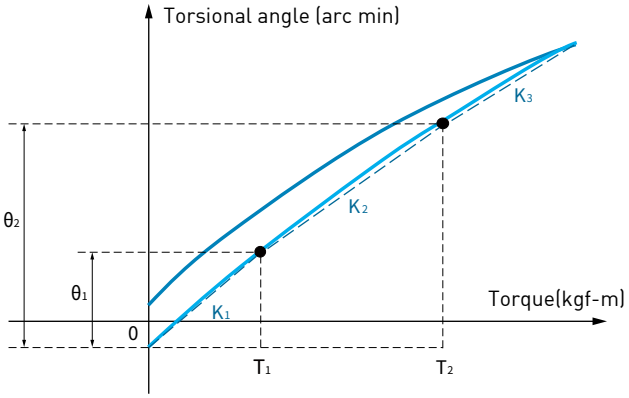
The maximum Torque value required under no-load conditions, when the output (low speed) applies torque and the input (high speed) starts to operate.

3-4 Torsional Rigidity

It is defined as the fixed input (wave generator) and applies a torque to the output (flex spline) of the Strain Wave Gear. The ratio generated by torque and the torsion angle.

The slope of the "torque-torsion angle graph" is expressed as a spring constant. The "torque-torsion angle diagram" is divided into 3 parts, and the spring constant of each area is K_1, K_2 and K_3 represent.

- 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 above "T_2"



Calculation of torsional angle

The torsional angle of the gear under load can be calculated using the following formulas:

- When $T \leq T_1$: $\theta = \frac{T}{K_1}$

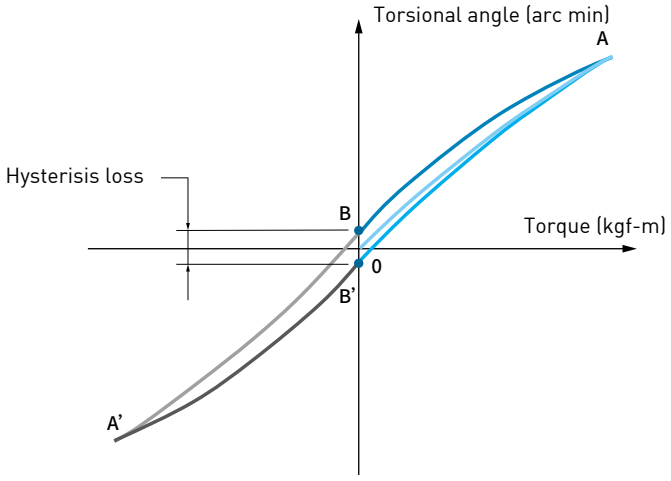
- When $T_1 < T \leq T_2$: $\theta = \frac{T_1}{K_1} + \frac{(T - T_1)}{K_2}$

- When $T > T_2$: $\theta = \frac{T_1}{K_1} + \frac{(T_2 - T_1)}{K_2} + \frac{(T - T_2)}{K_3}$

θ is torsional angle (arc min)
T is applied torque (kgfm)
T_1 , T_2 is torque (kgfm)※
K_1 , K_2 , K_3 is torsional rigidity (kgfm/arc min)※
※Refer to the torsional rigidity table of Chapter 5. Product Series

3-5 Hysterisis Loss

After the torque is applied to the rated value and return to "0", the torsion angle will not be completely "0", and will have 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.



3-6 Maximum Backlash

In a mechanical system, the maximum displacement or amount of rotation or rotation of another part in a certain direction while maintaining one part stationary. The backlash of the HIWIN DATORKER® gear engage part is suppressed to "0". The source of the maximum backlash is caused by the gap between the Oldham coupling and the wave generator.

3-7 Resonance

3-7-1 Resonance frequency

Overview of the calculation method for the natural frequency of a vibration system involving the strain wave gear:

$$f_n = \frac{1}{2\pi}\sqrt{\frac{K_1}{J}}$$

f_n is resonance frequency (Hz)
K_1 is torsional rigidity (Nm/rad)
J is load inertia (Kgm^2)

To minimize system vibration, ensure that the calculated resonance frequency complies with the recommended minimum values for each application.

Application	Recommended minimum resonance frequency f_n
Slow rotary tables, Welding axes, Tool magazines, Medical positioning	≧ 8
General machinery axes	≧ 15
Grinding B/C axes, Turning C axes, Milling heads, Laser welding axes	≧ 20

3-7-2 Resonance speed

Angular transmission error in the strain wave gear may sometimes manifest as rotational vibration on the load side. This becomes particularly critical when the vibration frequency of the strain wave gear matches the natural frequency of the system or the load inertia. Under such conditions, resonance occurs, and the angular transmission error will be amplified. To prevent this, it is very important to follow the design guidelines for each product series.
Additionally, the main source of angular transmission error is the structure of the strain wave gear. For each rotation of the input shaft, two error cycles will be generated. This means the main vibration frequency caused by the error is twice of the input frequency.

For example, if the vibration involving the reduction gear has a natural frequency of f_n = 25 Hz, then the corresponding input rotational speed N_n can be calculated as:

$$N_n = \frac{25}{2} \times 60 = 750 \text{ r/min}$$

It is recommended to avoid operating at the resonance speed. If passing through the resonance speed is necessary, do so quickly to minimize vibration and prevent potential damage.

4. Design Description

4-1 Wave Generator Structure

The wave generator is the input component of the HIWIN DATORKER® Strain Wave Gear. Depending on its size and design, it can be connected to the motor shaft using screws, clamps, keyways, axial bolts, or customized connection methods.

Wave generators are available in two types:

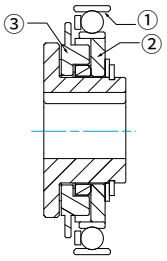
- Flexible type with oldham coupling: This design automatically compensates for installation misalignment, including eccentricity and angular errors.
- Rigid Integrated type: This version does not offer compensation and requires precise alignment during installation. Design details may vary across different series.

For more information, please refer to the appearance diagrams of each series.

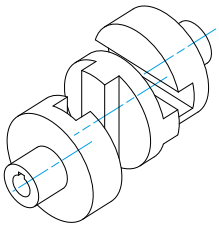
Below is a schematic illustration of the basic structure of the wave generator:

Wave Generator with Oldham coupling

①	Bearing
②	Cam
③	Oldham coupling

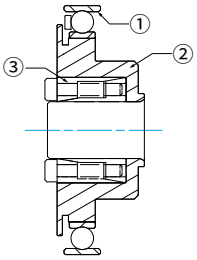


Principle of an Oldham coupling



Wave Generator with Clamping element

①	Bearing
②	Cam
③	Clamping element



4-2 Axial Force Acting on the Wave Generator

During operation, the flexspline undergoes continuous elastic deformation, which generates an axial thrust on the wave generator. Therefore, it is crucial to firmly secure the wave generator in the mechanical design to prevent displacement or damage.

- When the system is in deceleration mode, the thrust direction is F1.
- When the system is in acceleration mode, the thrust direction becomes F2.

The axial thrust acting on the wave generator can be calculated using the following formulas:

- For a reduction ratio of 50:

$$F = 2 \times \frac{T}{D} \times 0.07 \times \tan 30°$$

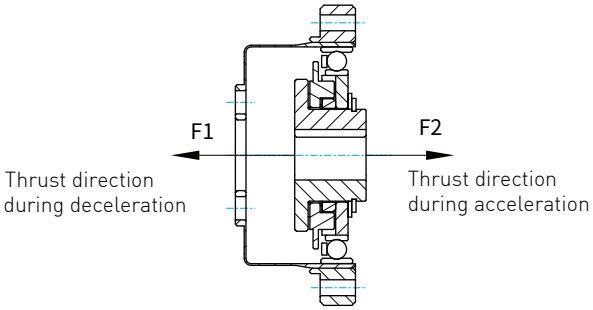
- For a reduction ratio of 80 or above:

$$F = 2 \times \frac{T}{D} \times 0.07 \times \tan 20°$$

F represents the thrust

D is model X 0.00254

T is output torque

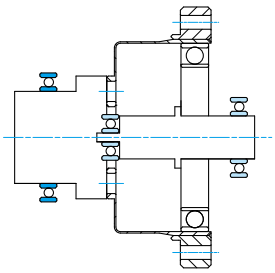


4-3 Bearing Support Design for Input and Output Shafts

When designing the DATORKER® – Strain Wave Gear mechanism, the bearing support for the input and output shafts is critical to ensuring both accuracy and service life.
These bearings must withstand possible axial and radial loads while maintaining stable positioning.
For the input side, the radial clearance of the bearings should comply with international standards. It is recommended to select grade “C2” or “CN” to reduce runout during operation.
When the wave generator (WG) is mounted directly on the motor shaft, it is essential to check the dimensional tolerance of the motor shaft and follow the specifications in each product section under “Installation accuracy.”
On the output side, to fully achieve the reducer’s precision, it is recommended to use a bearing structure with high rigidity and axial/radial preload to prevent gear accuracy degradation caused by load variations.
The diagram below illustrates the bearing support configurations for the wave generator (WG), flexspline (FS), and circular spline (CS) in different setups, indicating the input and output positions. These configurations can be selected based on application requirements. For more details, please refer to the“Installation accuracy” specifications in each product section.

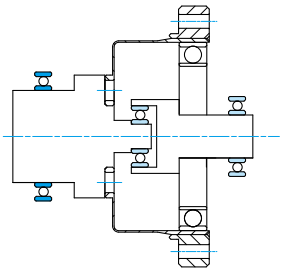
WG input, FS output, CS fixed

- Common reducer configuration
- Support bearing located inside FS, with the inner ring of the bearing rotating



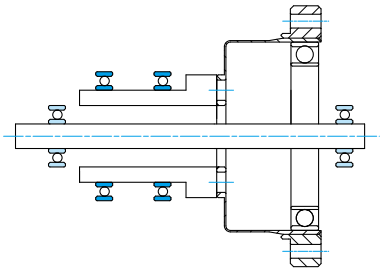
WG input, FS output, CS fixed

- Support bearing located inside FS, with the outer ring of the bearing rotating



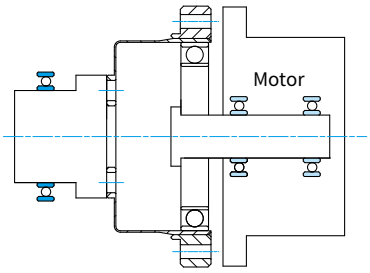
WG input, FS output, CS fixed (bearing on the outside)

- Support bearing located on the outer side of FS
- Compact design applications



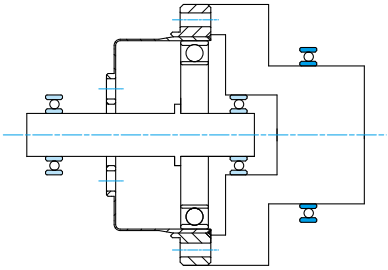
WG input, FS output, CS fixed

- The motor directly drives the wave generator



WG input, FS fixed, CS output

- Flexspline fixed, circular spline becomes the output



5. Product Series

5-1 DSC-CO Type

5-1-1 Technical data

Table 5-1-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
11	50	3.5	0.36	8.3	0.85	5.5	0.56	17	1.7	8500	3500
	100	5.0	0.51	11	1.1	8.9	0.91	25	2.6		
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	108	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-1-2 Angle transmission accuracy

Reduction ratio \ Model		11	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	5.8	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	2	1.5	1.5	1	1	1	1

Table 5-1-3 Hysterisis loss

Reduction ratio \ Model		11	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-1-4 Maximum backlash

Reduction ratio \ Model		11	14	17	20	25	32	40
50	$\times 10^{-5}$ rad	14.1	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	24	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	—	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	—	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	7.3	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	15	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	—	—	3.9	3.9	3.9	2.9	2.9
	arc sec	—	—	8	8	8	6	6
160	$\times 10^{-5}$ rad	—	—	—	2.9	2.9	2.4	2.4
	arc sec	—	—	—	6	6	5	5

Table 5-1-5 Starting torque

Unit : cNm

Reduction ratio \ Model	11	14	17	20	25	32	40
50	1.6	3.3	5.1	6.6	12	26	46
80	—	2.4	3.3	4.1	7.7	16	29
100	1.1	2.1	2.9	3.7	6.9	15	26
120	—	—	2.7	3.3	6.3	13	24
160	—	—	—	2.9	5.5	12	21

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

Table 5-1-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	11	14	17	20	25	32	40
50	1	1.4	2.5	4	7.5	16	28
80	—	1.4	2.5	4.2	7.7	16	28
100	1.4	1.7	2.8	4.5	8.4	18	31
120	—	—	3.1	4.9	9.2	19	34
160	—	—	—	5.8	11	23	40

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

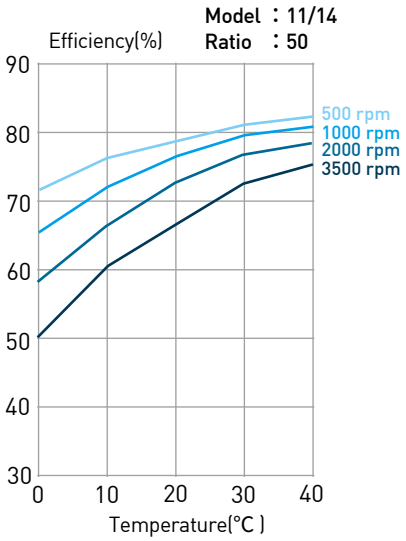
Table 5-1-7 Torsional rigidity

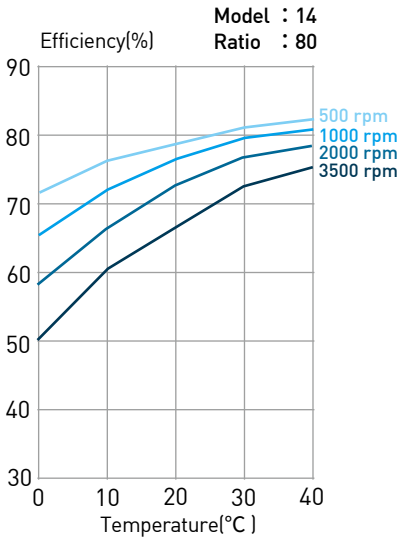
Reduction ratio \ Model			11	14	17	20	25	32	40
T_1		Nm	0.8	2.0	3.9	7.0	14	29	54
		kgfm	0.082	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	2.0	6.9	12	25	48	108	196
		kgfm	0.2	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.22	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.066	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.3	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.09	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.32	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.096	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	3.6	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	1.2	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	8	16	12	15.4	15.7	15.7	15.4
		arc min	2.6	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.27	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.08	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.34	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.1	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.44	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.13	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	3.0	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.0	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	6	12	9.7	11.3	11.1	11.6	11.1
		arc min	2.2	4.2	3.3	3.9	3.8	4.0	3.8

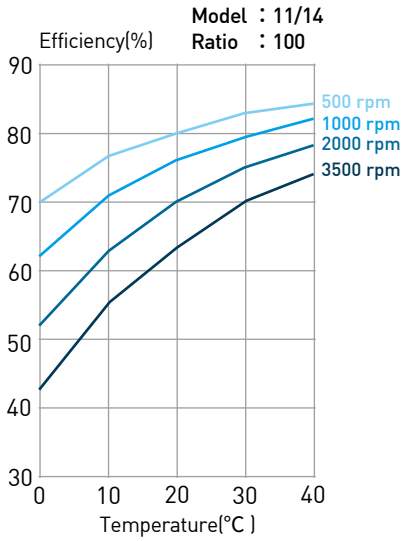
Note : The values are for reference only. The lower limit is 20% under the value in this table.

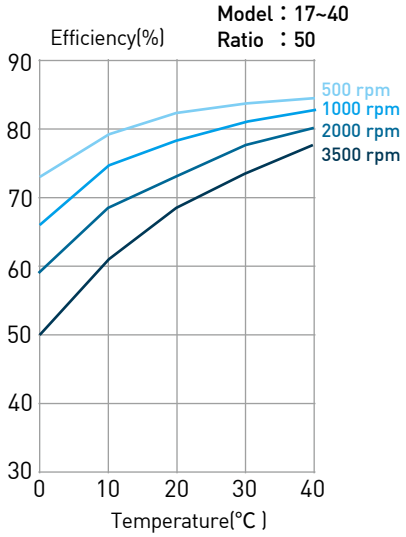
5-1-2 Efficiency E_R

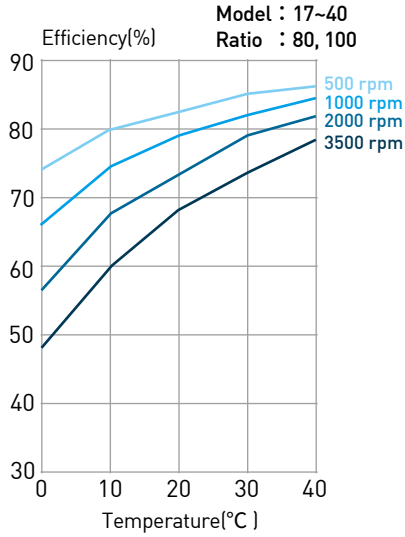
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

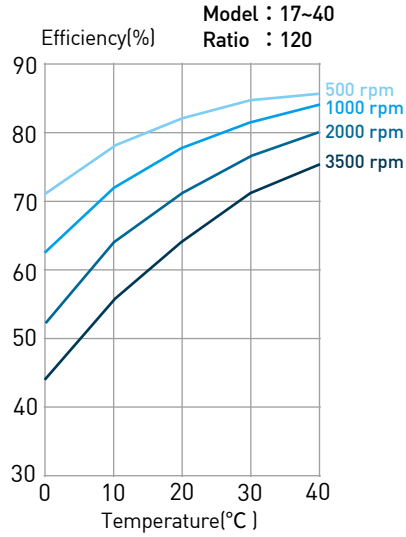


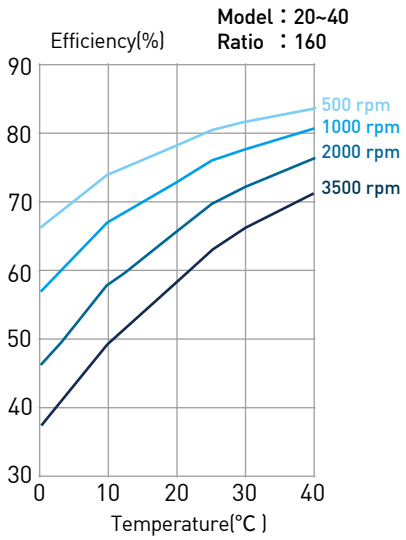










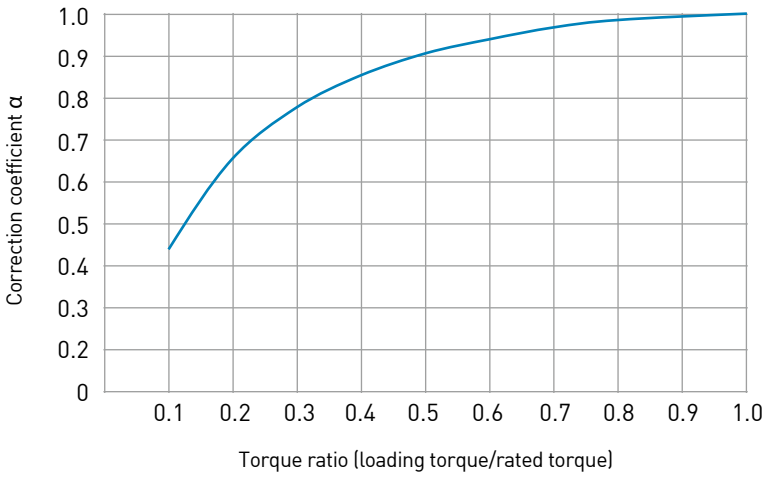


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-1-3 No-load operating torque

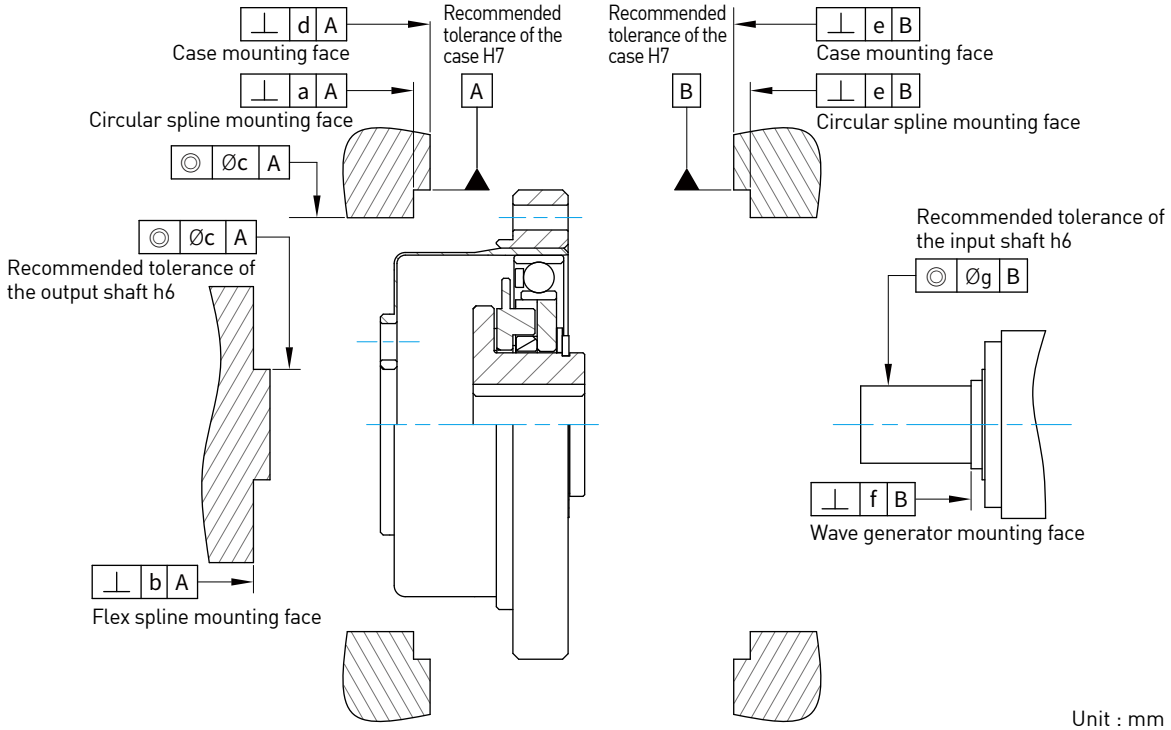
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model						
		11	14	17	20	25	32	40
50	500 r/min	1.2	1.8	3.4	5.1	9.7	21.2	38
	1000 r/min	1.6	2.3	4.4	6.9	12.5	27.2	51
	2000 r/min	2.1	3.1	5.8	9.4	18.5	37.2	73
	3500 r/min	2.8	4.2	7.9	13.4	25.5	50.2	98
80	500 r/min	—	1.4	2.6	3.9	7.6	16.8	31.2
	1000 r/min	—	1.9	3.6	5.7	10.4	22.8	44.2
	2000 r/min	—	2.7	5	8.2	16.4	32.8	65.2
	3500 r/min	—	3.8	7.1	12.2	23.4	45.8	91.2
100	500 r/min	0.9	1.3	2.5	3.7	7.2	16	30
	1000 r/min	1.3	1.8	3.5	5.5	10	22	43
	2000 r/min	1.8	2.6	4.9	8	16	32	64
	3500 r/min	2.5	3.7	7	12	23	45	90
120	500 r/min	—	—	2.4	3.5	6.9	15.4	29.1
	1000 r/min	—	—	3.4	5.2	9.7	21.4	42.1
	2000 r/min	—	—	4.8	7.8	15.7	31.4	63.1
	3500 r/min	—	—	6.9	11.8	22.7	44.4	89.1
160	500 r/min	—	—	—	3.4	6.6	14.8	27.8
	1000 r/min	—	—	—	5.2	9.4	20.8	40.8
	2000 r/min	—	—	—	7.7	15.4	30.8	61.8
	3500 r/min	—	—	—	11.7	22.4	43.8	87.8

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

5-1-4 Installation accuracy

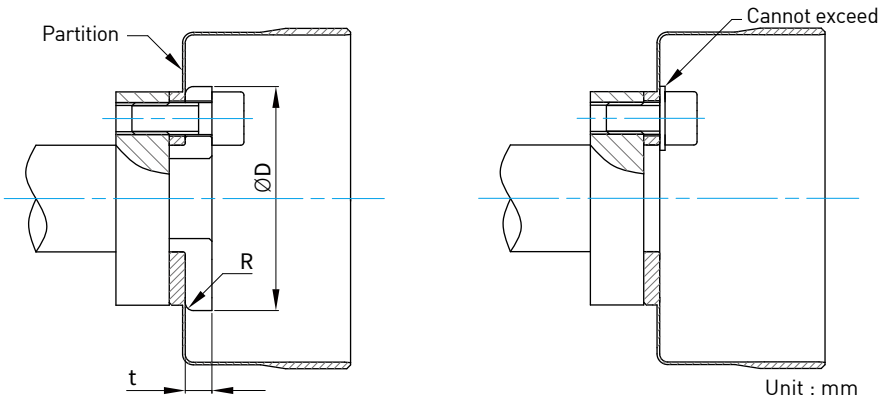


Unit : mm

Mark \ Model	11	14	17	20	25	32	40
a	0.011	0.011	0.012	0.013	0.014	0.016	0.016
b	0.006	0.008	0.011	0.014	0.018	0.022	0.025
Øc	0.008	0.015	0.018	0.019	0.022	0.022	0.024
d	0.010	0.011	0.015	0.017	0.024	0.026	0.026
e	0.010	0.011	0.015	0.017	0.024	0.026	0.026
f	0.012	0.017 (0.008)	0.020 (0.010)	0.020 (0.010)	0.024 (0.012)	0.024 (0.012)	0.032 (0.012)
Øg	0.015	0.030 (0.016)	0.034 (0.018)	0.044 (0.019)	0.047 (0.022)	0.050 (0.022)	0.063 (0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-1-5 Recommend size of the press plate



Unit : mm

Mark \ Model	11	14	17	20	25	32	40
$ØD^{0}_{-0.1}$	17.8	24.5	29	34	42	55	68
$R^{+0.1}_{0}$	0.5	1.2	1.2	1.4	1.5	2	2.5
t	2	2	2.5	2.5	5	7	7

Note : In order to avoid the sinking or loosening of the bolts on the press plate, it is recommended that: 1. The material is S45C;
2. The heat treatment hardness should be HB200~270.

5-1-6 Installation bolt tightening torque

1. Flex spline flange side

- When the load torque is less than the rated performance value in "Peak torque at start/stop" Table 4-1-1, use only bolts for installation.
- If the load torque may reach the rated performance value in "Instantaneous permissible max torque" Table 4-1-1, please use a combination of bolts and pins for installation.

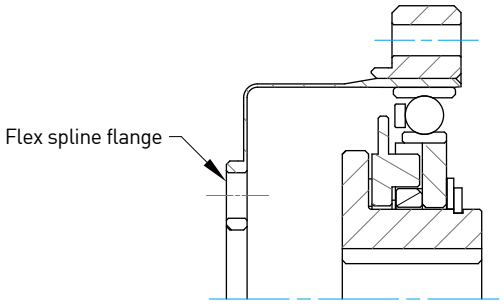


Table 5-1-8 Flex spline flange side bolt tightening torque

Item \ Model		11	14	17	20	25	32	40
Number of bolts		6	6	6	8	8	8	8
Bolts size		M3	M4	M5	M5	M6	M8	M10
Installation of bolts PCD	mm	12	17	19	24	30	40	50
Bolt tightening torque	Nm	2.0	4.5	9.0	9.0	15.3	37	74
	kgfm	0.20	0.46	0.92	0.92	1.56	3.8	7.5
Transmission torque	Nm	15	35	64	108	186	460	910
	kgfm	1.5	3.6	6.5	11	19	47	93

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

Table 5-1-9 Pin installation of flex spline flange

Item \ Model		11	14	17	20	25	32	40
Number of bolts		2	2	2	2	2	2	2
Pin diameter	mm	2	3	3	3	4	5	6
Pin hole PCD	mm	15.2	18.5	21.5	27	34	45	56
Bolt plus pin's transmission torque	kgfm	3.0	7.5	11	17	32	74	140

Note : Recommended pin type: parallel pin; material : S45C-Q

2. Circular spline flange side

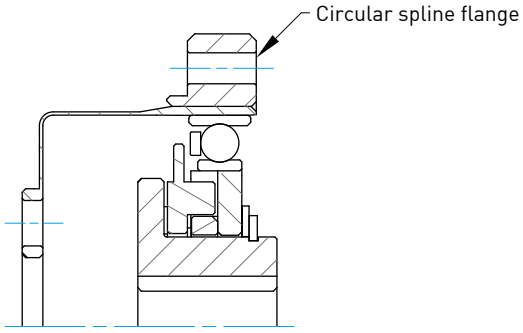
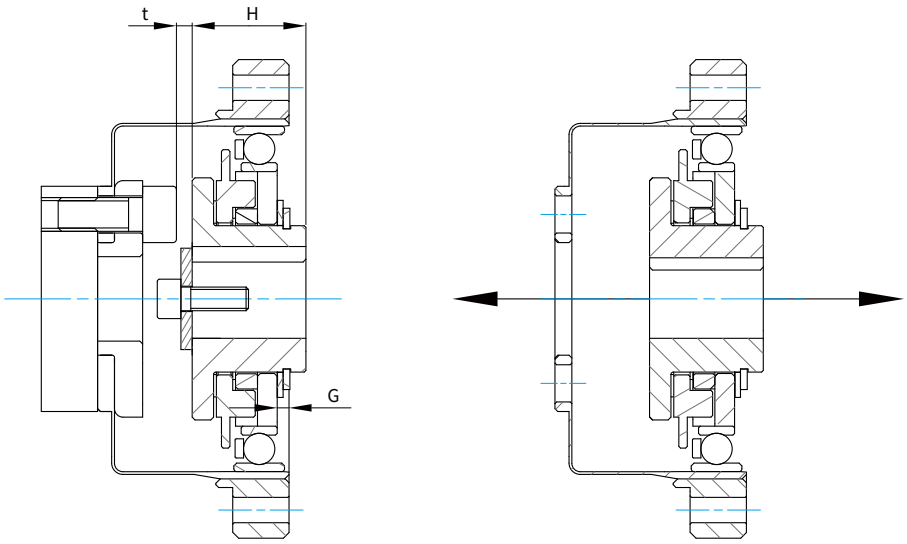


Table 5-1-10 Bolt installation of circular spline flange

Item \ Model		11	14	17	20	25	32	40
Number of bolts		8	6	12	12	12	12	12
Bolts size		M2.5	M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	35	44	54	62	75	100	120
Bolt tightening torque	Nm	1.1	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.11	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	39	54	131	147	314	676	1150
	kgfm	4.0	5.5	13	15	32	69	117

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-1-7 Installation of wave generator



Unit : mm

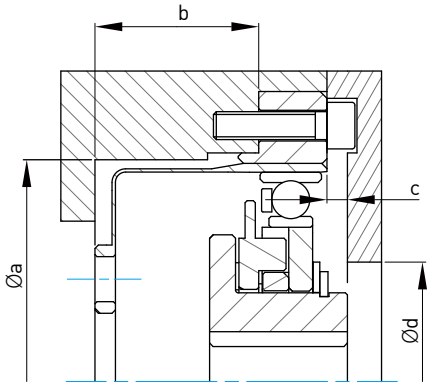
Mark \ Model	14	17	20	25	32	40
G	0.4	0.3	0.1	2.1	2.5	3.3
$H^{0}_{-0.1}$	17.6	19.5	20.1	20.2	22	27.5
t	2.5	2.5	2.9	2.8	3.8	4.5

Note: 1. Avoid interference between the Wave generator and the locking bolt of the flex spline.
2. Due to the elastic deformation of the flex spline, the Strain Wave Gear applies thrust to the Wave generator during operation.The thrust will change with the operating conditions. In any case, a mechanism that prevents slipping due to the thrust of the Wave generator must be used.

5-1-8 Lubrication

1. Recommended dimensions for the inner wall of the case

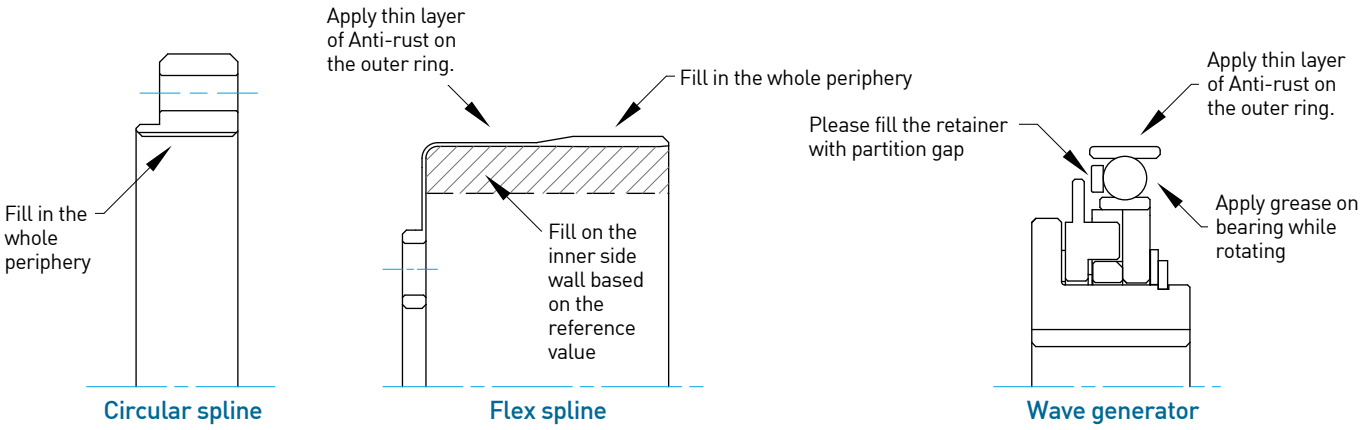
In order to avoid the splashing of excessive lubricant on other parts during operation. It is recommended to adhere to the following dimensions:



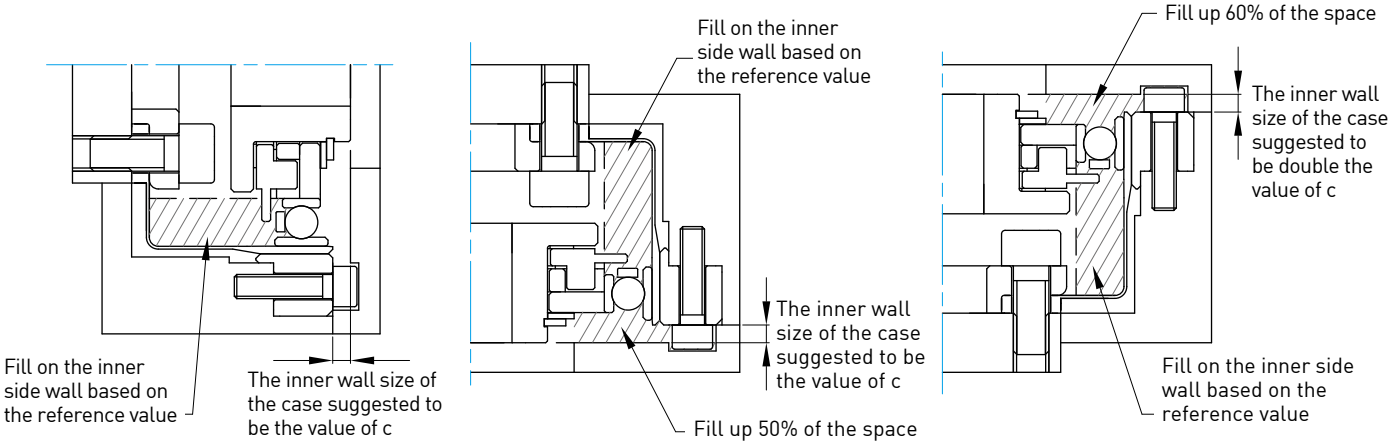
Unit : mm

Model / Mark	11	14	17	20	25	32	40
Øa	30	38	45	53	66	86	106
b	14	17.1	19	20.5	23	26.8	33
c	0.5	1	1	1.5	1.5	1.5	2
Ød	16	16	26	30	37	37	45

2.Lubricant application



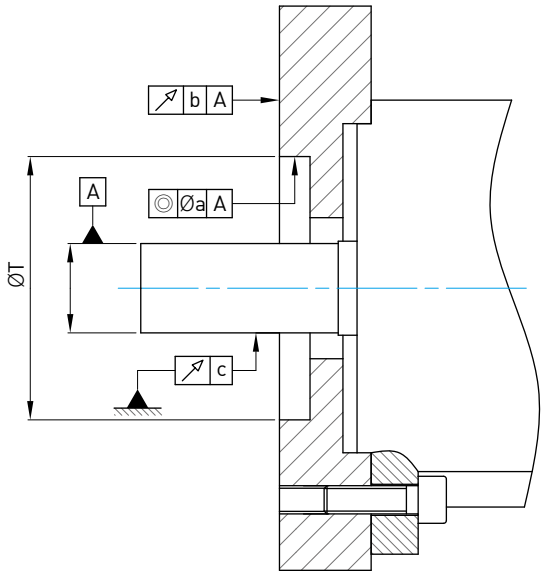
3.The key points of different application methods



Unit : g

Instructions \ Model		11	14	17	20	25	32	40
Used horizontally		2.9	5.5	10	16	30	60	110
Used vertical	Wave generator is facing down	3.5	7	12	18	35	70	125
	Wave generator is facing up	4.4	8.5	14	21	40	80	145

5-1-9 Motor installation

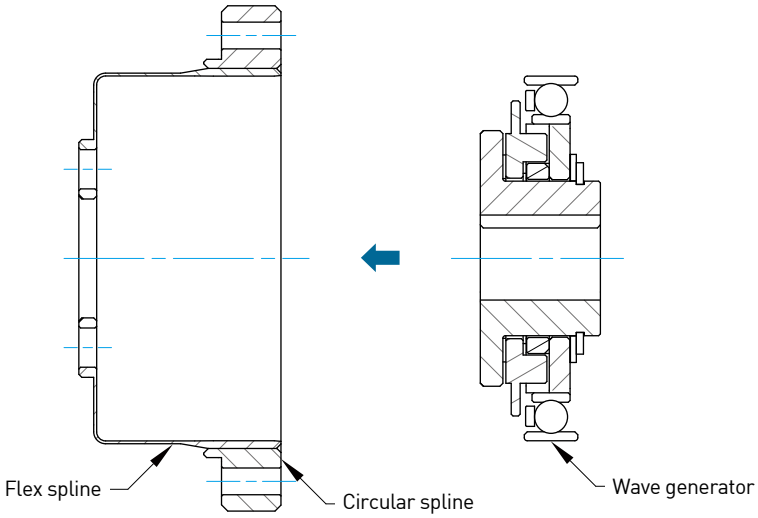


Unit : mm

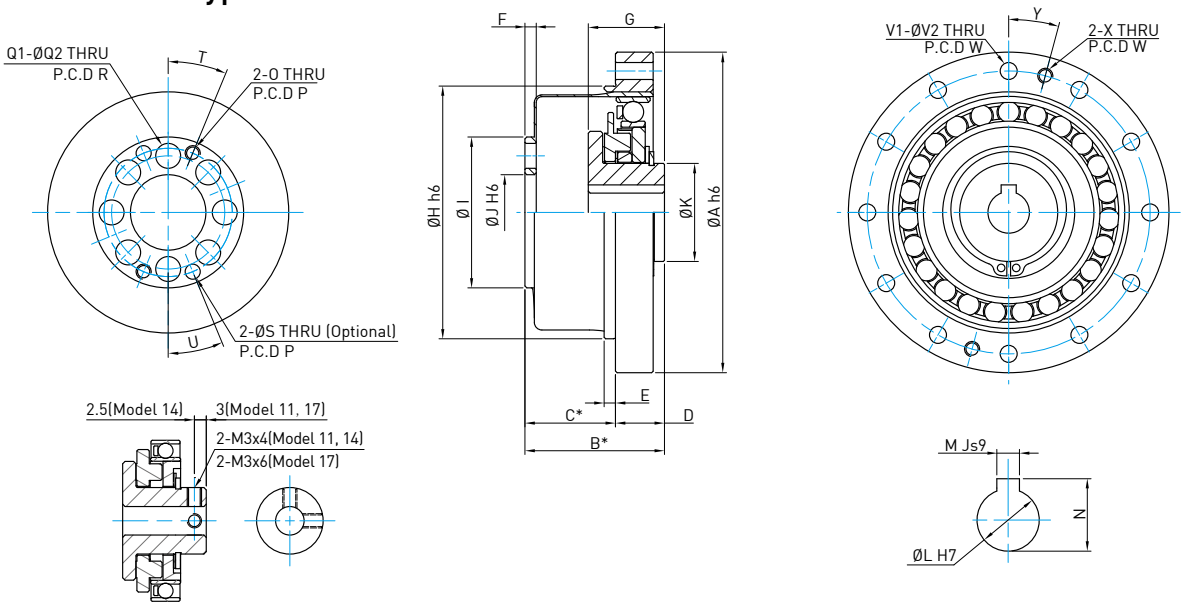
Mark \ Model	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
c	0.015	0.015	0.018	0.018	0.018	0.018
ØT H6	50	60	70	85	110	135

5-1-10 Installation sequence

Install the circular spline and flex spline into the mechanism then install the wave generator.



5-1-11 DSC-CO type size chart



Model11、14、17

Unit : mm

Mark \ Model	11	14	17	20	25	32	40
ØA h6	40	50	60	70	85	110	135
B*	$25.8^{\ 0}_{-0.7}$	$28.5^{\ 0}_{-0.8}$	$32.5^{\ 0}_{-0.9}$	$33.5^{\ 0}_{-1.0}$	$37^{\ 0}_{-1.0}$	$44^{\ 0}_{-1.1}$	$53^{\ 0}_{-1.1}$
C*	$14.5^{+0.4}_{\ 0}$	$17.5^{+0.4}_{\ 0}$	$20^{+0.5}_{\ 0}$	$21.5^{+0.6}_{\ 0}$	$24^{+0.6}_{\ 0}$	$28^{+0.6}_{\ 0}$	$34^{+0.6}_{\ 0}$
D	5	6	6.5	7.5	10	14	17
E	2	2	2.5	3	3	3	4
F	2	2.4	3	3	3	3.2	4
G	$16^{\ 0}_{-0.1}$	$17.6^{\ 0}_{-0.1}$	$19.5^{\ 0}_{-0.1}$	$20.1^{\ 0}_{-0.1}$	$20.2^{\ 0}_{-0.1}$	$22^{\ 0}_{-0.1}$	$27.5^{\ 0}_{-0.1}$
ØH h6	31	38	48	54	67	90	110
ØI	17.8	23	27.2	32	40	52	64
ØJ H6	6	11	10	16	20	26	32
ØK	11	14	18	21	26	26	32
ØL H7	5	6	8	9	11	14	14
M Js9	–	–	–	3	4	5	5
N	–	–	–	$10.4^{+0.1}_{\ 0}$	$12.8^{+0.1}_{\ 0}$	$16.3^{+0.1}_{\ 0}$	$16.3^{+0.1}_{\ 0}$
O	–	M3	M3	M3	M4	M5	M6
P (P.C.D)	–	18.5	21.5	27	34	45	56
Q1	6	6	6	8	8	8	8
ØQ2	3.4	4.5	5.5	5.5	6.6	9	11
R (P.C.D)	12	17	19	24	30	40	50
S (Optional)	$2^{+0.015}_{\ 0}$	$3^{+0.015}_{\ 0}$	$3^{+0.015}_{\ 0}$	$3^{+0.015}_{\ 0}$	$4^{+0.015}_{\ 0}$	$5^{+0.015}_{\ 0}$	$6^{+0.015}_{\ 0}$
T (Degree)	–	30°	30°	22.5°	22.5°	22.5°	22.5°
U (Degree)	–	30°	30°	–	–	–	-
V1	8	6	12	12	12	12	12
ØV2	2.9	3.5	3.5	3.5	4.5	5.5	6.6
W (P.C.D)	35	44	54	62	75	100	120
X	M2.5	M3	M3	M3	M4	M5	M6
Y (Degree)	22.5°	30°	15°	15°	15°	15°	15°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.012	0.033	0.079	0.193	0.413	1.69	4.50
Weight (Kg)	0.05	0.09	0.15	0.28	0.45	0.89	1.7

*1. The dimension B, C is the fitting position and permissible tolerance in the axial direction.

*2. If the load torque may reach the rated performance value in "Instantaneous permissible max torqueplease use a combination of bolts and pins for installation.

5-2 DSC-CE-L Type

5-2-1 Technical data

Table 5-2-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.8	23	2.4	11	1.1	47	4.8		
	100	7.8	0.8	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	17.9	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	37.9	216	22	686	70		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-2-2 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-2-3 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0

Table 5-2-4 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32
50	3.3	5.1	6.6	12	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
160	-	-	2.9	5.5	12

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

Table 5-2-5 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	1.4	2.5	4	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
160	-	-	5.8	11	23

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

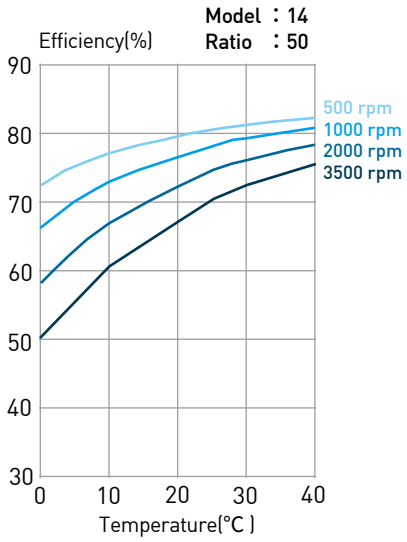
Table 5-2-6 Torsional rigidity

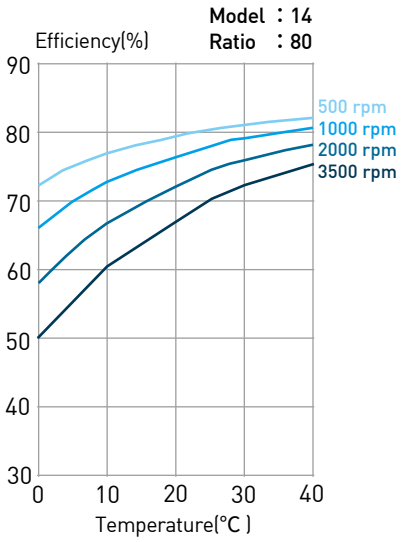
Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2	3.9	7	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
		arc min	2.0	1.7	1.8	1.9	1.9
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7
		arc min	5.6	4.2	5.3	5.4	5.4
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
		arc min	1.4	1.3	1.5	1.5	1.5
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6
		arc min	4.2	3.3	3.9	3.8	4.0

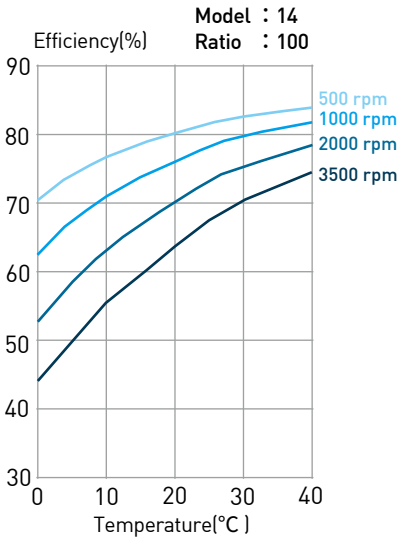
Note : The values are for reference only. The lower limit is 20% under the value in this table.

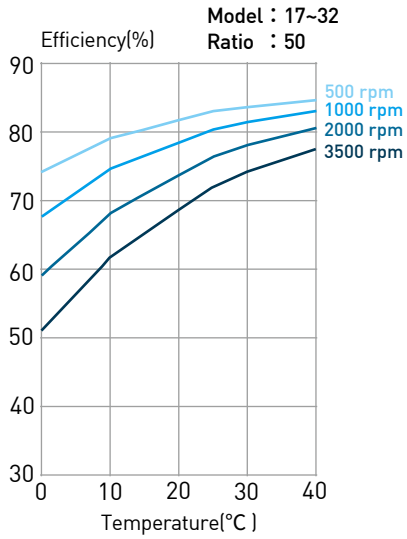
5-2-2 Efficiency E_R

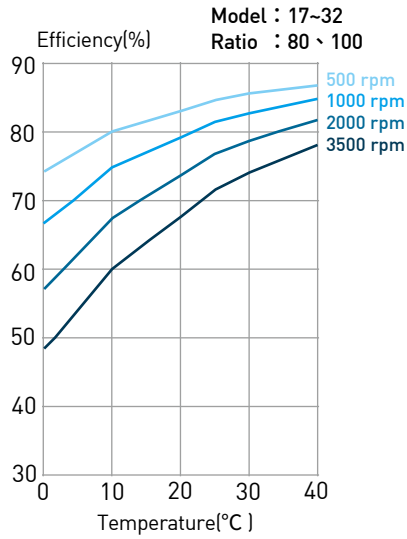
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

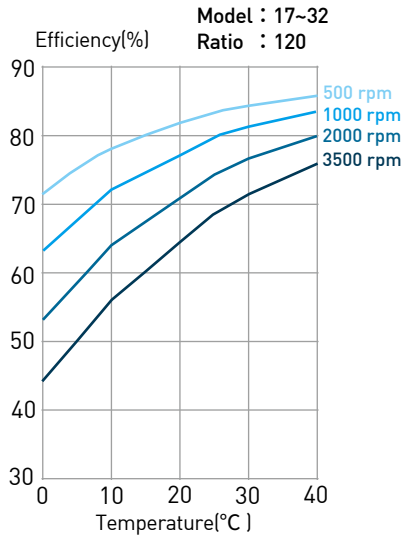


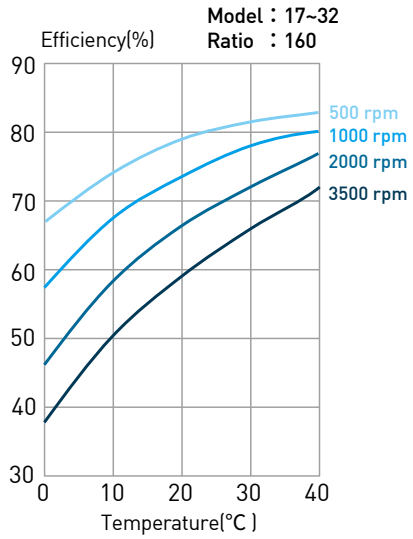










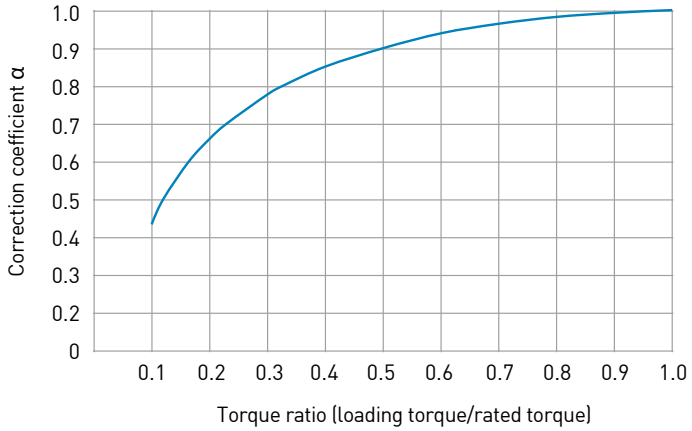


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-2-3 No-load operating torque

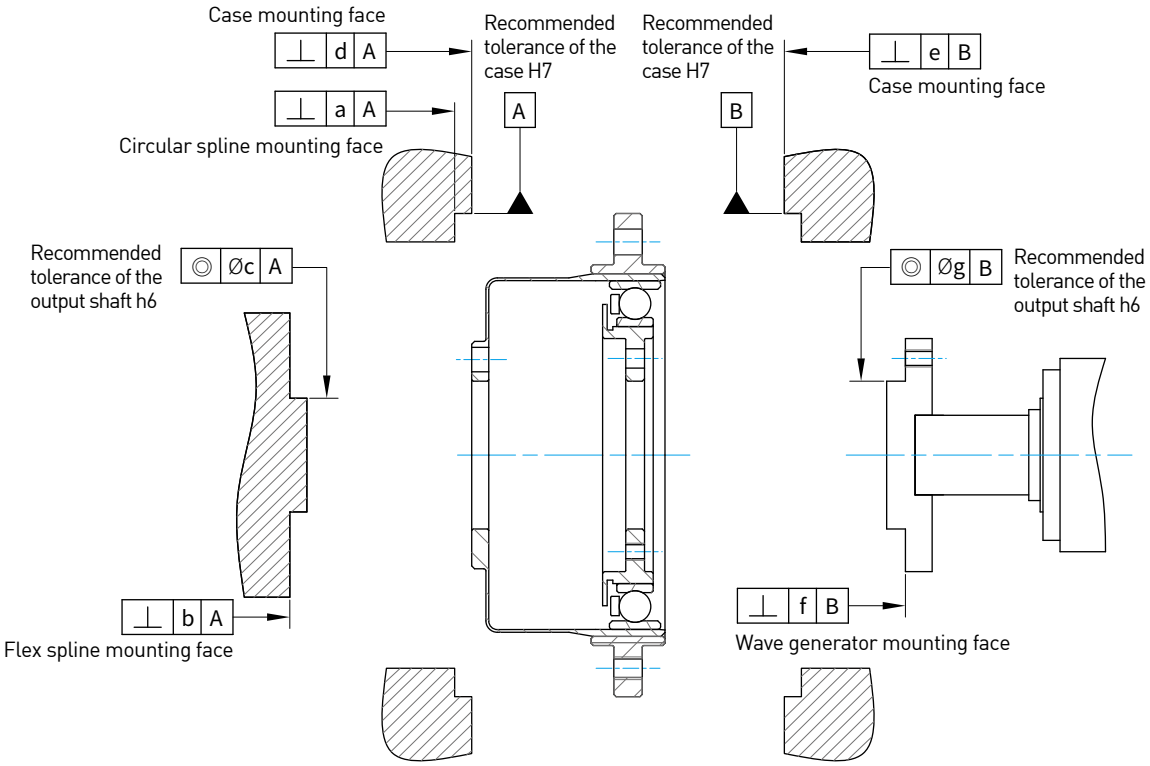
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	2	2.8	5.2	9.7	21.5
	1000 r/min	2.3	3.6	6.8	14.2	28.5
	2000 r/min	3.3	5.1	10	19.2	39.5
	3500 r/min	4.7	6.8	14.2	27.2	51.5
80	500 r/min	1.6	2.1	4.2	7.8	17.7
	1000 r/min	1.9	2.9	5.8	12.3	24.7
	2000 r/min	2.9	4.4	9	17.3	35.7
	3500 r/min	4.3	6.1	13.2	25.3	47.7
100	500 r/min	1.5	2	4	7.5	17
	1000 r/min	1.8	2.8	5.6	12	24
	2000 r/min	2.8	4.3	8.8	17	35
	3500 r/min	4.2	6	13	25	47
120	500 r/min	-	1.9	3.9	7.3	16.5
	1000 r/min	-	4.7	5.5	11.8	23.5
	2000 r/min	-	4.2	8.7	16.8	34.5
	3500 r/min	-	5.9	12.9	24.8	46.5
160	500 r/min	-	-	3.7	6.9	15.8
	1000 r/min	-	-	5.3	11.4	22.8
	2000 r/min	-	-	8.5	16.4	33.8
	3500 r/min	-	-	12.7	24.4	45.8

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

5-2-4 Installation accuracy

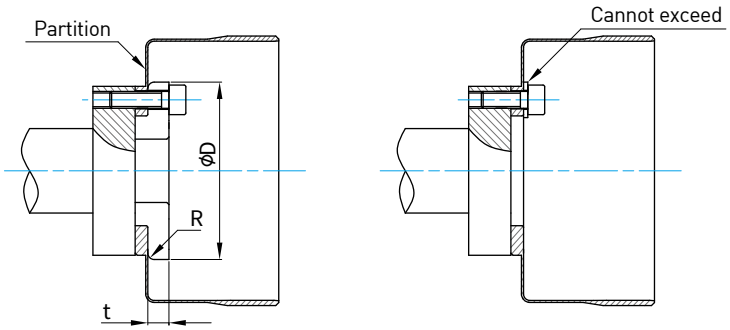


Unit : mm

Mark \ Model	14	17	20	25	32
a	0.011	0.012	0.013	0.014	0.016
b	0.008	0.011	0.014	0.018	0.022
Øc	0.015	0.018	0.019	0.022	0.022
d	0.011	0.015	0.017	0.024	0.026
e	0.011	0.015	0.017	0.024	0.026
f	0.008	0.01	0.01	0.012	0.012
Øg	0.016	0.018	0.019	0.022	0.022

5-2-5 Install the flex spline

It is recommended to install directly with bolts. The head of the bolt should not exceed Dimension D.



Unit : mm

Mark \ Model	14	17	20	25	32
$ØD_{-0.1}^{0}$	24.5	29	34	42	55
$R_{0}^{+0.1}$	1.2	1.2	1.4	1.5	2
t	3	3	3	5	7

5-2-6 Installation bolt tightening torque

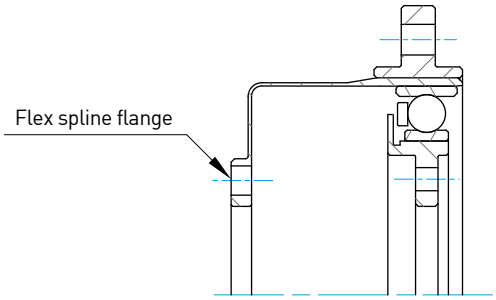


Table 5-2-7 Flex spline flange side bolt tightening torque

Item \ Model		14	17	20	25	32
Number of bolts		12	14	12	12	12
Bolts size		M2.5	M2.5	M3	M4	M5
Installation of bolts PCD	mm	18.9	23.1	27	33.6	44.9
Bolts tightening torque	Nm	1.2	1.2	2.2	5.1	10
	kgfm	0.12	0.12	0.22	0.52	1.02
Transmission torque	Nm	95	135	200	446	952
	kgfm	9.69	13.77	20.39	45.48	97.08

Note : Friction coefficent μ ≥ 0.4 with EKagrip® gasket"

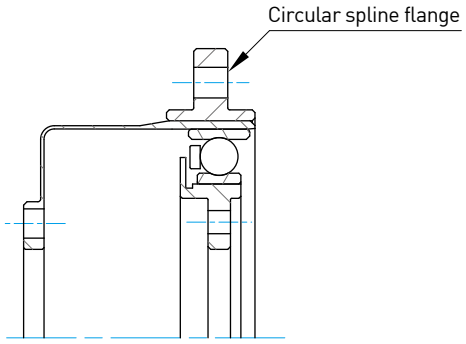


Table 5-2-8 Bolt installation of Circular spline flange

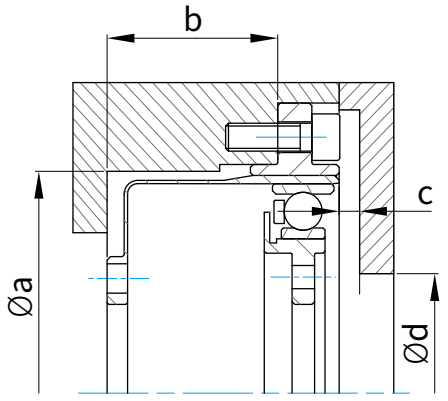
Item \ Model		14	17	20	25	32
Number of bolts		12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	44	54	62	75	100
Bolts tightening torque	Nm	2.1	2.1	2.1	5.1	10
	kgfm	0.21	0.21	0.21	0.52	1.02
Transmission torque	Nm	110	130	150	315	690
	kgfm	11.22	13.26	15.3	32.12	70.36

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-2-7 Lubrication

1. Recommended dimensions for the inner wall of the case

In order to avoid the splashing of excessive lubricant on other parts during operation. It is recommended to adhere to the following dimensions:

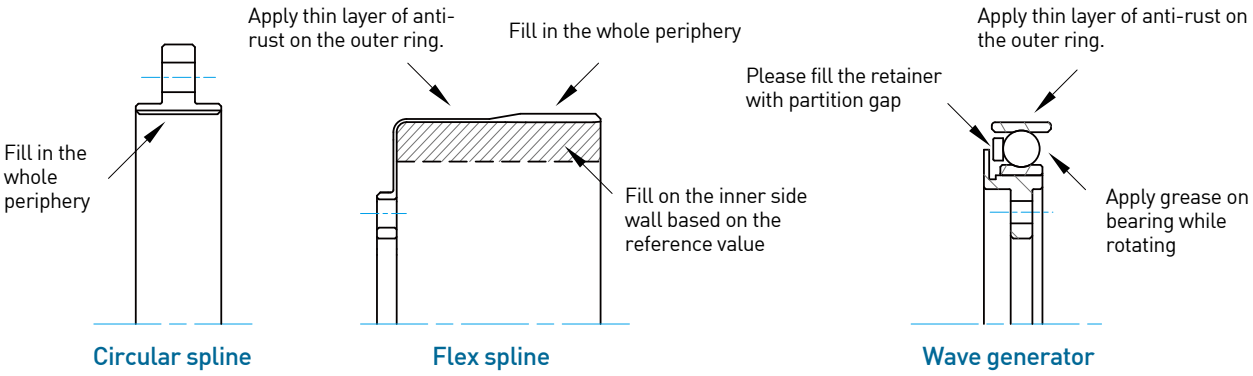


Unit : mm

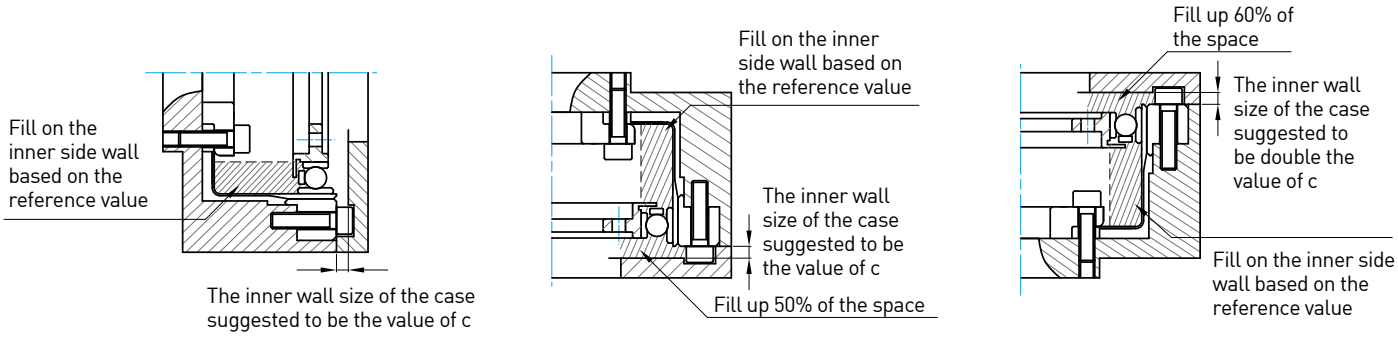
Mark \ Model	14	17	20	25	32
Øa	38	45	53	66	86
b	17.1	19	20.5	23	26.8
c	1	1	1.5	1.5	1.5
$Ød^{+0.5}_{0}$	16	26	30	37	37

Note: The value in ( ) is the value of the wave generator is facing up.

2. Lubricant application



3. The key points of different application methods

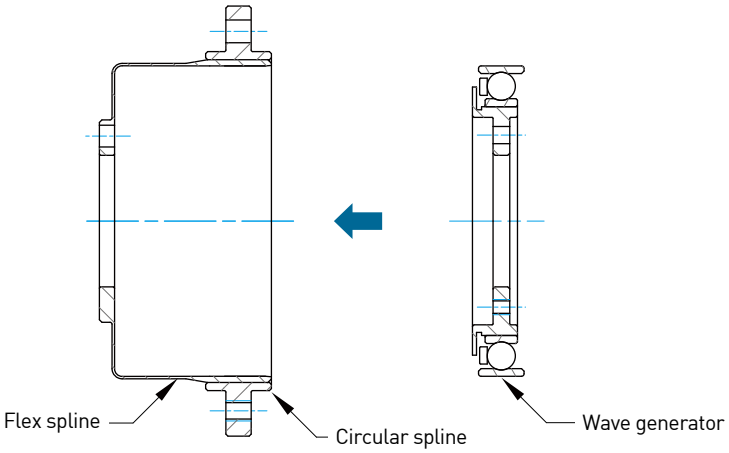


Unit : g

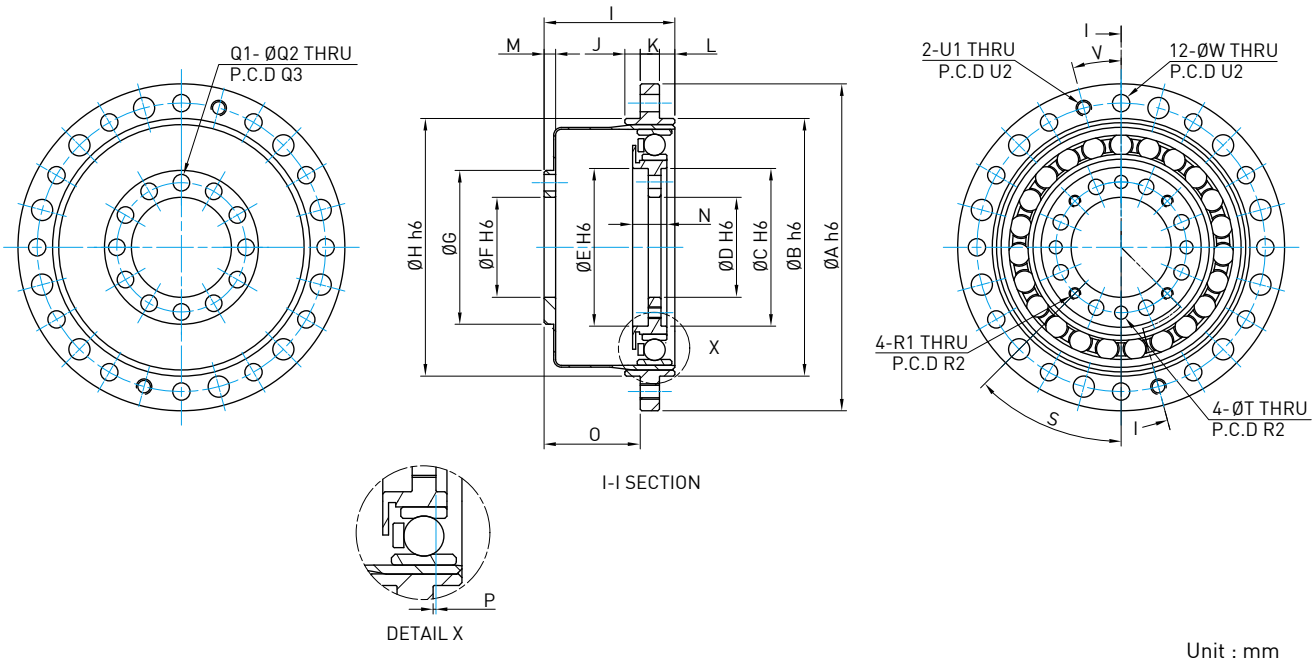
Instructions \ Model		14	17	20	25	32
Used horizontally		5.5	10	16	30	60
Used vertical	Wave generator is facing down	7	12	18	35	70
	Wave generator is facing up	8.5	14	21	40	80

5-2-8 Installation sequence

Install the circular spline and flex spline into the mechanism then install the wave generator.



5-2-9 DSC-CE-L type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h6	50	60	70	85	110
ØB h6	38	48	54	67	90
ØC H6	22.6	27	32	41	53
ØD H6	13.5	18	21	26	36
ØE H6	22.6	27	32	41	53
ØF H6	13.5	18	21	26	36
ØG	23	27.2	32	40	52
ØH H6	38	48	54	67	90
I	23.5	26.5	29	34	42
J	2.5	2.75	3.25	4	5.5
K	3	3.5	4	5	6
L	2.5	2.75	3.25	4	5.5
M	2.4	3	3	3	3.2
N	7.4	7.6	9.1	8.9	11.5
O	$18^{+0.4}_{0}$	$20.25^{+0.5}_{0}$	$21.75^{+0.6}_{0}$	$25^{+0.6}_{0}$	$30.5^{+0.6}_{0}$
P	$0.1^{+0.4}_{0}$	$0.2^{0}_{-0.45}$	$0.6^{0}_{-0.5}$	$0.4^{0}_{-0.5}$	$0.5^{0}_{-0.55}$
Q1	12	14	12	12	12
ØQ2	2.7	2.7	3.5	4.3	5.3
Q3 (P.C.D)	18.9	23.1	27	33.6	44.9
R1	M2	M2	M2.5	M3	M4
R2 (P.C.D)	18	22.5	26.75	34	44.5
S (Degree)	45°	45°	45°	45°	45°
ØT	2.4	2.4	2.9	3.4	4.5
U1	M3	M3	M3	M4	M5
U2 (P.C.D)	44	54	62	75	100
V (Degree)	15°	15°	15°	15°	15°
ØW	3.4	3.4	3.4	4.5	5.5
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.020	0.049	0.112	0.263	0.924
Weight (Kg)	0.055	0.10	0.14	0.24	0.54

5-3 DSC-PO Type

5-3-1 Technical data

Table 5-3-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	108	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-3-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.035	0.0425	0.05	0.062	0.08	0.096
Offset amount		R	m	0.0095	0.0095	0.0095	0.0115	0.013	0.0145
Basic load ratings	Dynamic load	C	kN	4.7	5.3	5.8	9.6	15.0	21.3
			kgf	480	540	590	980	1530	2170
	Static load	Co	kN	6.1	7.6	9.0	15.1	25.0	36.5
			kgf	620	770	920	1540	2550	3720
Moment rigidity		K	$\times 10^4$ Nm/rad	4.38	7.75	12.8	24.2	53.9	91.0
			kgfm/arc min	1.3	2.3	3.8	7.2	16	27
Permissible dynamic tilting moment		M	Nm	41	64	91	156	313	450
Permissible static tilting moment		Mo	Nm	53	80	113	234	500	876
Permissible axial load		Fa	kN	1.004	1.130	1.235	2.051	3.205	4.550
Permissible radial load		Fr	kN	0.673	0.757	0.827	1.374	2.147	3.049

Table 5-3-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-3-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-3-5 Maximum backlash

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	—	3.9	3.9	3.9	2.9	2.9
	arc sec	—	8	8	8	6	6
160	$\times 10^{-5}$ rad	—	—	2.9	2.9	2.4	2.4
	arc sec	—	—	6	6	5	5

Table 5-3-6 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.1	6.1	7.8	15	31	55
80	2.8	4	4.9	9.2	19	35
100	2.5	3.4	4.3	8	18	31
120	—	3.1	3.8	7.3	15	28
160	—	—	3.3	6.3	14	24

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

Table 5-3-7 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.6	3	4.7	9	18	33
80	1.6	3	4.8	9.1	19	33
100	1.8	3.3	5.1	9.8	20	36
120	—	3.5	5.5	11	22	39
160	—	—	6.4	13	26	46

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

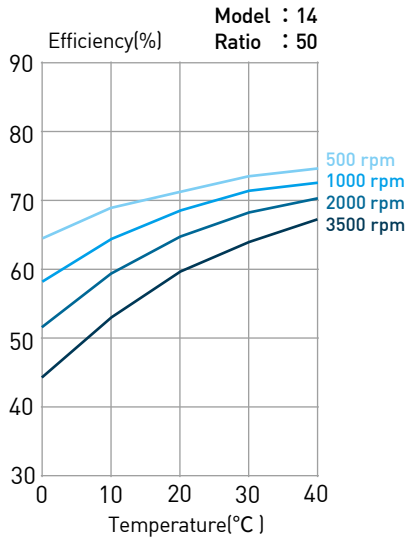
Table 5-3-8 Torsional rigidity

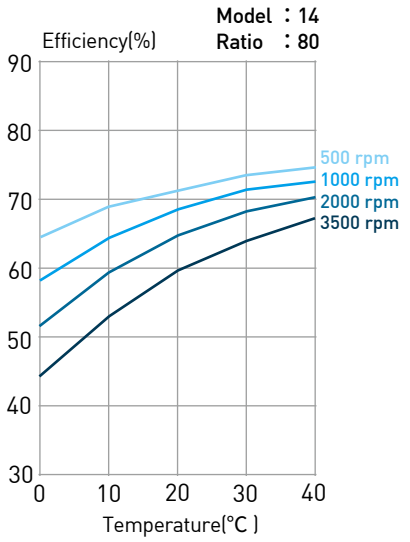
Reduction ratio		Model	14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

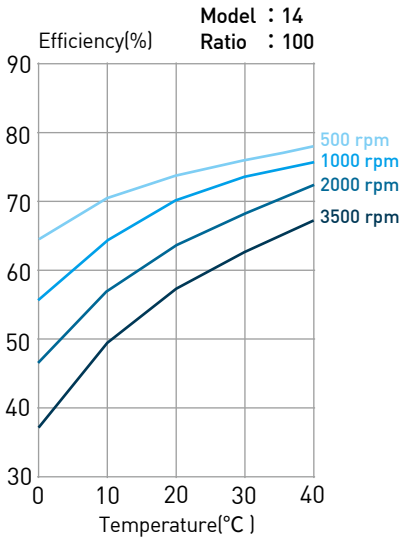
Note : The values are for reference only. The lower limit is 20% under the value in this table.

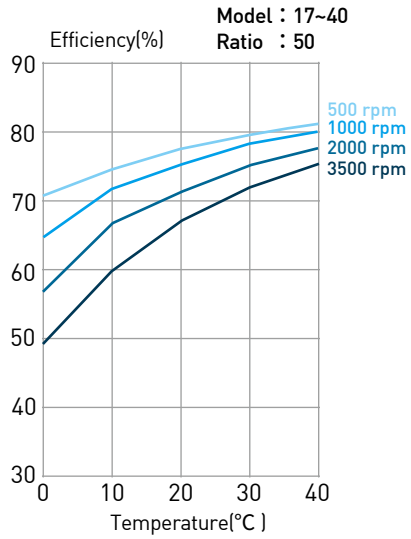
5-3-2 Efficiency E_R

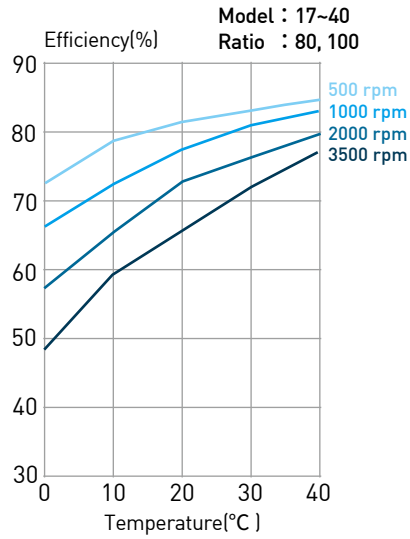
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

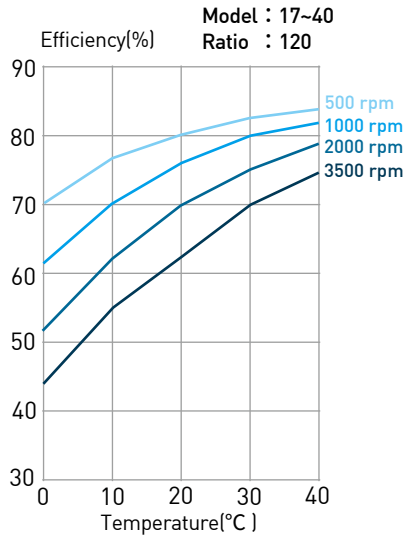


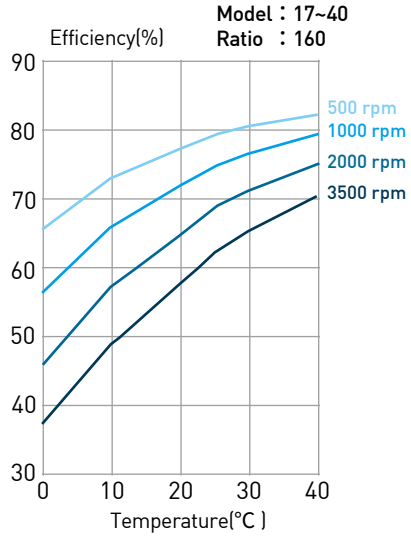










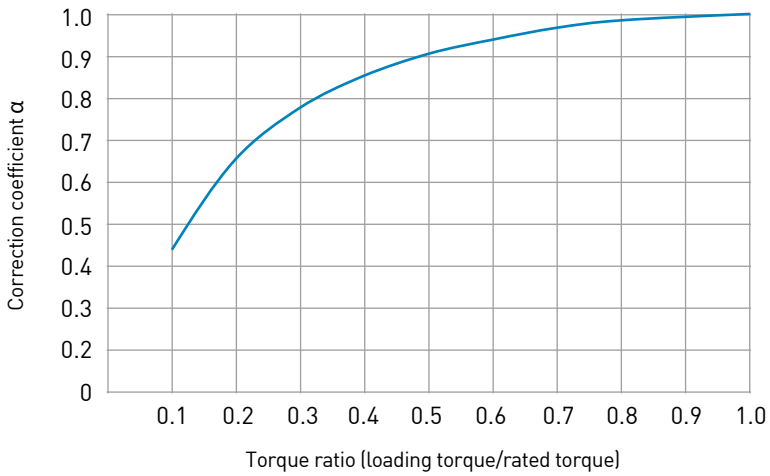


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-3-3 No-load operating torque

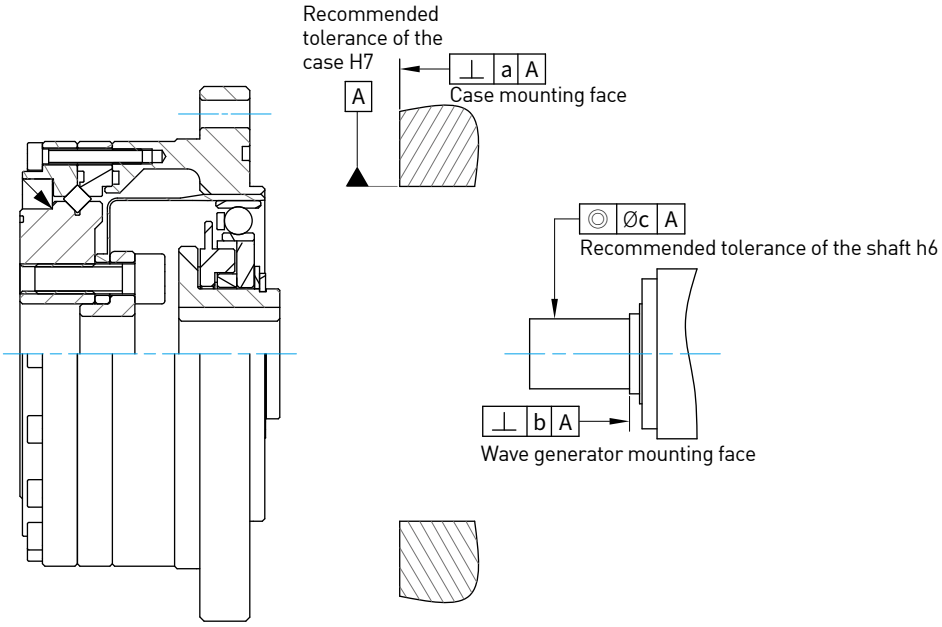
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	3.2	5.1	7.3	12.8	26.1	46
	1000 r/min	3.9	6.1	9.1	17.8	33.1	58
	2000 r/min	4.6	7.6	11.8	21.8	44.1	79
	3500 r/min	5.9	9.6	12.7	28.8	57.1	103
80	500 r/min	2.3	3.8	5.5	9.7	20.3	36.1
	1000 r/min	3	4.8	7.3	14.7	27.3	48.1
	2000 r/min	3.7	6.3	10	18.7	38.3	69.1
	3500 r/min	5	8.3	10.9	25.7	51.3	93.1
100	500 r/min	2.1	3.5	5	9	19	34
	1000 r/min	2.8	4.5	6.8	14	26	46
	2000 r/min	3.5	6	9.5	18	37	67
	3500 r/min	4.8	8	10.4	25	50	91
120	500 r/min	-	3.3	4.7	8.5	18.1	32.5
	1000 r/min	-	4.3	6.5	13.5	25.1	44.5
	2000 r/min	-	5.8	9.2	17.5	36.1	65.5
	3500 r/min	-	7.8	10.1	24.5	49.1	89.5
160	500 r/min	-	-	4.2	7.8	16.8	30.5
	1000 r/min	-	-	6	12.8	23.8	42.5
	2000 r/min	-	-	8.7	16.8	34.8	63.5
	3500 r/min	-	-	9.6	23.8	47.8	87.5

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

5-3-4 Installation accuracy

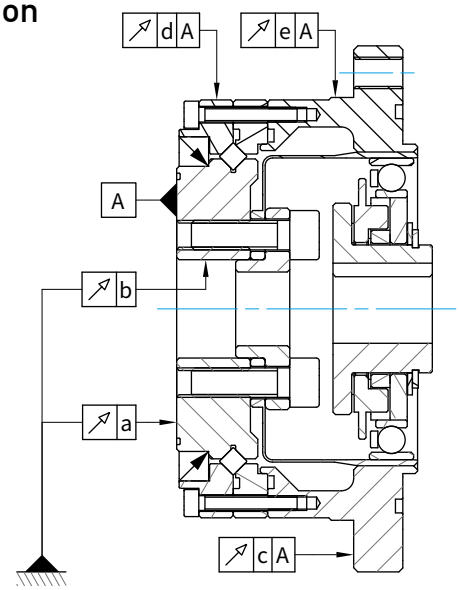


Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.032
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.050	0.063
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-3-5 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.010	0.010	0.010	0.015	0.015	0.015
b	0.010	0.012	0.012	0.013	0.013	0.015
c	0.024	0.026	0.038	0.045	0.056	0.060
d	0.010	0.010	0.010	0.010	0.010	0.015
e	0.038	0.038	0.047	0.049	0.054	0.060

5-3-6 Installation bolt tightening torque

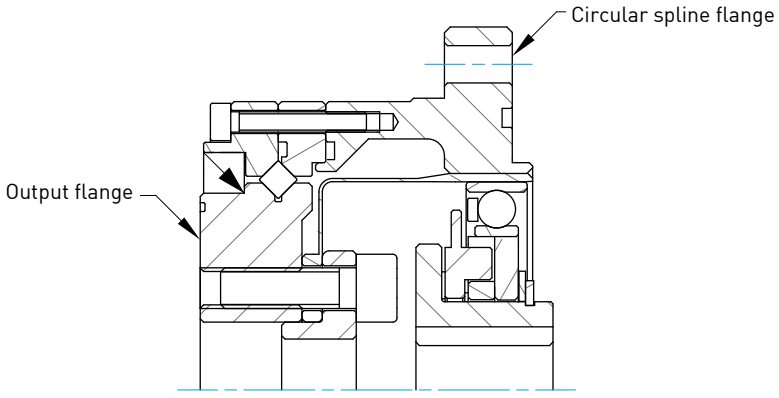


Table 4-3-9 Bolt tightening torque for output flange

Item \ Model		14	17	20	25	32	40
Number of bolts		6	6	8	8	8	8
Bolts size		M4	M5	M6	M8	M10	M10
Installation of bolts PCD	mm	23	27	32	42	55	68
Bolts tightening torque	Nm	4.5	9	15.3	37	74	74
	kgfm	0.46	0.92	1.56	3.8	7.6	7.6
Transmission torque	Nm	49	91	204	486	1108	1258
	kgfm	5.0	9.3	21	50	104	128

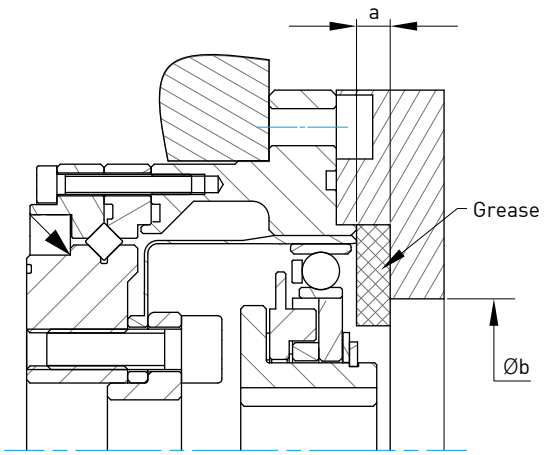
Table 5-3-10 Bolt tightening torque for circular spline flange

Item \ Model		14	17	20	25	32	40
Number of bolts		6	6	6	8	12	8
Bolts size		M4	M4	M5	M5	M6	M8
Installation of bolts PCD	mm	65	71	82	96	125	144
Bolts tightening torque	Nm	4.5	4.5	9.0	9.0	15.3	37
	kgfm	0.46	0.46	0.92	0.92	1.56	3.8
Transmission torque	Nm	137	147	274	431	1200	1680
	kgfm	14	15	28	44	122	171

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-3-7 Lubrication

Keep the space between the reducer and mounting flange as narrow as possible so that grease can be kept inside during operation.



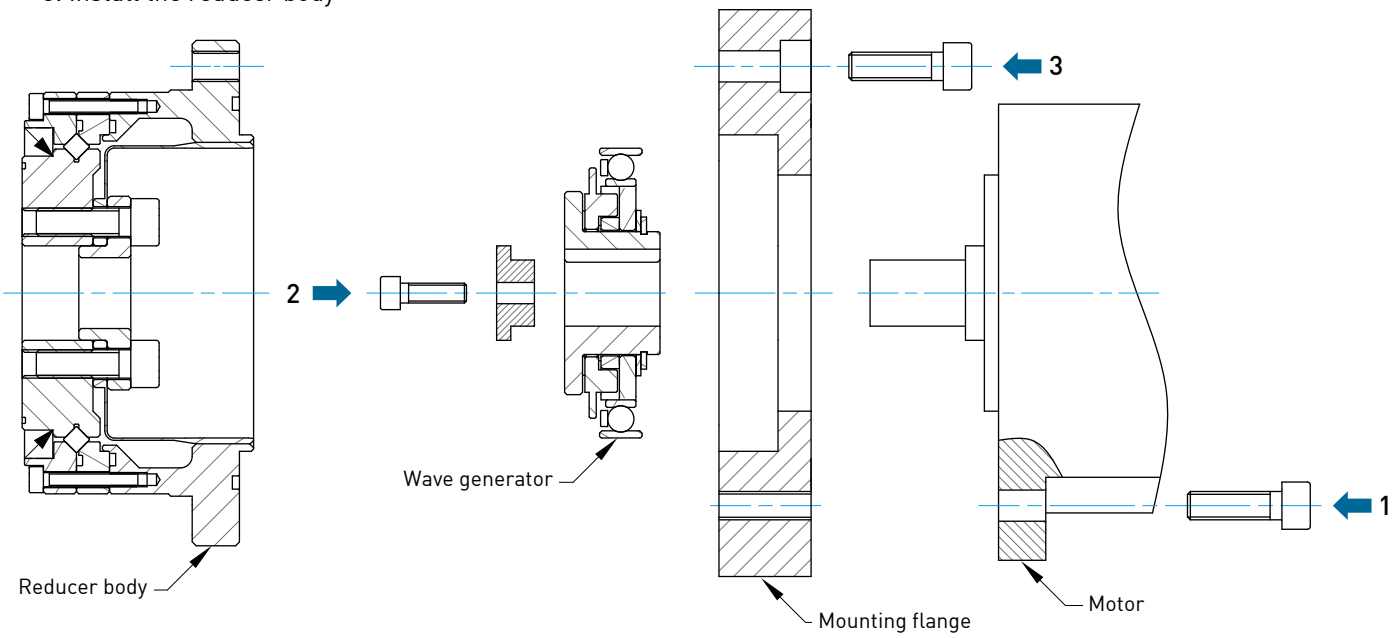
Unit : mm

Item \ Model	14	17	20	25	32	40
a ※1	1	1	1.5	1.5	1.5	2
a ※2	3	3	4.5	4.5	4.5	6
Øb	16	26	30	37	37	45

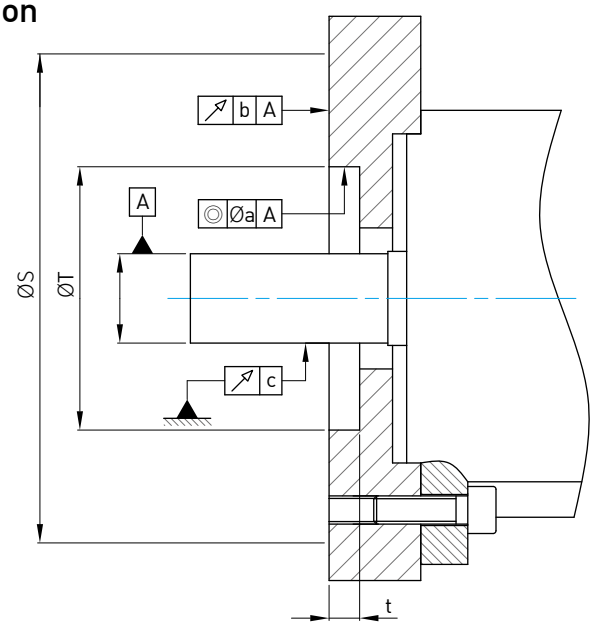
※1 Center shaft horizontal or vertical: when the wave generator is facing downward
※2 Center shaft vertical: when the wave generator is facing upward

5-3-8 Installation procedure

1. Install the mounting flange on the motor mounting surface
2. Install the wave generator on the motor output shaft
3. Install the reducer body



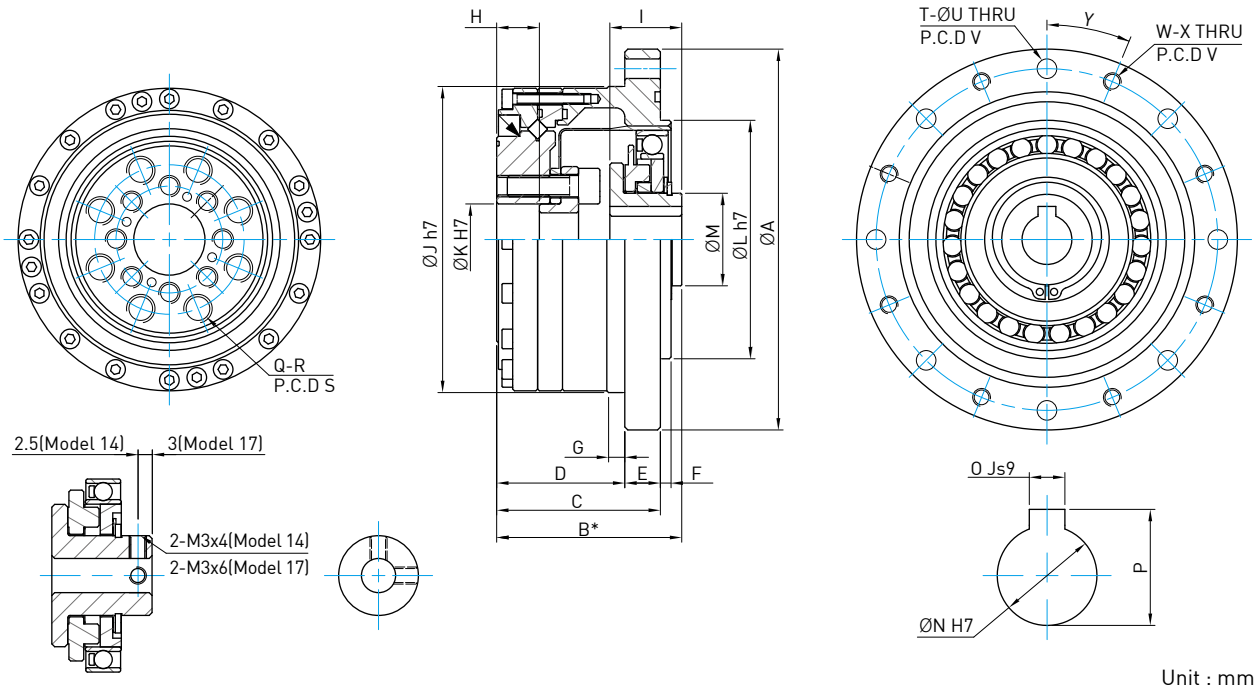
5-3-9 Motor installation



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
c	0.015	0.015	0.018	0.018	0.018	0.018
ØS	73	79	93	107	138	160
t	3	3	4.5	4.5	4.5	6
ØT H7	38	48	56	67	90	110

5-3-10 DSC-PO type size chart



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA	73	79	93	107	138	160
B*	$41^{\ 0}_{-0.9}$	$45^{\ 0}_{-0.9}$	$45.5^{\ 0}_{-1}$	$52^{\ 0}_{-1}$	$62^{\ 0}_{-1.1}$	$72.5^{\ 0}_{-1.1}$
C	34	37	38	46	57	66.5
D	27	29	28	36	45	50.5
E	7	8	10	10	12	16
F	2	2	3	3	3	4
G	3.5	4	5	5	5	5
H	9.4	9.5	9	12	15	5
I	$17.6^{\ 0}_{-0.1}$	$19.5^{\ 0}_{-0.1}$	$20.1^{\ 0}_{-0.1}$	$20.2^{\ 0}_{-0.1}$	$22^{\ 0}_{-0.1}$	$27.5^{\ 0}_{-0.1}$
ØJ h7	56	63	72	86	113	127
ØK H7	11	10	14	20	26	32
ØL h7	38	48	56	67	90	110
ØM	14	18	21	26	26	32
ØN H7	6	8	12	14	14	14
O Js9	–	–	4	5	5	5
P	–	–	$13.8^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$
Q	6	6	8	8	8	8
R	M4 x 8 DP	M5 x 10 DP	M6 x 9 DP	M8 x 12 DP	M10 x 15 DP	M10 x15 DP
S (P.C.D)	23	27	32	42	55	68
T	6	6	6	8	12	8
ØU	4.5	4.5	5.5	5.5	6.6	9
V (P.C.D)	65	71	82	96	125	144
W	6	6	6	8	12	8
X	M4	M4	M5	M5	M6	M8
Y (Degree)	30°	30°	30°	22.5°	15°	22.5°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (kg)	0.52	0.68	0.98	1.5	3.2	5.0

*The dimension B is the fitting position and permissible tolerance in the axial direction.

5-4 DSC-PO-M Type

5-4-1 Technical data

Table 5-4-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.8	23	2.4	11	1.1	47	4.8		
	100	7.8	0.8	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-4-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.0465	0.059	0.070	0.088	0.114	0.134
Offset amount		R	m	0.014	0.014	0.016	0.018	0.020	0.026
Basic load ratings	Dynamic load	C	kN	8.25	10.7	21.0	21.8	34.5	43.3
			kgf	840	1090	2140	2230	3520	4415
	Static load	Co	kN	11.4	14.8	27.0	35.8	59	81.6
			kgf	1160	1510	2750	3660	6020	8320
Moment rigidity		K	$\times 10^4$ Nm/rad	7.9	13.7	24.0	39.0	120.3	179.4
			kgfm/arc min	2.4	4.1	7.1	11.6	35.7	53.2
Permissible dynamic tilting moment		M	Nm	73	114	172	254	578	886
Permissible static tilting moment		Mo	Nm	155	276	603	1050	2242	3645
Permissible axial load		Fa	kN	2.030	2.286	4.486	5.298	9.357	10.361
Permissible radial load		Fr	kN	1.360	1.532	3.006	3.550	6.269	6.942

Table 5-4-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-4-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-4-5 Maximum backlash

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	—	3.9	3.9	3.9	2.9	2.9
	arc sec	—	8	8	8	6	6
160	$\times 10^{-5}$ rad	—	—	2.9	2.9	2.4	2.4
	arc sec	—	—	6	6	5	5

Table 5-4-6 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.1	6.1	7.8	15	31	55
80	2.8	4	4.9	9.2	19	35
100	2.5	3.4	4.3	8	18	31
120	—	3.1	3.8	7.3	15	28
160	—	—	3.3	6.3	14	24

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

Table 5-4-7 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.6	3	4.7	9	18	33
80	1.6	3	4.8	9.1	19	33
100	1.8	3.3	5.1	9.8	20	36
120	—	3.5	5.5	11	22	39
160	—	—	6.4	13	26	46

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

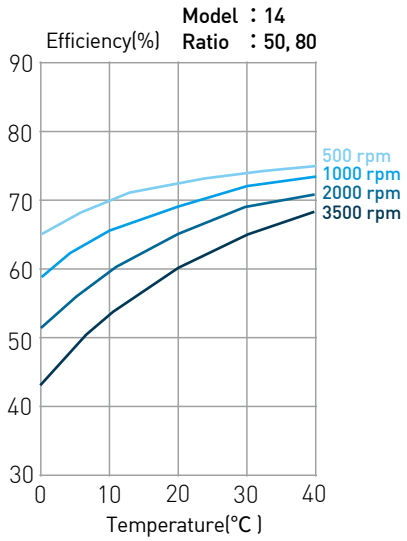
Table 5-4-8 Torsional rigidity

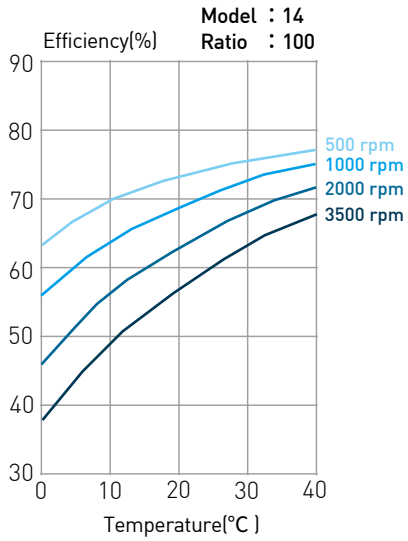
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

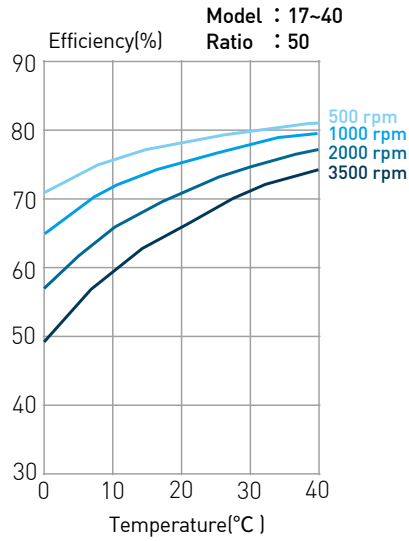
Note : The values are for reference only. The lower limit is 20% under the value in this table.

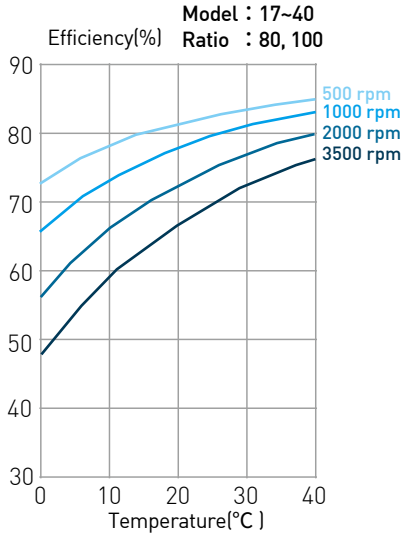
5-4-2 Efficiency E_R

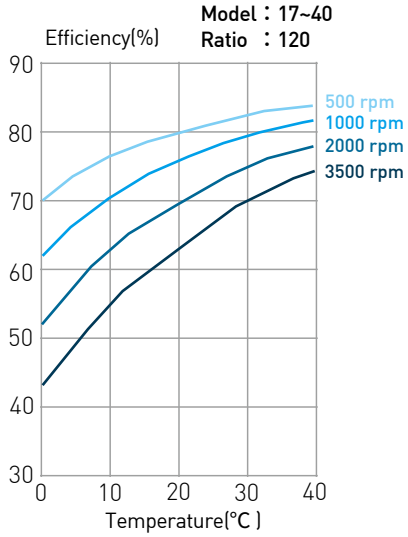
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

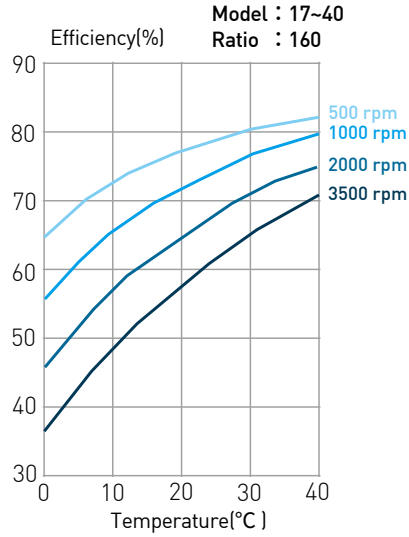




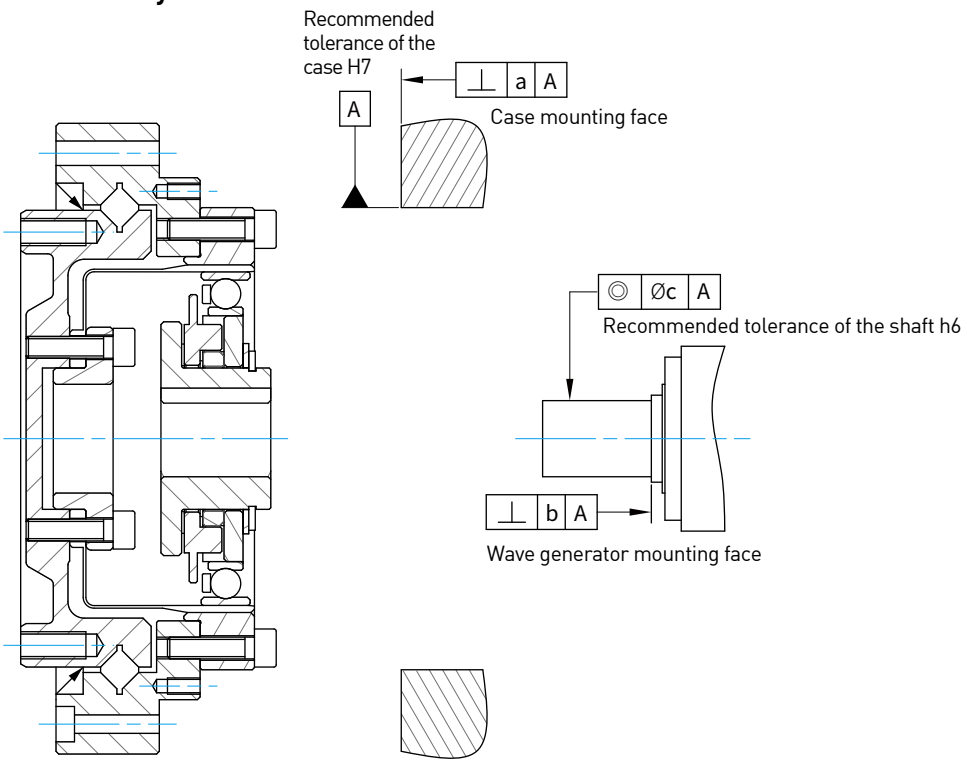








5-4-3 Installation accuracy

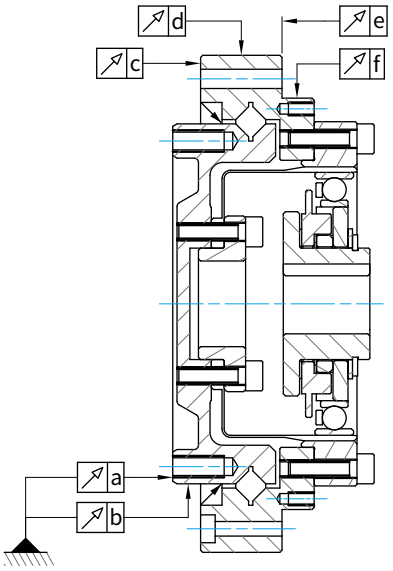


Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.032
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.050	0.063
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-4-4 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.010	0.010	0.010	0.010	0.012	0.012
b	0.010	0.010	0.010	0.010	0.010	0.010
c	0.010	0.010	0.010	0.010	0.012	0.012
d	0.010	0.010	0.010	0.010	0.010	0.010
e	0.020	0.020	0.020	0.020	0.020	0.020
f	0.015	0.015	0.015	0.015	0.015	0.015

5-4-5 Installation bolt tightening torque

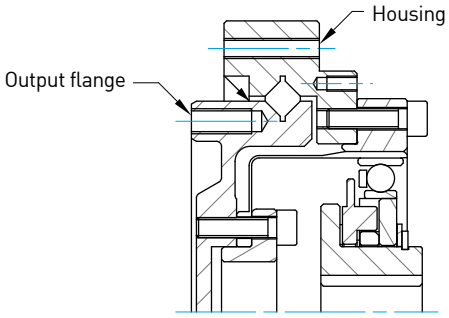


Table 5-4-9 Bolt tightening torque for output flange

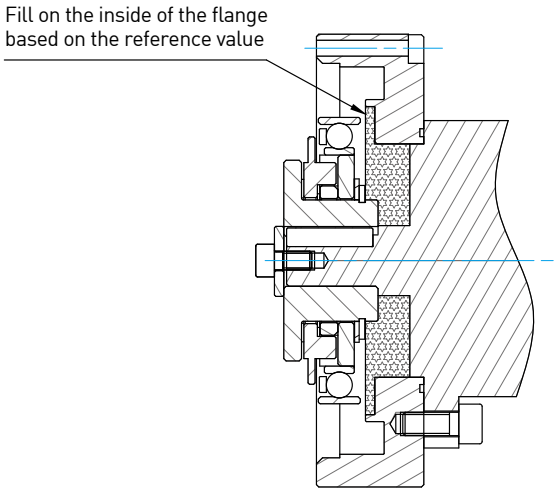
Item \ Model		14	17	20	25	32	40
Number of bolts		12	12	12	12	12	12
Bolts size		M3	M4	M4	M5	M6	M8
Installation of bolts PCD	mm	43	52	62	76	96	118
Bolts tightening torque	Nm	2.3	5.1	5.1	10	17.4	42.2
	kgfm	0.23	0.52	0.52	1.0	1.8	4.3
Transmission torque	Nm	85	188	228	463	847	1964
	kgfm	8.6	19.1	23.2	47.2	86.3	200.2

Table 5-4-10 Bolt tightening torque for circular spline flange

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	68	80	89	105	135	168
Bolts tightening torque	Nm	2.3	2.3	2.3	5.1	10.0	17.4
	kgfm	0.23	0.23	0.23	0.52	1.0	1.8
Transmission torque	Nm	89	158	177	378	805	1482
	kgfm	9.1	16.1	18.0	38.6	82.1	151.1

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-4-6 Lubrication

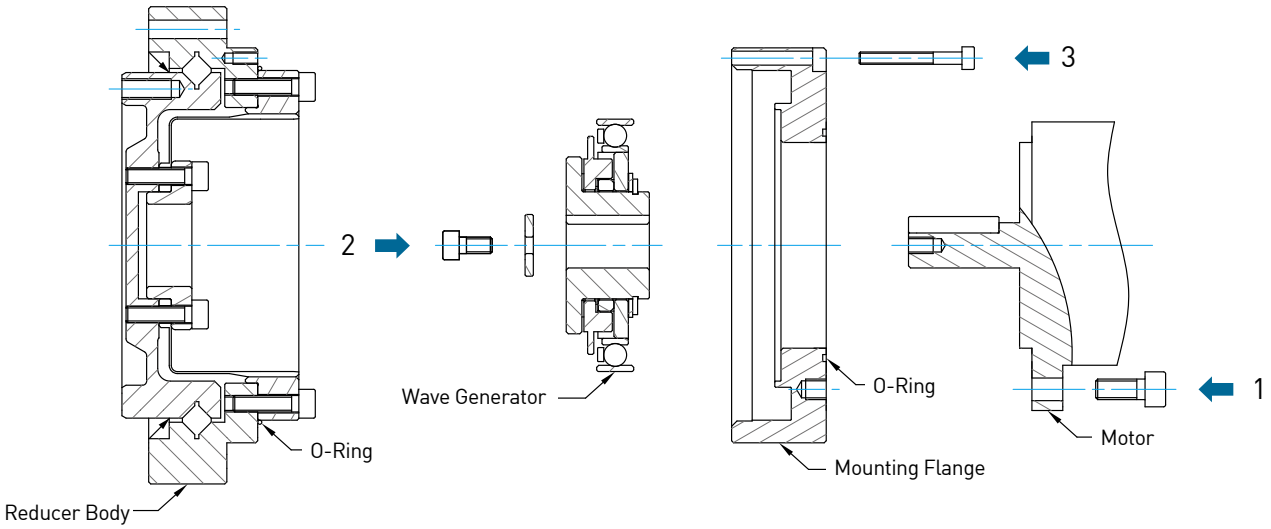


Unit : g

Model	14	17	20	25	32	40
Standard grease quantity	5.5	10	16	40	60	130

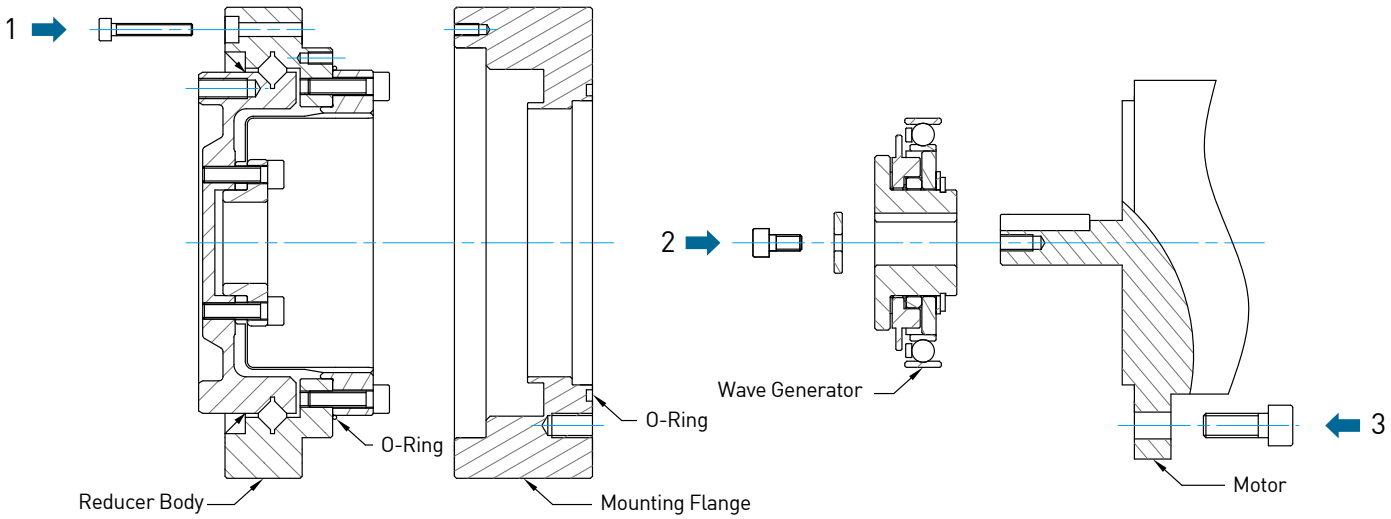
5-4-7 Installation sequence

Mounting flange type A



1. Install the mounting flange on the motor mounting surface
2. Install the wave generator on the motor output shaft
3. Install the reducer body

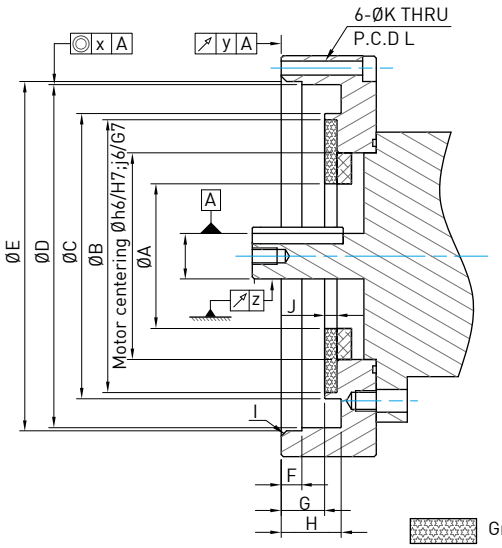
Mounting flange type B



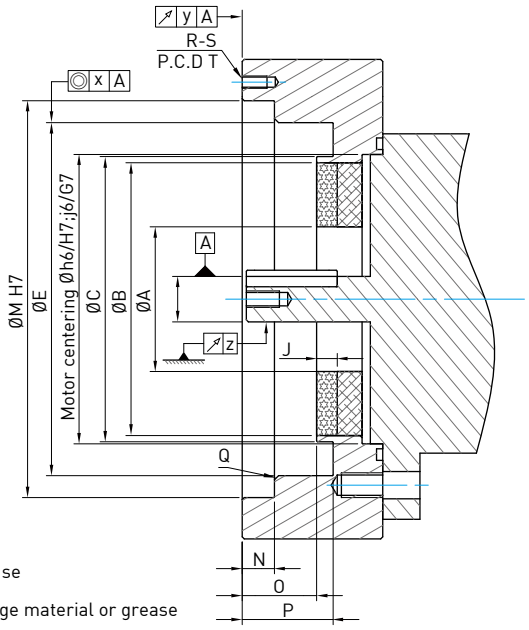
1. Install the reducer body on the mounting flange surface
2. Install the wave generator on the motor output shaft
3. Install the mounting flange on the motor mounting surface

5-4-8 Motor installation

Mounting flange type A



Mounting flange type B



Grease

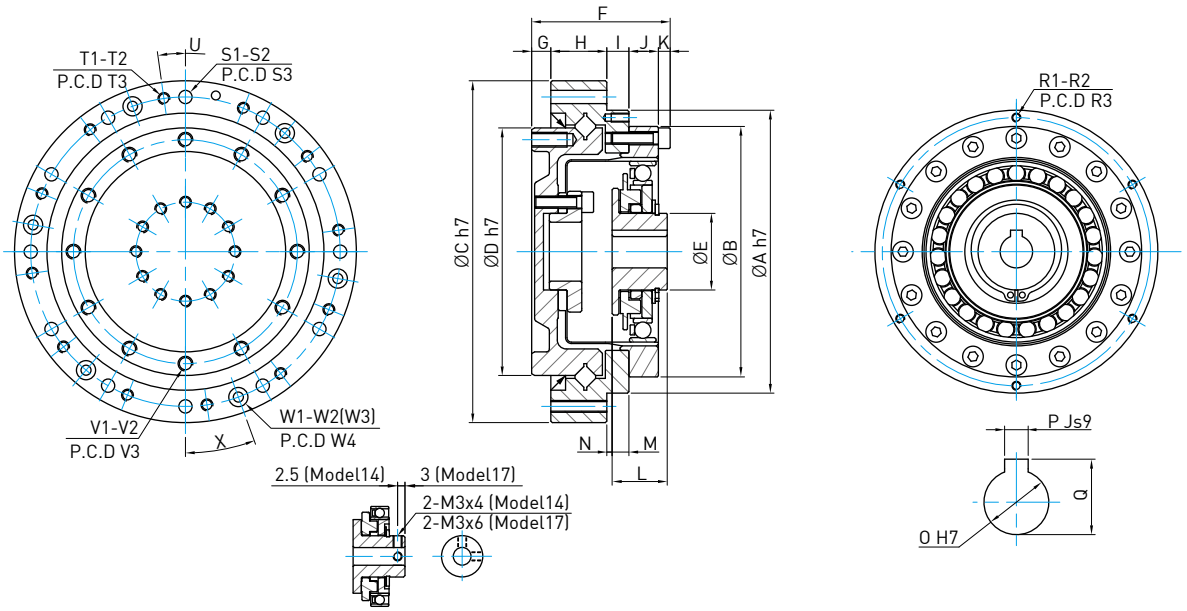
Flange material or grease

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA	16	26	30	37	37	45
ØB	36.5	47	53	66	86	106
ØC	$37.5^{\ 0}_{-0.1}$	$48^{\ 0}_{-0.1}$	$55.5^{\ 0}_{-0.1}$	$69^{\ 0}_{-0.1}$	$90.5^{\ 0}_{-0.1}$	$110^{\ 0}_{-0.1}$
ØD	$50^{+0.027}_{\ 0}$	$60^{+0.034}_{\ 0}$	$70^{+0.036}_{\ 0}$	$85^{+0.050}_{\ 0}$	$110^{+0.055}_{\ 0}$	$135^{+0.065}_{\ 0}$
ØE	$50.4^{+0.1}_{\ 0}$	$60.4^{+0.1}_{\ 0}$	$70.4^{+0.1}_{\ 0}$	$85.4^{+0.1}_{\ 0}$	$110.4^{+0.1}_{\ 0}$	$135.4^{+0.1}_{\ 0}$
F	2.5	3	3	5	6.5	11
G	$6.5^{+0.1}_{\ 0}$	$7^{+0.1}_{\ 0}$	$8^{+0.1}_{\ 0}$	$10.5^{+0.1}_{\ 0}$	$14.5^{+0.1}_{\ 0}$	$18^{+0.1}_{\ 0}$
H	$9.5^{+0.1}_{\ 0}$	$10^{+0.1}_{\ 0}$	$11^{+0.1}_{\ 0}$	$14.5^{+0.1}_{\ 0}$	$19.5^{+0.1}_{\ 0}$	$24^{+0.1}_{\ 0}$
I	$1^{\ 0}_{-0.1}$	$1.3^{\ 0}_{-0.1}$	$1.3^{\ 0}_{-0.1}$	$1.3^{\ 0}_{-0.1}$	$1.3^{\ 0}_{-0.1}$	$2^{\ 0}_{-0.1}$
J	1	1.5	1.5	1.5	2	2
ØK	2.9	3.4	3.4	3.4	4.5	5.5
L(P.C.D)	55	66	76	91	118	144
ØM	60	72	82	96	125	154
N	$4.3^{+0.1}_{\ 0}$	$6.3^{+0.1}_{\ 0}$	$6.9^{+0.1}_{\ 0}$	$7.8^{+0.1}_{\ 0}$	$9.8^{+0.1}_{\ 0}$	$10.3^{+0.1}_{\ 0}$
O	$10.5^{+0.1}_{\ 0}$	$13^{+0.1}_{\ 0}$	$14.6^{+0.1}_{\ 0}$	$18^{+0.1}_{\ 0}$	$24^{+0.1}_{\ 0}$	$28^{+0.1}_{\ 0}$
P	$13.5^{+0.1}_{\ 0}$	$16^{+0.1}_{\ 0}$	$17.6^{+0.1}_{\ 0}$	$22^{+0.1}_{\ 0}$	$29^{+0.1}_{\ 0}$	$34^{+0.1}_{\ 0}$
Q	$0.7^{\ 0}_{-0.1}$	$1^{\ 0}_{-0.1}$	$1^{\ 0}_{-0.1}$	$1^{\ 0}_{-0.1}$	$1^{\ 0}_{-0.1}$	$1.7^{\ 0}_{-0.1}$
R	4	6	6	6	6	6
S	M2.5	M2.5	M2.5	M3	M4	M5
T (P.C.D)	68	78	88	105	135	165
X	0.030	0.034	0.044	0.047	0.050	0.063
Y	0.030	0.040	0.040	0.040	0.040	0.050
Z	0.030 (0.016)	0.034 (0.018)	0.044 (0.019)	0.047 (0.022)	0.050 (0.022)	0.063 (0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-4-9 DSC-PO-M type size chart



Model14、17

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	60	72	82	96	125	154
ØB	$50^{+0.01}_{-0.015}$	$60^{+0.01}_{-0.02}$	$70^{+0.01}_{-0.02}$	$85^{+0.01}_{-0.025}$	$110^{+0.01}_{-0.025}$	$135^{+0.1}_{-0.03}$
ØC h7	78	88	98	116	148	180
ØD h7	49	59	69	84	110	132
ØE	14	18	21	26	26	32
F	30	34	40	47	59	69.5
G	5	5	5.7	6.5	6.5	7.5
H	12	13.5	17.2	19	24	29
I	4	6	6.6	7.5	9.5	10
J	6	6.5	7.5	10	14	17
K	3	3	3	4	5	6
L	$17.6^{0}_{-0.1}$	$19.5^{0}_{-0.1}$	$20.1^{0}_{-0.1}$	$20.2^{0}_{-0.1}$	$22^{0}_{-0.1}$	$27.5^{0}_{-0.1}$
M (flange type A)	$6.6^{+0.4}_{0}$	$7^{+0.45}_{0}$	$8.1^{+0.5}_{0}$	$7.2^{+0.5}_{0}$	$6^{+0.55}_{0}$	$8.5^{+0.55}_{0}$
N (flange type B)	$2.6^{+0.4}_{0}$	$1^{+0.45}_{0}$	$1.5^{+0.5}_{0}$	$0.3^{0}_{-0.5}$	$3.5^{0}_{-0.55}$	$1.5^{0}_{-0.55}$
ØO H7	6	8	9	11	14	14
P Js9	–	–	3	4	5	5
Q	–	–	$10.4^{+0.1}_{0}$	$12.8^{+0.1}_{0}$	$16.3^{+0.1}_{0}$	$16.3^{+0.1}_{0}$
R1	6	6	6	6	6	6
R2	M2.5 x 4 DP	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP	M4 x 8 DP	M5 x 10 DP
R3 (P.C.D)	55	66	76	91	118	144
S1	8	12	12	12	12	12
ØS2	3.4	3.4	3.4	4.5	5.5	6.6
S3 (P.C.D)	68	80	89	105	135	168
T1	8	12	12	12	12	12
T2	M3 x 7.8 DP	M3	M3	M4	M5	M6
T3 (P.C.D)	68	80	89	105	135	168
U (Degree)	15°	10°	10°	8°	10°	10°
V1	12	12	12	12	12	12
V2	M3 x 6 DP	M4 x 8 DP	M4 x 8 DP	M5 x 10 DP	M6 x 10 DP	M8 x 14 DP
V3 (P.C.D)	43	52	62	76	96	118
W1	4	6	6	6	6	6
W2	Ø5.5 x 3 DP	Ø5.5 x 3 DP	Ø5.5 x 3 DP	Ø6.5 x 3.4 DP	Ø8 x 4.4 DP	Ø10 x 6 DP
ØW3	2.9	2.9	2.9	3.4	4.5	5.5
W4 (P.C.D)	68	78	88	105	135	165
X (Degree)	30°	20°	20°	20°	20°	20°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (Kg)	0.54	0.79	1.30	1.95	3.90	6.90

5-5 DSC-AJ-M Type

5-5-1 Technical data

Table 5-5-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.8	23	2.4	11	1.1	47	4.8		
	100	7.8	0.8	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-5-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.0465	0.059	0.070	0.088	0.114	0.134
Offset amount		R	m	0.014	0.014	0.016	0.018	0.020	0.026
Basic load ratings	Dynamic load	C	kN	8.25	10.7	21.0	21.8	34.5	43.3
			kgf	840	1090	2140	2230	3520	4415
	Static load	Co	kN	11.4	14.8	27.0	35.8	59	81.6
			kgf	1160	1510	2750	3660	6020	8320
Moment rigidity		K	$\times 10^4$ Nm/rad	7.9	13.7	24.0	39.0	120.3	179.4
			kgfm/arc min	2.4	4.1	7.1	11.6	35.7	53.2
Permissible dynamic tilting moment		M	Nm	73	114	172	254	578	886
Permissible static tilting moment		Mo	Nm	155	276	603	1050	2242	3645
Permissible axial load		Fa	kN	2.030	2.286	4.486	5.298	9.357	10.361
Permissible radial load		Fr	kN	1.360	1.532	3.006	3.550	6.269	6.942

Table 5-5-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-5-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-5-5 Starting torque

Unit : cNm

Reduction ratio	Model	14	17	20	25	32	40
50		5.7	9.7	14	22	41	72
80		4.4	7.2	11	15	29	52
100		3.7	6.5	9.9	14	27	47
120		—	6.2	9.3	13	24	44

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

Table 5-5-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	3.4	5.8	8.4	13	25	43
80	4.2	6.9	10	15	28	50
100	4.5	7.8	12	17	33	56
120	—	8.9	13	19	34	63

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

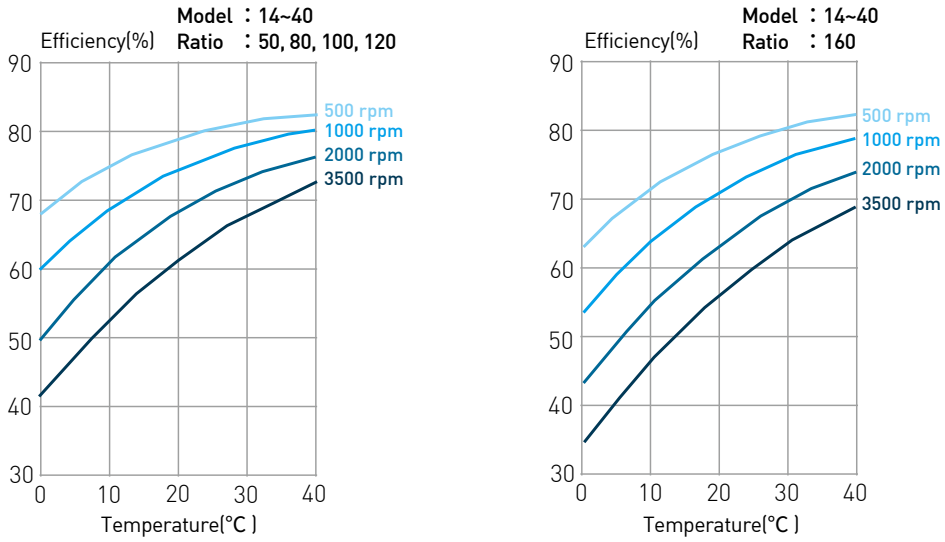
Table 5-5-7 Torsional rigidity

Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

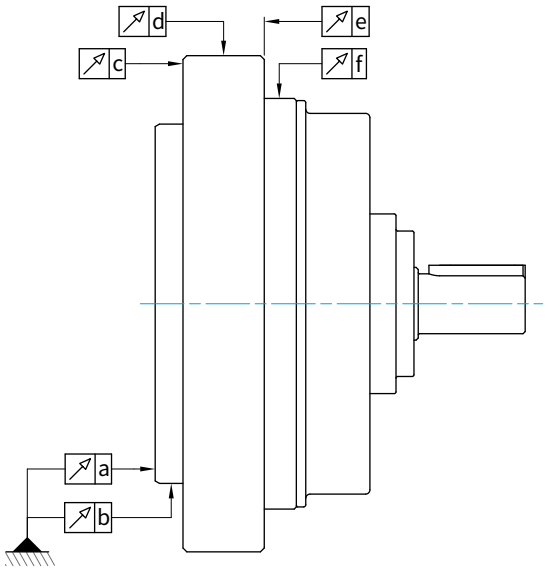
Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-5-2 Efficiency E_R

DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .



5-5-3 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.010	0.010	0.010	0.010	0.012	0.012
b	0.010	0.010	0.010	0.010	0.010	0.010
c	0.010	0.010	0.010	0.010	0.012	0.012
d	0.010	0.010	0.010	0.010	0.010	0.010
e	0.020	0.020	0.020	0.020	0.020	0.020
f	0.015	0.015	0.015	0.015	0.015	0.015

5-5-4 Installation bolt tightening torque

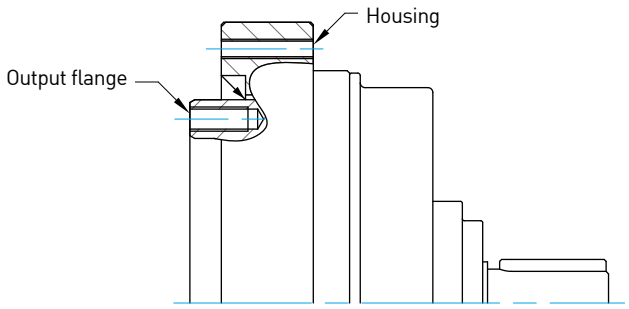


Table 5-5-8 Bolt tightening torque for output flange

Item \ Model		14	17	20	25	32	40
Number of bolts		12	12	12	12	12	12
Bolts size		M3	M4	M4	M5	M6	M8
Installation of bolts PCD	mm	43	52	62	76	96	118
Bolts tightening torque	Nm	2.3	5.1	5.1	10	17.4	42.2
	kgfm	0.23	0.52	0.52	1.0	1.8	4.3
Transmission torque	Nm	85	188	228	463	847	1964
	kgfm	8.6	19.1	23.2	47.2	86.3	200.2

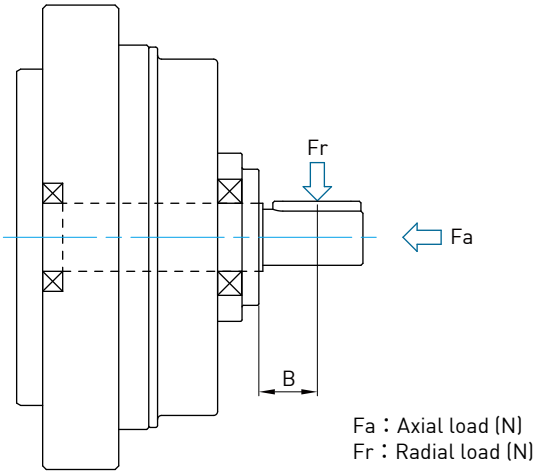
Table 5-5-9 Bolt tightening torque for housing

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	68	80	89	105	135	168
Bolts tightening torque	Nm	2.3	2.3	2.3	5.1	10.0	17.4
	kgfm	0.23	0.23	0.23	0.52	1.0	1.8
Transmission torque	Nm	89	158	177	378	805	1482
	kgfm	9.1	16.1	18.0	38.6	82.1	151.1

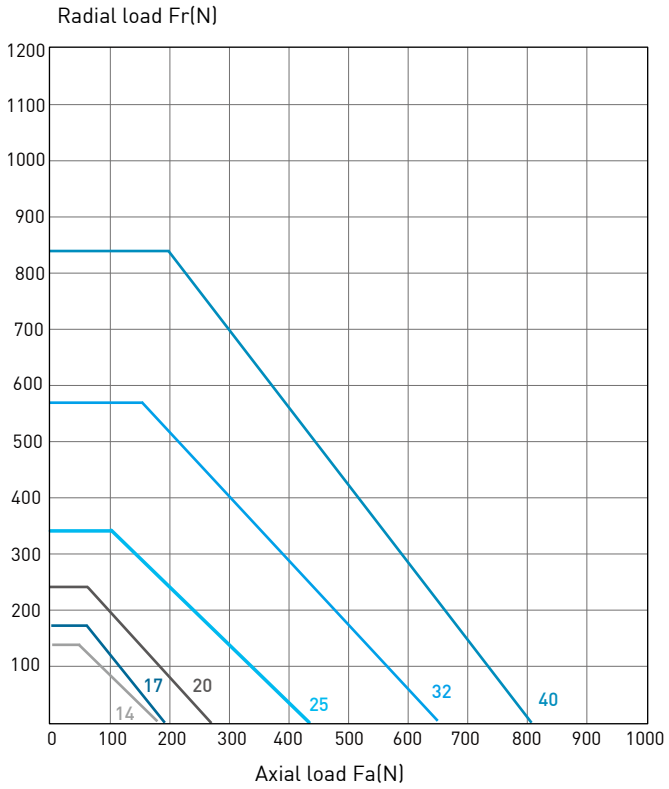
Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-5-5 Permissible input load

To ensure proper performance of the reducer, please confirm the load applied to the input section as shown below:

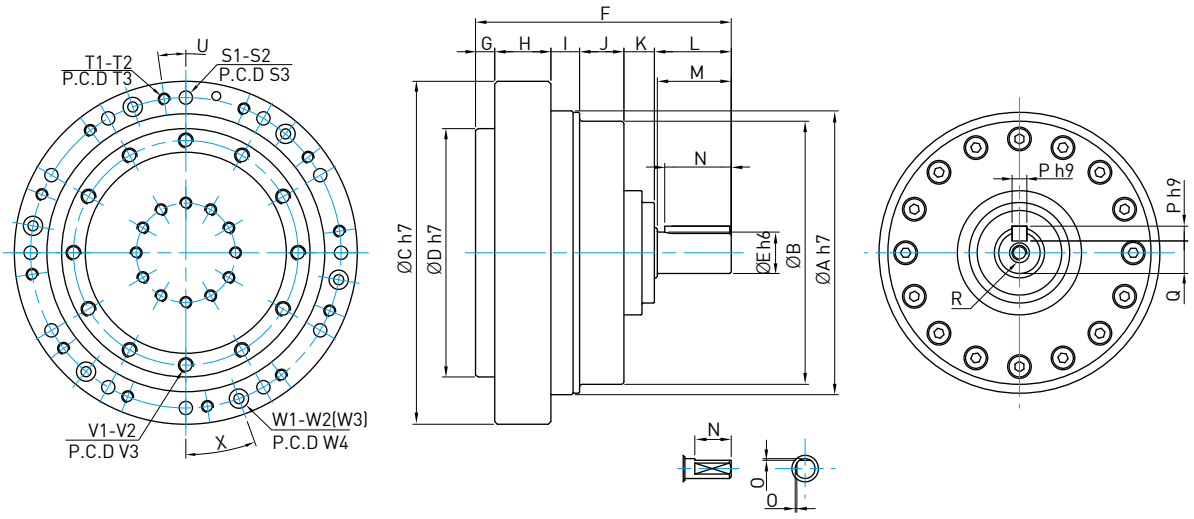


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 7000hour.



Item / Model		14	17	20	25	32	40
Offset (B)	mm	7	8	10	12.5	12.5	15
Maximum radial load (Fr)	N	118	145	232	342	567	825

5-5-6 DSC-AJ-M type size chart



Model14、17

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	60	72	82	96	125	154
ØB	53	64	74	89	116	142
ØC h7	78	88	98	116	148	180
ØD h7	49	59	69	84	110	132
ØE h6	6	8	10	14	14	16
F	55	61.5	73.5	86.5	100.5	117.5
G	5	5	5.7	6.5	6.5	7.5
H	12	13.5	17.2	19	24	29
I	5.7	8.2	8.8	9.7	12.7	13.7
J	9.8	9.8	11.5	15	20	24.5
K	7.5	8	9.3	10.3	11.3	11.8
L	15	17	21	26	26	31
M	14	16	20	25	25	30
N	11	12	16.5	22.5	22.5	27.5
O	0.5	0.5	–	–	–	–
P h9	–	–	3	5	5	5
Q	–	–	$8.2^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$13^{\ 0}_{-0.1}$
R	–	–	M3 x 6 DP	M5 x 10 DP	M5 x 10 DP	M5 x 10 DP
S1	8	12	12	12	12	12
ØS2	3.4	3.4	3.4	4.5	5.5	6.6
S3 (P.C.D)	68	80	89	105	135	168
T1	8	12	12	12	12	12
T2	M3 x 7.8 DP	M3	M3	M4	M5	M6
T3 (P.C.D)	68	80	89	105	135	168
U (Degree)	15°	10°	10°	8°	10°	10°
V1	12	12	12	12	12	12
V2	M3 x 6 DP	M4 x 8 DP	M4 x 8 DP	M5 x 10 DP	M6 x 10 DP	M8 x 14 DP
V3 (P.C.D)	43	52	62	76	96	118
W1	4	6	6	6	6	6
W2	Ø5.5 x 3 DP	Ø5.5 x 3 DP	Ø5.5 x 3 DP	Ø6.5 x 3.4 DP	Ø8 x 4.4 DP	Ø10 x 6 DP
ØW3	2.9	2.9	2.9	3.4	4.5	5.5
W4 (P.C.D)	68	78	88	105	135	165
X (Degree)	30°	20°	20°	20°	20°	20°
Moment of Inertia ($\times 10^{-4}$ kgm^2)	0.025	0.059	0.137	0.32	1.20	3.41
Weight (Kg)	0.64	0.95	1.40	2.50	5.40	8.80

5-6 DSH-PO Type

5-6-1 Technical data

Table 5-6-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-6-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-6-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-6-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-6-5 Maximum backlash

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	—	3.9	3.9	3.9	2.9	2.9
	arc sec	—	8	8	8	6	6
160	$\times 10^{-5}$ rad	—	—	2.9	2.9	2.4	2.4
	arc sec	—	—	6	6	5	5

Table 5-6-6 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.1	6.1	7.8	15	31	55
80	2.8	4	4.9	9.2	19	35
100	2.5	3.4	4.3	8	18	31
120	—	3.1	3.8	7.3	15	28
160	—	—	3.3	6.3	14	24

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

Table 5-6-7 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.6	3	4.7	9	18	33
80	1.6	3	4.8	9.1	19	33
100	1.8	3.3	5.1	9.8	20	36
120	—	3.5	5.5	11	22	39
160	—	—	6.4	13	26	46

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

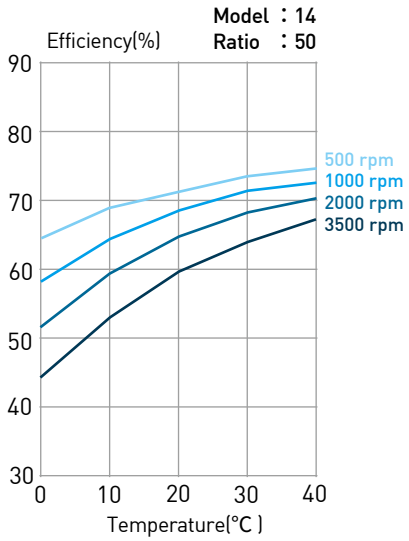
Table 5-6-8 Torsional rigidity

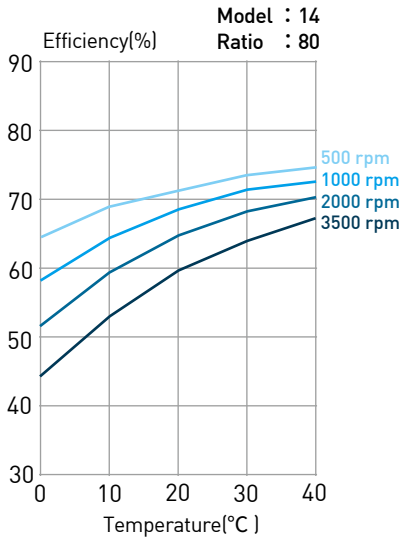
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

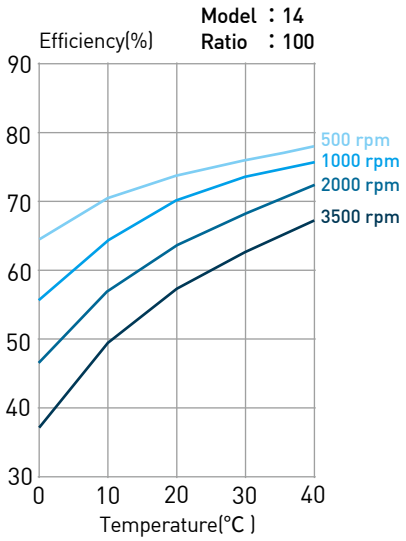
Note : The values are for reference only. The lower limit is 20% under the value in this table.

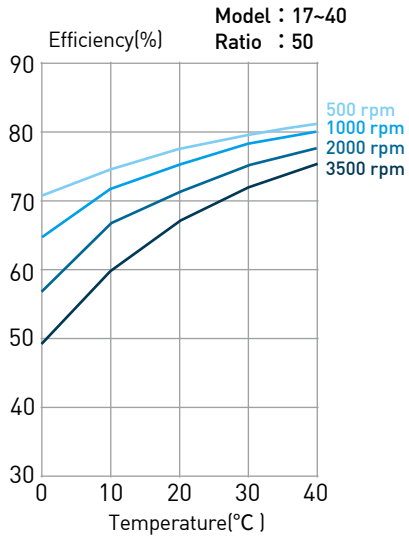
5-6-2 Efficiency E_R

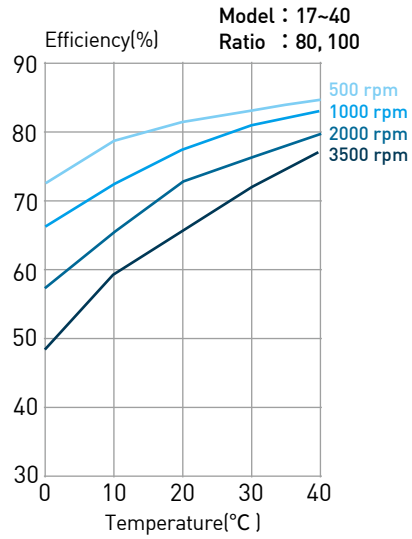
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

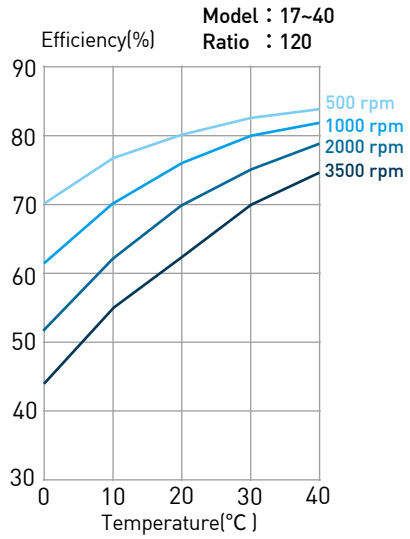


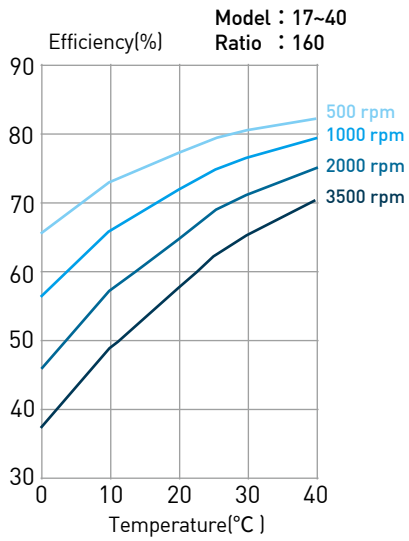




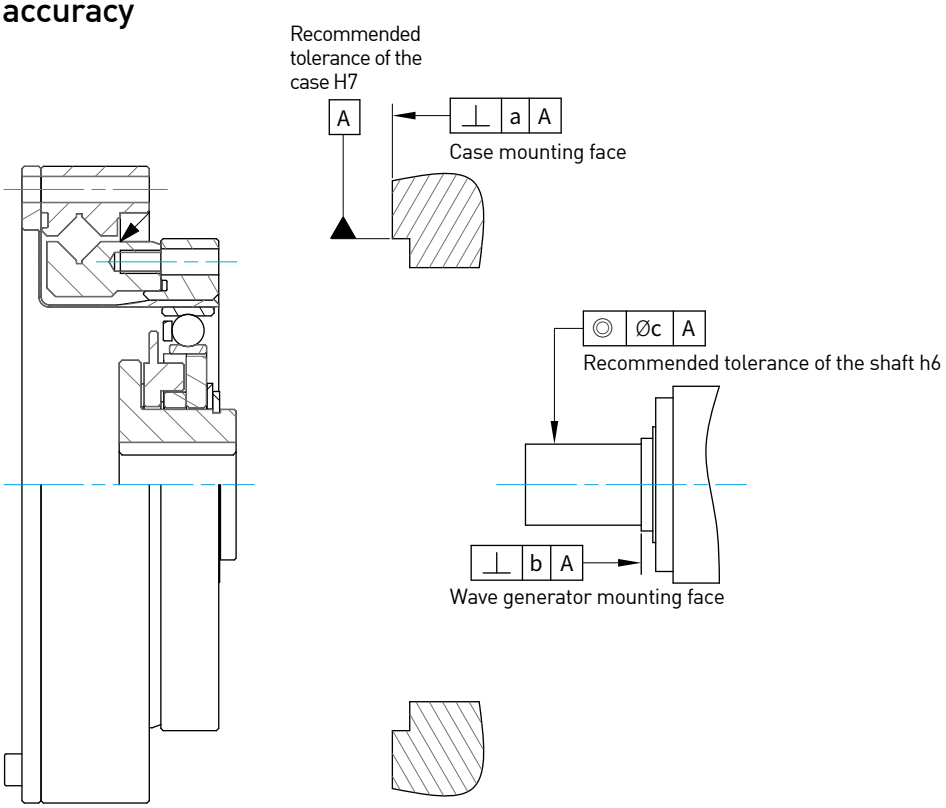








5-6-3 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
C	0.030	0.034	0.044	0.047	0.047	0.05
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.022)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-6-4 Installation bolt tightening torque

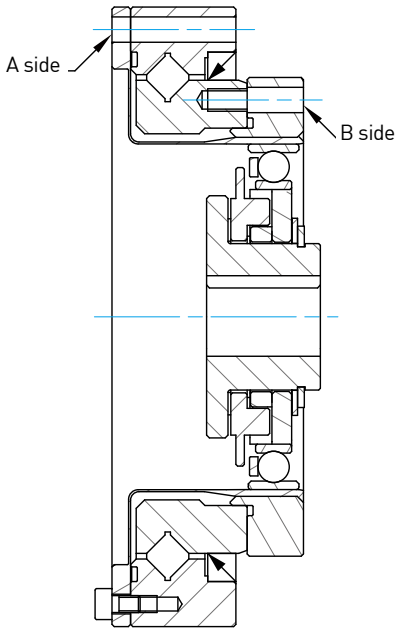


Table 5-6-9 A side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	108	186	206	431	892	1509
	kgfm	11	19	21	44	91	154

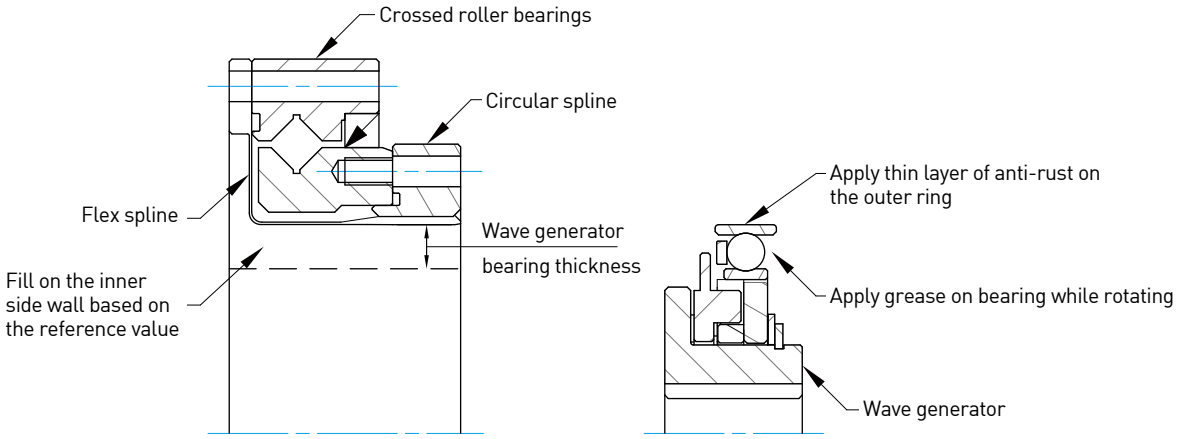
Table 5-6-10 B side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	72	176	206	431	902	1558
	kgfm	7.3	18	21	44	92	159

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-6-5 Lubrication

Other than the tooth space of DSH-PO Type, all other parts are not packed with lubricant. Please follow the below points for applying the lubricant.

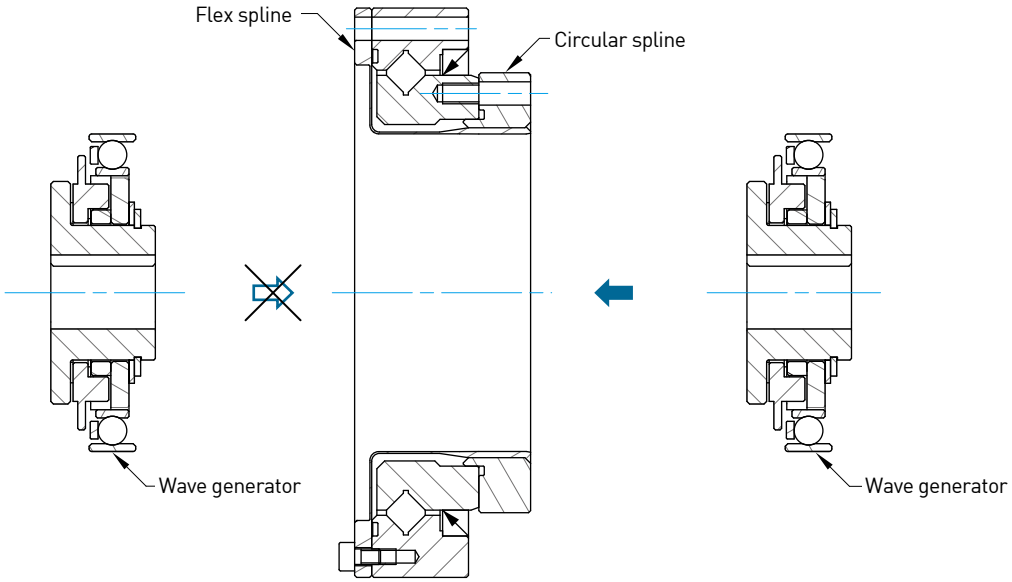


Unit : g

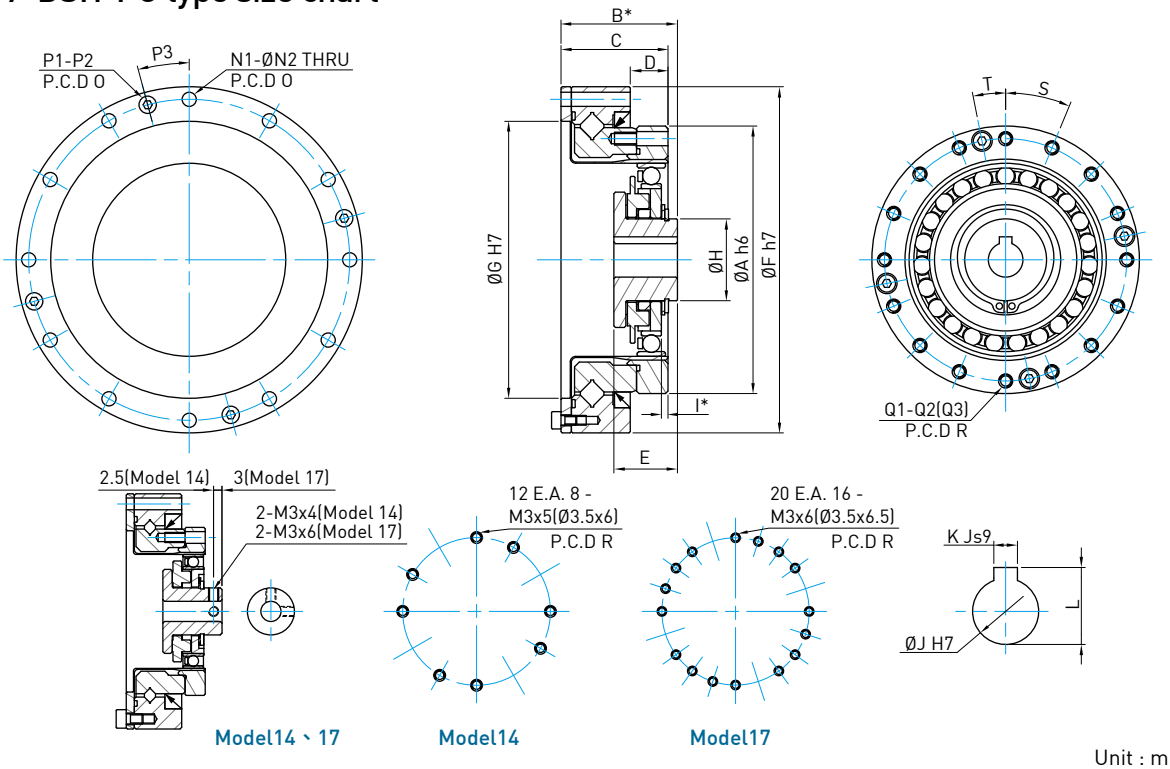
Instructions \ Model		14	17	20	25	32	40
Used horizontally		5.8	11	18	32	64	120
Used vertical	Wave generator is facing down	7.5	13	19	37	74	130
	Wave generator is facing up	8.9	15	22	42	84	150

5-6-6 Installation sequence

Install the wave generator only after installing the reducer body into the case. Please note the installation sequence to avoid damage on the tooth face.



5-6-7 DSH-PO type size chart



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h6	50	60	70	85	110	135
B*	$28.5^{\ 0}_{-0.8}$	$32.5^{\ 0}_{-0.9}$	$33.5^{\ 0}_{-1}$	$37^{\ 0}_{-1.1}$	$44^{\ 0}_{-1.1}$	$53^{\ 0}_{-1.1}$
C	23.5	26.5	29	34	42	51
D	7	7.5	8.5	12	15	18
E	$17.6^{\ 0}_{-0.1}$	$19.5^{\ 0}_{-0.1}$	$20.1^{\ 0}_{-0.1}$	$20.2^{\ 0}_{-0.1}$	$22^{\ 0}_{-0.1}$	$27.5^{\ 0}_{-0.1}$
ØF h7	70	80	90	110	142	170
ØG H7	48	60	70	88	114	140
ØH	14	18	21	26	26	32
I*	0.4	0.3	0.1	2.1	2.5	3.3
ØJ H7	6	8	9	11	14	14
K Js9	-	-	3	4	5	5
L	-	-	$10.4^{\ +0.1}_{\ 0}$	$12.8^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$
N1	8	12	12	12	12	12
ØN2	3.5	3.5	3.5	4.5	5.5	6.6
O (P.C.D)	64	74	84	102	132	158
P1	2	4	4	4	4	6
P2	M3	M3	M3	M3	M4	M4
P3 (Degree)	22.5°	15°	15°	15°	15°	15°
Q1	12 E.A. 8	20 E.A. 16	16	16	16	16
Q2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
Q3	Ø3.5 x 6 DP	Ø3.5 x 6.5 DP	Ø3.5 x 7.5 DP	Ø4.5 x 10 DP	Ø5.5 x 14 DP	Ø6.6 x 17 DP
ØR	44	54	62	77	100	122
S (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
T (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (Kg)	0.41	0.57	0.81	1.31	2.94	5.1

*The dimension B, I is the fitting position and permissible tolerance in the axial direction.

5-7 DSH-PH Type

5-7-1 Technical data

Table 5-7-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-7-2 Crossed roller bearing specifications

Item \ Model				14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-7-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-7-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-7-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.1	6.1	7.8	15	31	55
80	2.8	4	4.9	9.2	19	35
100	2.5	3.4	4.3	8	18	31
120	—	3.1	3.8	7.3	15	28
160	—	—	3.3	6.3	14	24

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

Table 5-7-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.6	3	4.7	9	18	33
80	1.6	3	4.8	9.1	19	33
100	1.8	3.3	5.1	9.8	20	36
120	—	3.5	5.5	11	22	39
160	—	—	6.4	13	26	46

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

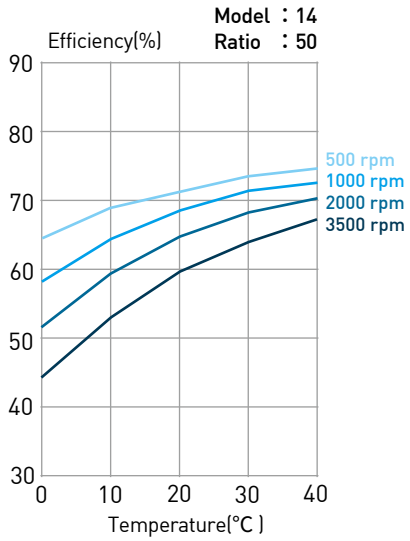
Table 5-7-7 Torsional rigidity

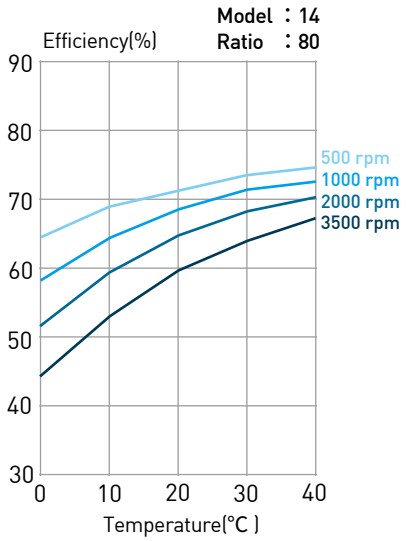
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

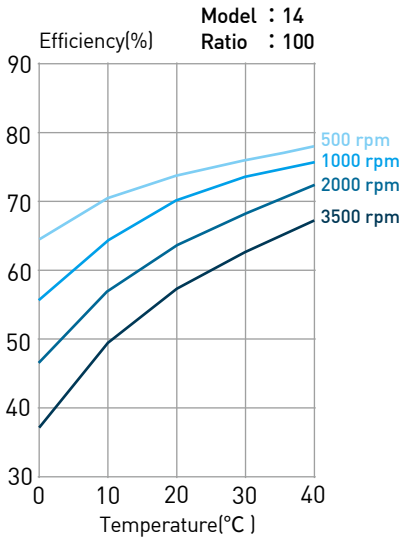
Note : The values are for reference only. The lower limit is 20% under the value in this table.

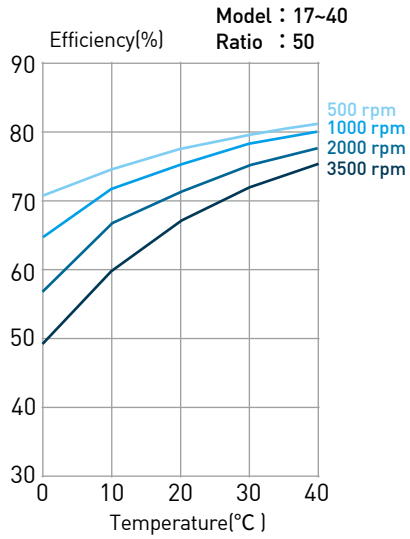
5-7-2 Efficiency E_R

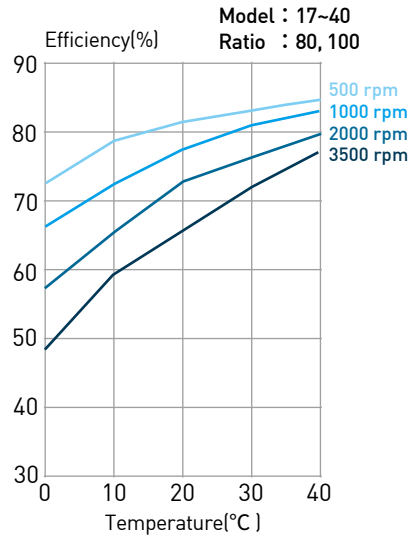
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

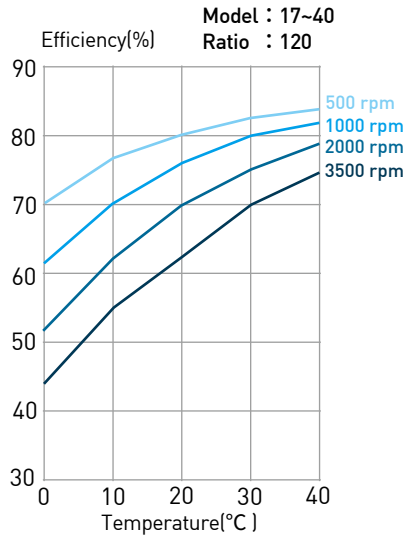


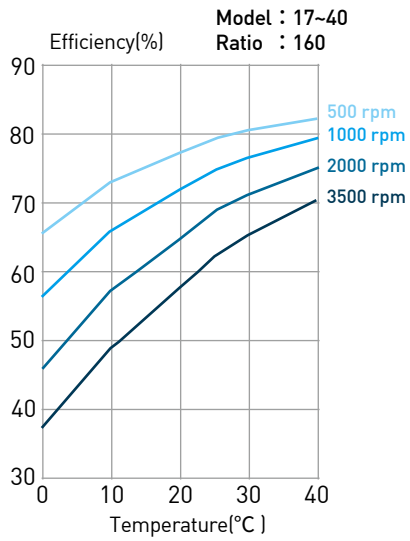




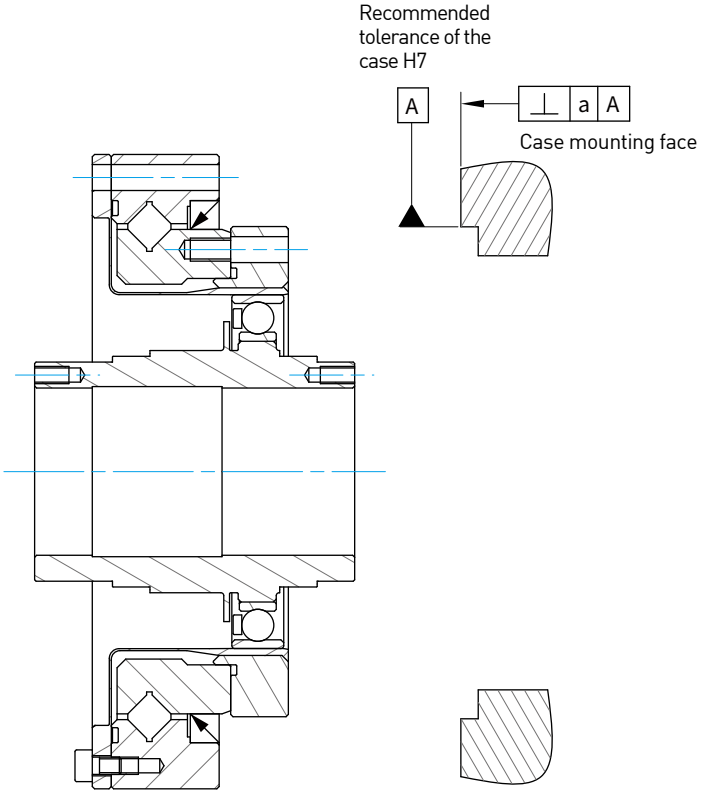








5-7-3 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026

5-7-4 Installation bolt tightening torque

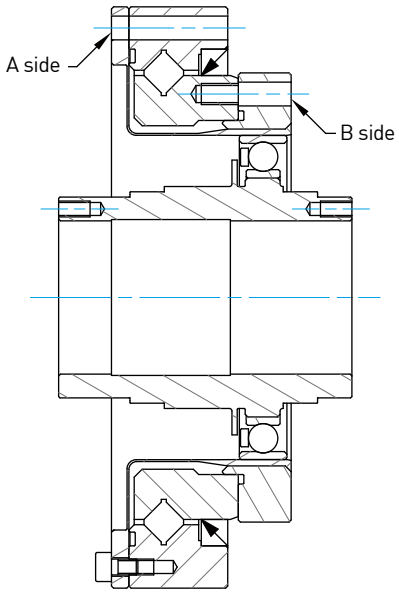


Table 5-7-8 A side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	108	186	206	431	892	1509
	kgfm	11	19	21	44	91	154

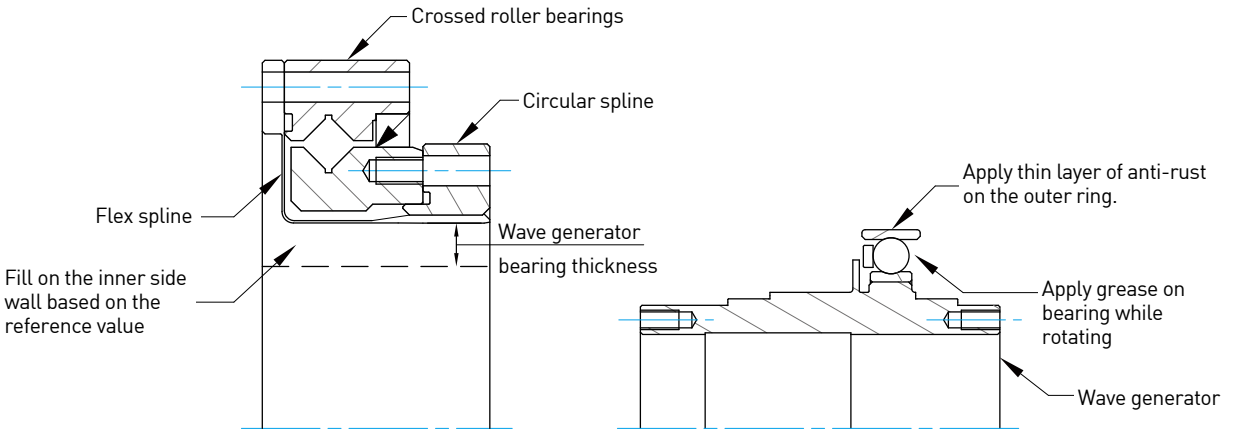
Table 5-7-9 B side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	72	176	206	431	902	1558
	kgfm	7.3	18	21	44	92	159

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-7-5 Lubrication

Other than the tooth space of DSH-PH Type, all other parts are not packed with lubricant. Please follow the below points for applying the lubricant.

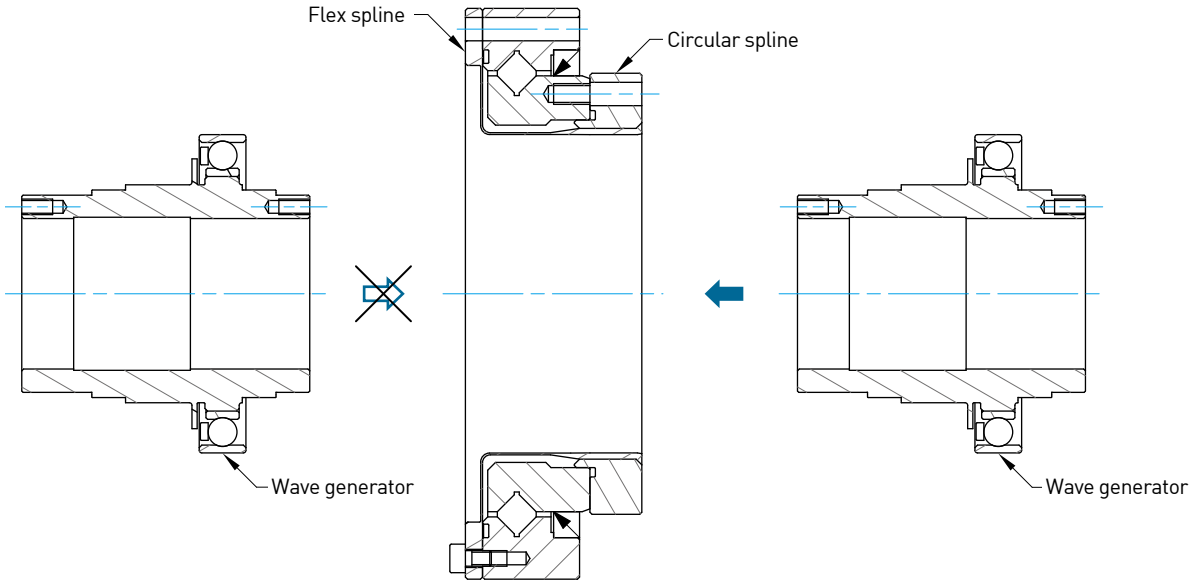


Unit : g

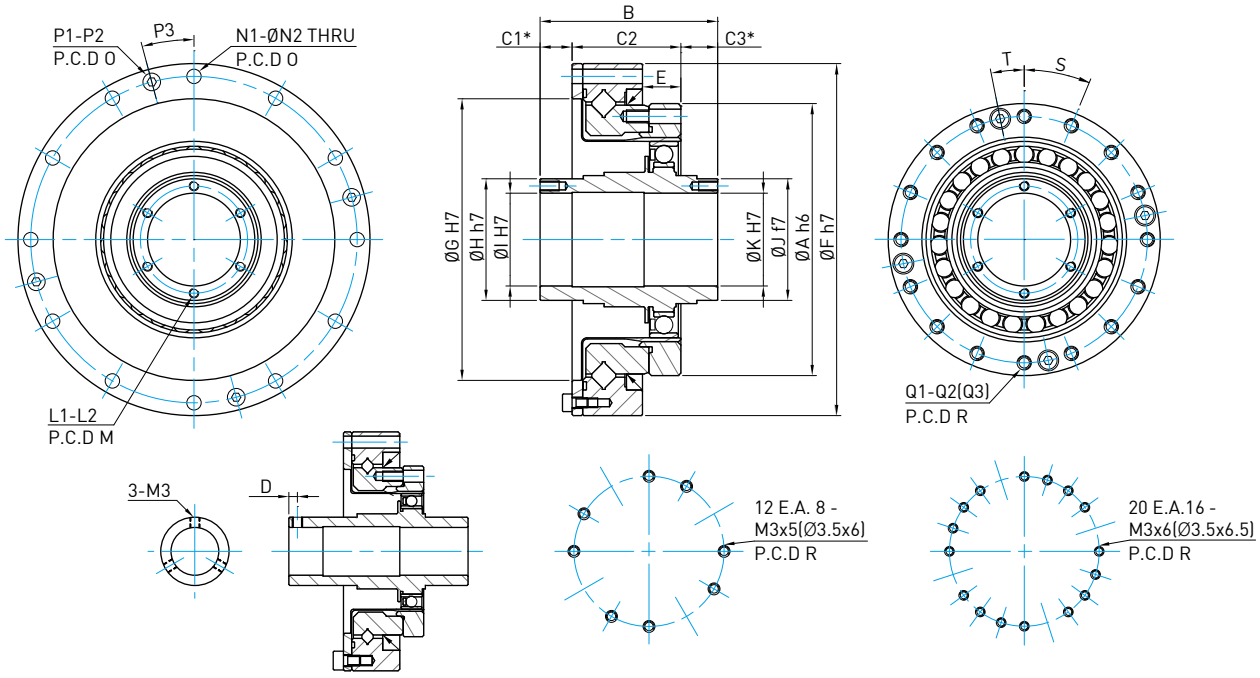
Instructions \ Model		14	17	20	25	32	40
Used horizontally		5.8	11	18	32	64	120
Used vertical	Wave generator is facing down	7.5	13	19	37	74	130
	Wave generator is facing up	8.9	15	22	42	84	150

5-7-6 Installation sequence

Install the wave generator only after installing the reducer body into the case. Please note the installation sequence to avoid damage on the tooth face.

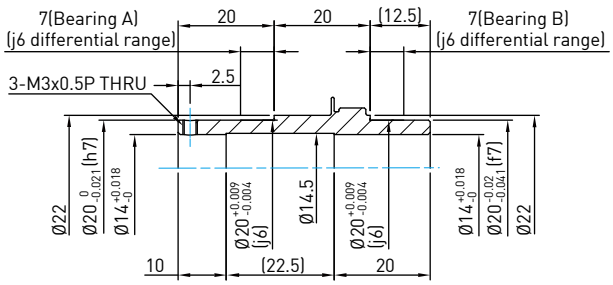


5-7-7 DSH-PH type size chart

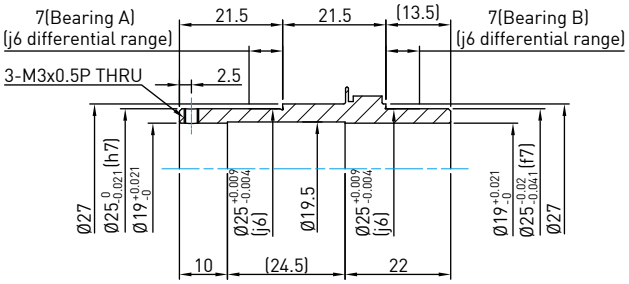


Model14、17 Model14 Model17

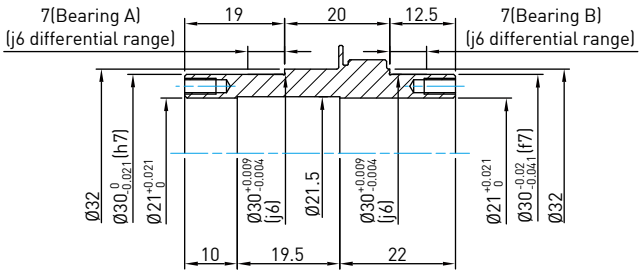
Model 14



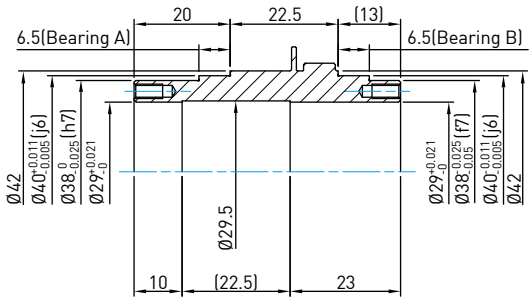
Model 17



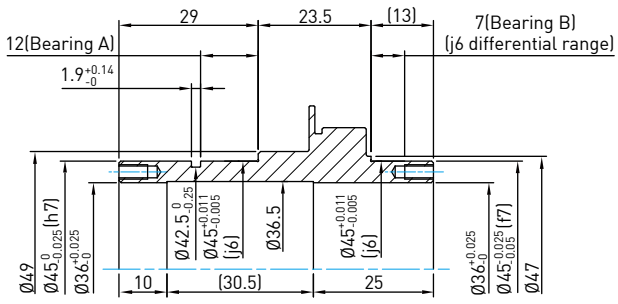
Model 20



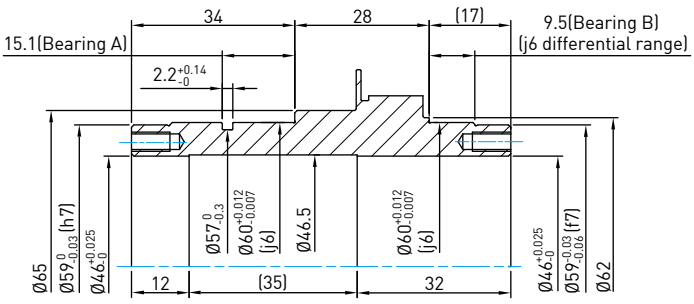
Model 25



Model 32



Model 40



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h6	50	60	70	85	110	135
B	$52.5^{\ 0}_{-0.1}$	$56.5^{\ 0}_{-0.1}$	$51.5^{\ 0}_{-0.1}$	$55.5^{\ 0}_{-0.1}$	$65.5^{\ 0}_{-0.1}$	$79^{\ 0}_{-0.1}$
C1*	$16^{+0.8}_{\ 0}$	$16^{+0.9}_{\ 0}$	$9.5^{+1.0}_{\ 0}$	$10^{+1.1}_{\ 0}$	$12^{+1.1}_{\ 0}$	$13^{+1.1}_{\ 0}$
C2	23.5	26.5	29	34	42	51
C3*	13	14	13	11.5	11.5	15
D	2.5	2.5	–	–	–	–
E	7	7.5	8.5	12	15	18
ØF h7	70	80	90	110	142	170
ØG H7	48	60	70	88	114	140
ØH h7	20	25	30	38	45	59
ØI H7	14	19	21	29	36	46
ØJ f7	20	25	30	38	45	59
ØK H7	14	19	21	29	36	46
L1	3	3	2x6	2x6	2x6	2x6
L2	M3	M3	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP	M4 x 8 DP
M (P.C.D)	–	–	25.5	33.5	40.5	52
N1	8	12	12	12	12	12
ØN2	3.5	3.5	3.5	4.5	5.5	6.6
O (P.C.D)	64	74	84	102	132	158
P1	2	4	4	4	4	6
P2	M3	M3	M3	M3	M4	M4
P3 (Degree)	22.5°	15°	15°	15°	15°	15°
Q1	12 E.A. 8	20 E.A. 16	16	16	16	16
Q2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
Q3	Ø3.5 x 6 DP	Ø3.5 x 6.5 DP	Ø3.5 x 7.5 DP	Ø4.5 x 10 DP	Ø5.5 x 14 DP	Ø6.6 x 17 DP
ØR	44	54	62	77	100	122
S (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
T (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Bearing A**	6804ZZ	6805ZZ	6806ZZ	6808ZZ	6909ZZ	6912ZZ
Bearing B**	6804ZZ	6805ZZ	6806ZZ	6808ZZ	6809ZZ	6812ZZ
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.091	0.193	0.404	1.070	2.85	9.28
Weight (Kg)	0.45	0.63	0.89	1.44	3.1	5.4

*The dimension C1, C3 is the fitting position and permissible tolerance in the axial direction.
**It is recommended to use a deep groove bearing model.

5-8 DSH-AH Type

5-8-1 Technical data

Table 5-8-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-8-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-8-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-8-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-8-5 Starting torque

Unit : cNm

Reduction ratio	Model	14	17	20	25	32	40
50		8.8	27	36	56	85	136
80		7.5	25	33	50	74	117
100		6.9	24	32	49	72	112
120		—	24	31	48	68	110
160		—	—	31	47	67	105

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

Table 5-8-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	5.3	16	22	34	51	82
80	7.2	24	31	48	70	112
100	8.2	29	38	59	86	134
120	—	34	45	69	97	158
160	—	—	59	90	128	201

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

Table 5-8-7 Torsional rigidity

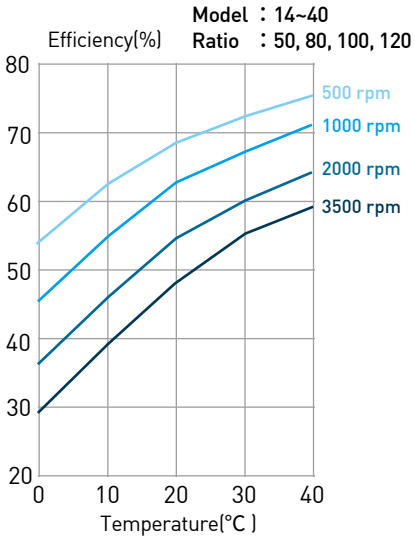
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

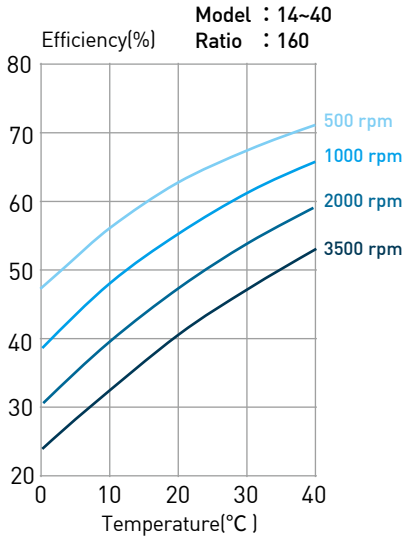
Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-8-2 Efficiency

1. Rated torque E_R

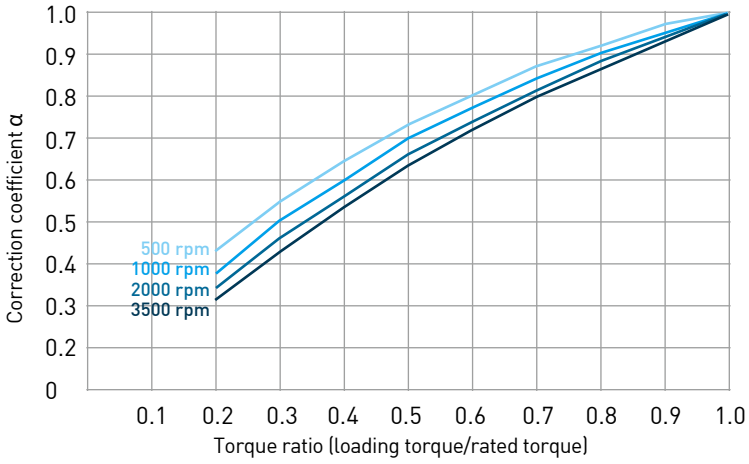
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .





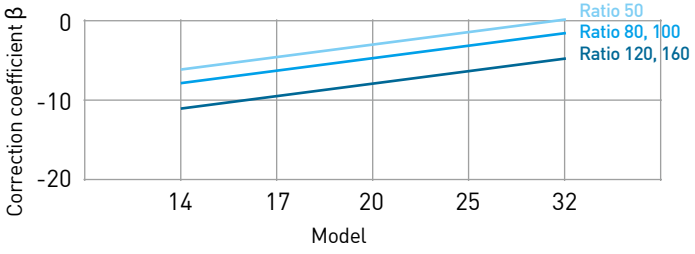
2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.



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

5-8-3 No-load operating torque

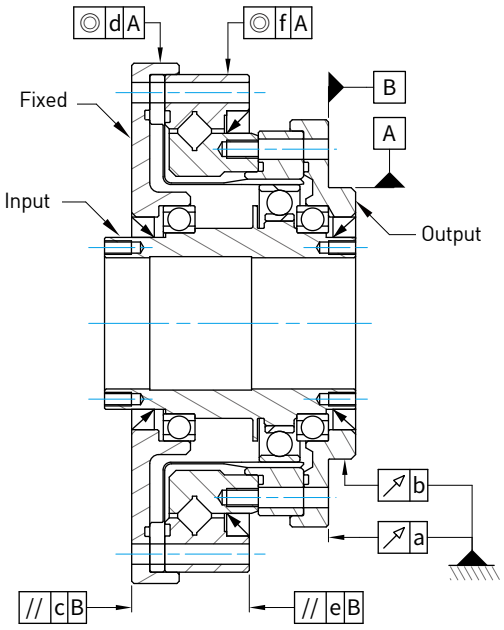
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	6.3	17.8	23.6	37.2	58	103.3
	1000 r/min	7.8	21.8	28.6	49.2	76	168.3
	2000 r/min	10.1	27.8	37.6	62.2	98	183.3
	3500 r/min	14.1	36.8	48.6	89.2	138	236.3
80	500 r/min	5.4	16.4	21.5	33.8	51.5	92.4
	1000 r/min	6.9	20.4	26.5	45.8	69.5	157.4
	2000 r/min	9.2	26.4	35.5	58.8	91.5	172.4
	3500 r/min	13.2	35.4	46.5	85.8	131.5	225.4
100	500 r/min	5.2	16	21	33	50	90
	1000 r/min	6.7	20	26	45	68	155
	2000 r/min	9	26	35	58	90	170
	3500 r/min	13	35	46	85	130	223
120	500 r/min	—	15.8	20.6	32.4	48.9	88.3
	1000 r/min	—	19.8	25.6	44.4	66.9	153.3
	2000 r/min	—	25.8	34.6	57.4	88.9	168.3
	3500 r/min	—	34.8	45.6	84.4	128.9	221.3
160	500 r/min	—	—	20.2	31.7	47.5	86
	1000 r/min	—	—	25.2	43.7	65.5	151
	2000 r/min	—	—	34.2	56.7	87.5	166
	3500 r/min	—	—	45.2	83.7	127.5	219

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

5-8-4 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.033	0.038	0.040	0.046	0.054	0.057
b	0.035	0.035	0.039	0.041	0.047	0.050
c	0.064	0.071	0.079	0.085	0.104	0.111
d	0.053	0.050	0.059	0.061	0.072	0.075
e	0.040	0.045	0.051	0.057	0.065	0.071
f	0.038	0.038	0.047	0.049	0.054	0.060

5-8-5 Installation bolt tightening torque

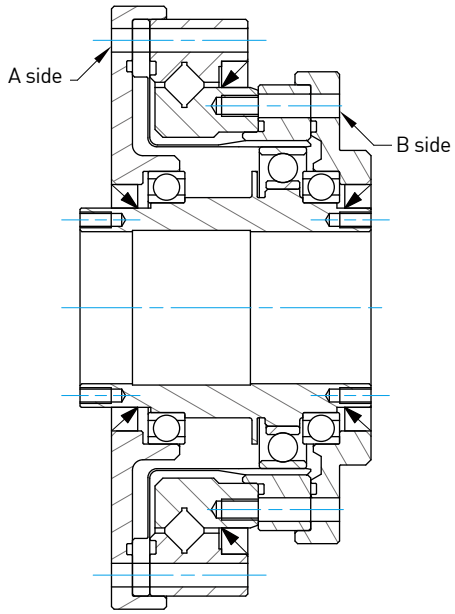


Table 5-8-8 A side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	108	186	206	431	892	1509
	kgfm	11	19	21	44	91	154

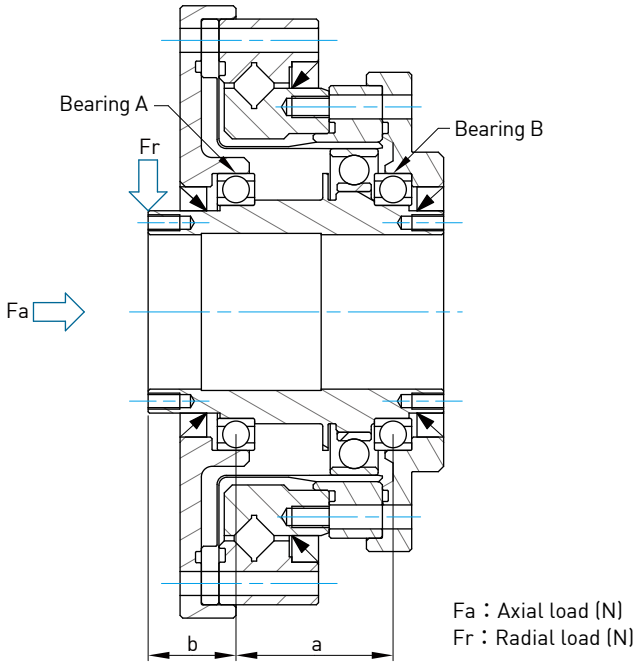
Table 5-8-9 B side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	72	176	206	431	902	1558
	kgfm	7.3	18	21	44	92	159

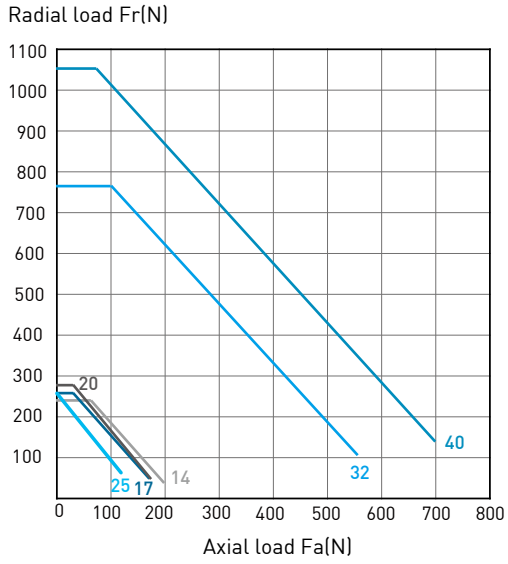
Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-8-6 Permissible input load

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

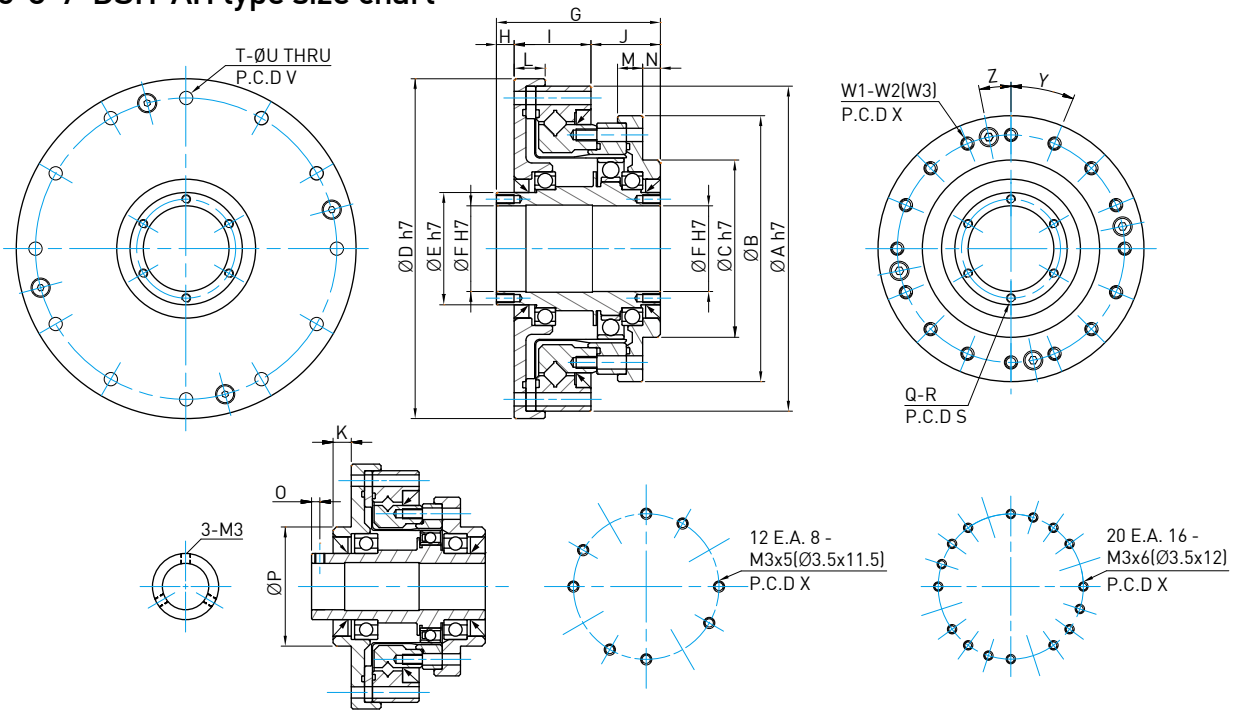


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 7000hour.



Item / Model	Bearing A		Bearing B		a (mm)	b (mm)	Maximum radial load Fr (N)
	Dynamic load C (kN)	Static load Co (kN)	Dynamic load C (kN)	Static load Co (kN)			
14	4.0	2.47	4.0	2.47	27	16.5	230
17	4.3	2.95	4.3	2.95	29	17.5	250
20	4.5	3.45	4.5	3.45	27	15.5	275
25	4.9	4.35	4.9	4.35	29.5	16.5	250
32	14.1	10.9	5.35	5.25	33	23	770
40	16.4	14.3	11.5	10.9	39.5	27.5	1060

5-8-7 DSH-AH type size chart



Model14、17 Model14 Model17

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	70	80	90	110	142	170
ØB	54	64	75	90	115	140
ØC h7	36	45	50	60	85	100
ØD h7	74	84	95	115	147	175
ØE h7	20	25	30	38	45	59
ØF H7	14	19	21	29	36	46
G	52.5	56.5	51.5	55.5	65.5	79
H	12	12	5	6	7	8
I	20.5	23	25	26	32	38
J	20	21.5	21.5	23.5	26.5	33
K	5.5	5.5	–	–	–	–
L	9	10	10.5	10.5	12	14
M	8	8.5	9	8.5	9.5	13
N	7.5	8.5	7	6	5	7
O	2.5	2.5	–	–	–	–
P	36	45	–	–	–	–
Q	3	3	2x6	2x6	2x6	2x6
R	M3	M3	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP	M4 x 8 DP
S (P.C.D)	–	–	25.5	33.5	40.5	52
T	8	12	12	12	12	12
ØU	3.5	3.5	3.5	4.5	5.5	6.6
V (P.C.D)	64	74	84	102	132	158
W1	12 E.A. 8	20 E.A. 16	16	16	16	16
W2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
W3	Ø3.5 x 11.5 DP	Ø3.5 x 12 DP	Ø3.5 x 13.5 DP	Ø4.5 x 15.5 DP	Ø5.5 x 20.5 DP	Ø6.6 x 25 DP
X (P.C.D)	44	54	62	77	100	122
Y (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
Z (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.091	0.193	0.404	1.07	2.85	9.28
Weight (Kg)	0.71	1.0	1.38	2.1	4.5	7.7

5-9 DSH-AJ Type

5-9-1 Technical data

Table 5-9-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	5.4	0.55	18	1.8	6.9	0.7	35	3.6	8500	3500
	80	7.8	0.80	23	2.4	11	1.1	47	4.8		
	100	7.8	0.80	28	2.9	11	1.1	54	5.5		
17	50	16	1.6	34	3.5	26	2.6	70	7.1	7300	3500
	80	22	2.2	43	4.4	27	2.7	87	8.9		
	100	24	2.4	54	5.5	39	4	110	11		
	120	24	2.4	54	5.5	39	4	86	8.8		
20	50	25	2.5	56	5.7	34	3.5	98	10	6500	3500
	80	34	3.5	74	7.5	47	4.8	127	13		
	100	40	4.1	82	8.4	49	5	147	15		
	120	40	4.1	87	8.9	49	5	147	15		
	160	40	4.1	92	9.4	49	5	147	15		
25	50	39	4.0	98	10	55	5.6	186	19	5600	3500
	80	63	6.4	137	14	87	8.9	255	26		
	100	67	6.8	157	16	108	11	284	29		
	120	67	6.8	167	17	108	11	304	31		
	160	67	6.8	176	18	108	11	314	32		
32	50	76	7.8	216	22	108	11	382	39	4800	3500
	80	118	12	304	31	167	17	568	58		
	100	137	14	333	34	216	22	647	66		
	120	137	14	353	36	216	22	686	70		
	160	137	14	372	38	216	22	686	70		
40	50	137	14	402	41	196	20	686	70	4000	3000
	80	206	21	519	53	284	29	980	100		
	100	265	27	568	58	372	38	1080	110		
	120	294	30	617	63	451	46	1180	120		
	160	294	30	647	66	451	46	1180	120		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-9-2 Crossed roller bearing specifications

Item \ Model				14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-9-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-9-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	5.8
	arc min	1.5	1.5	1	1	1	2.0
80 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1.0

Table 5-9-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	5.7	9.7	14	22	41	72
80	4.4	7.2	11	15	29	52
100	3.7	6.5	9.9	14	27	47
120	—	6.2	9.3	13	24	44
160	—	—	8.6	12	23	39

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

Table 5-9-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	3.4	5.8	8.4	13	25	43
80	4.2	6.9	10	15	28	50
100	4.5	7.8	12	17	33	56
120	—	8.9	13	19	34	63
160	—	—	17	23	43	75

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

Table 5-9-7 Torsional rigidity

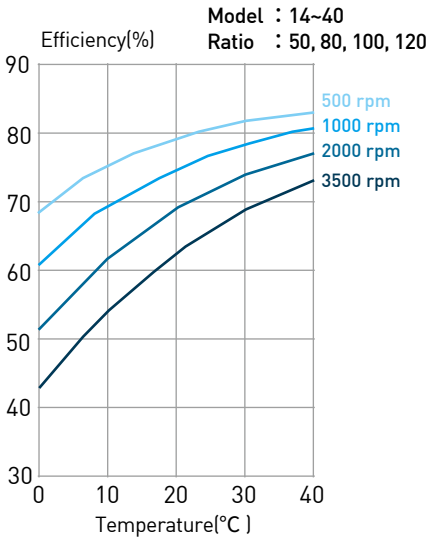
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

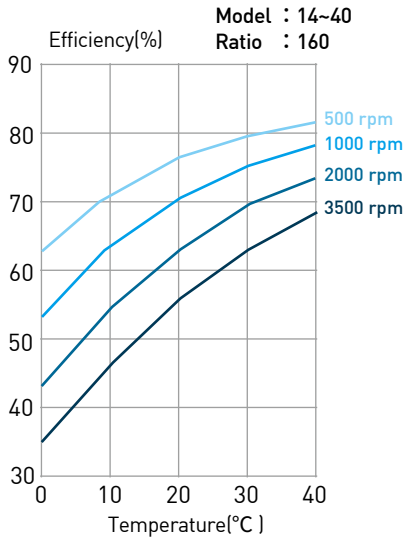
Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-9-2 Efficiency

1. Rated torque E_R

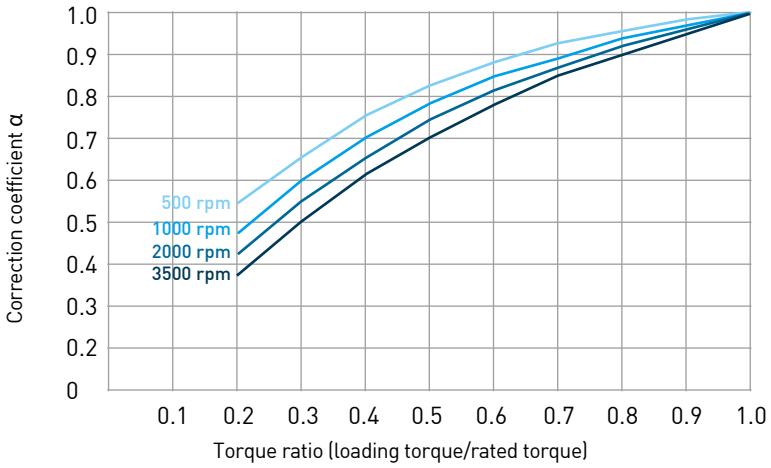
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .





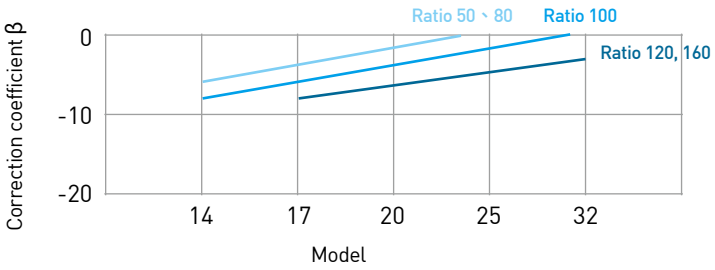
2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.



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

5-9-3 No-load operating torque

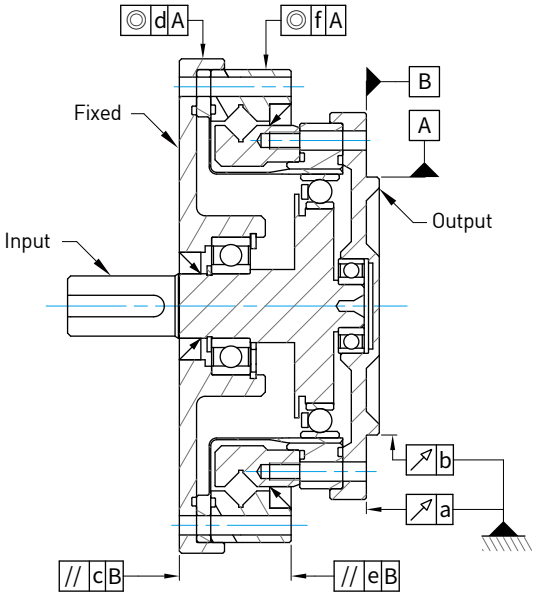
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	3.9	8	11.6	18.2	31	55.3
	1000 r/min	4.7	9.8	14.6	22.2	38	71.3
	2000 r/min	5.8	12.8	19.6	28.2	53	93.3
	3500 r/min	7	14.8	22.6	35.2	68	137.3
80	500 r/min	3	6.6	9.5	14.8	24.5	44.4
	1000 r/min	3.8	8.4	12.5	18.8	31.5	60.4
	2000 r/min	4.9	11.4	17.5	24.8	46.5	82.4
	3500 r/min	6.1	13.4	20.5	31.8	61.5	126.4
100	500 r/min	2.8	6.2	9	14	23	42
	1000 r/min	3.6	8	12	18	30	58
	2000 r/min	4.7	11	17	24	45	80
	3500 r/min	5.9	13	20	31	60	124
120	500 r/min	—	6	8.6	13.4	21.9	40.3
	1000 r/min	—	7.8	11.6	17.4	28.9	56.3
	2000 r/min	—	10.8	16.6	23.4	43.9	78.3
	3500 r/min	—	12.8	19.6	30.4	58.9	122.3
160	500 r/min	—	—	8.2	12.7	20.5	38
	1000 r/min	—	—	11.2	16.7	27.5	54
	2000 r/min	—	—	16.2	22.7	42.5	76
	3500 r/min	—	—	19.2	29.7	57.5	120

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

5-9-4 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.033	0.038	0.040	0.046	0.054	0.057
b	0.035	0.035	0.039	0.041	0.047	0.050
c	0.064	0.071	0.079	0.085	0.104	0.111
d	0.053	0.050	0.059	0.061	0.072	0.075
e	0.040	0.045	0.051	0.057	0.065	0.071
f	0.038	0.038	0.047	0.049	0.054	0.060

5-9-5 Installation bolt tightening torque

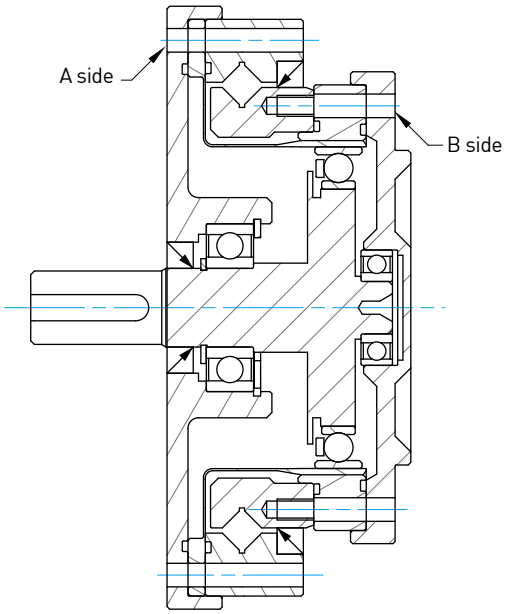


Table 5-9-8 A side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	108	186	206	431	892	1509
	kgfm	11	19	21	44	91	154

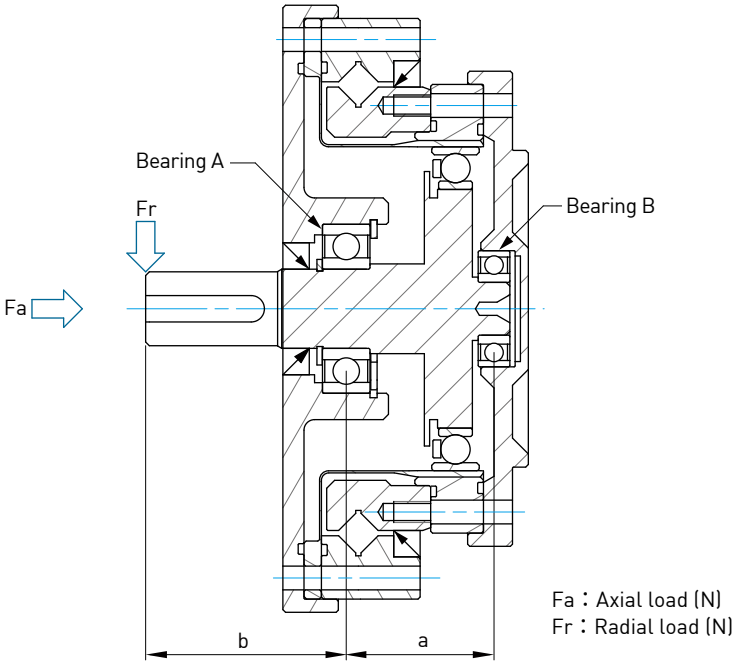
Table 5-9-9 B side mounting bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	72	176	206	431	902	1558
	kgfm	7.3	18	21	44	92	159

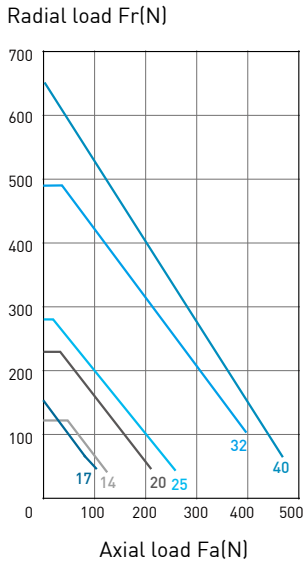
Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-9-6 Permissible input load

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

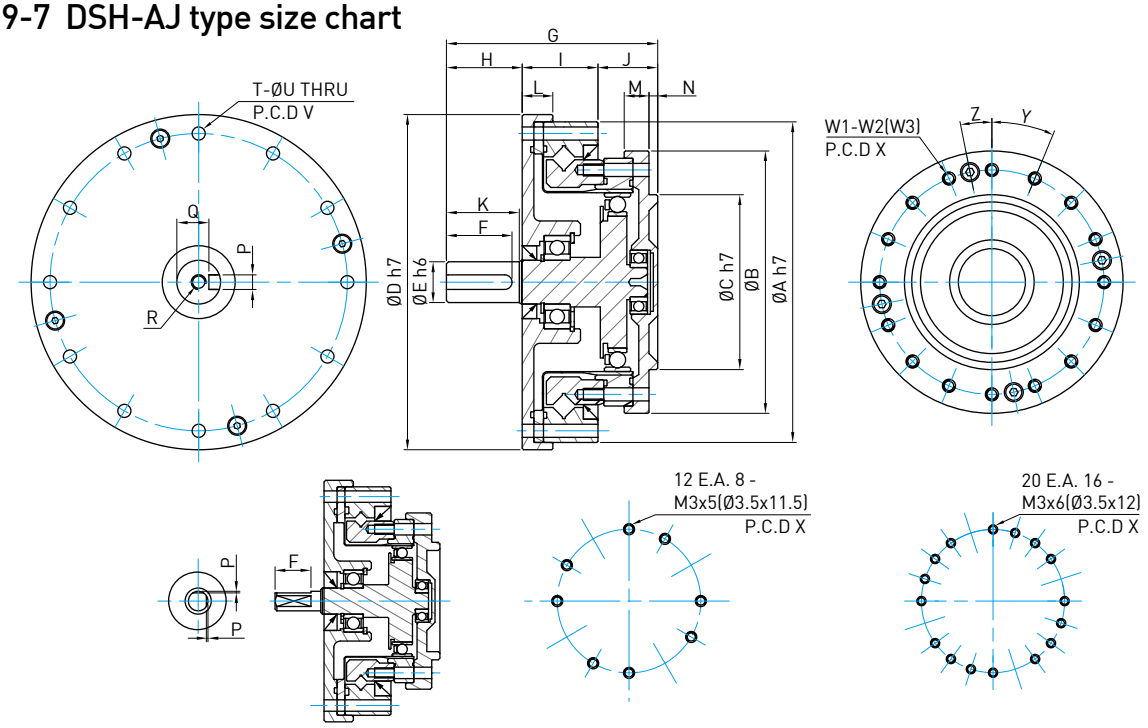


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 7000hour.



Item / Model	Bearing A		Bearing B		a (mm)	b (mm)	Maximum radial load Fr (N)
	Dynamic load C (kN)	Static load Co (kN)	Dynamic load C (kN)	Static load Co (kN)			
14	2.24	0.91	1.08	0.43	20	14	110
17	2.7	1.27	1.61	0.71	23.5	21	135
20	4.35	2.26	2.24	0.91	26.5	23.3	210
25	5.6	2.83	2.7	1.27	28	28	270
32	9.4	5	4.35	2.26	36	27	490
40	13.2	8.3	6	3.25	43	32.5	660

5-9-7 DSH-AJ type size chart



Model14、17　　Model14　　Model17　　Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	70	80	90	110	142	170
ØB	54	64	75	90	115	140
ØC h7	36	45	50	60	85	100
ØD h7	74	84	95	115	147	175
ØE h6	6	8	10	14	14	16
ØF	11	12	16.5	22.5	22.5	27.5
G	50.5	56	63.5	72.5	84.5	100
H	15	17	21	26	26	31
I	20.5	23	25	26	32	38
J	15	16	17.5	20.5	26.5	31
K	14	16	20	25	25	30
L	9	10	10.5	10.5	12	14
M	8	8.5	9	8.5	9.5	13
N	2.5	3	3	3	5	5
P	0.5	0.5	$3^{\ 0}_{-0.025}$	$5^{\ 0}_{-0.03}$	$5^{\ 0}_{-0.03}$	$5^{\ 0}_{-0.03}$
Q	–	–	$8.2^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$13^{\ 0}_{-0.1}$
R	–	–	M3 x 6 DP	M5 x 10 DP	M5 x 10 DP	M5 x 10 DP
T	8	12	12	12	12	12
ØU	3.5	3.5	3.5	4.5	5.5	6.6
V (P.C.D)	64	74	84	102	132	158
W1	12 E.A. 8	20 E.A. 16	16	16	16	16
W2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
W3	Ø3.5 x 11.5 DP	Ø3.5 x 12 DP	Ø3.5 x 13.5 DP	Ø4.5 x 15.5 DP	Ø5.5 x 20.5 DP	Ø6.6 x 25 DP
X (P.C.D)	44	54	62	77	100	122
Y (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
Z (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.025	0.059	0.137	0.32	1.2	3.41
Weight (Kg)	0.66	0.94	1.38	2.1	4.4	7.3

5-10 DGC-CO Type

5-10-1 Technical data

Table 5-10-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9.0	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	143	15		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1530	156		
	160	382	39	841	86	586	60	1530	156		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-10-2 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-10-3 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-10-4 Maximum backlash

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	-	3.9	3.9	3.9	2.9	2.9
	arc sec	-	8	8	8	6	6
160	$\times 10^{-5}$ rad	-	-	2.9	2.9	2.4	2.4
	arc sec	-	-	6	6	5	5

Table 5-10-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	3.6	5.6	7.3	13	29	51
80	2.6	3.6	4.5	8.5	18	32
100	2.3	3.2	4.1	7.6	17	29
120	-	3.0	3.6	6.9	14	26
160	-	-	3.2	6.1	13	23

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

Table 5-10-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.5	2.8	4.4	8.3	18	31
80	1.5	2.8	4.6	8.5	18	31
100	1.9	3.1	5.0	9.2	20	34
120	-	3.4	5.4	10	21	37
160	-	-	6.4	12	25	44

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

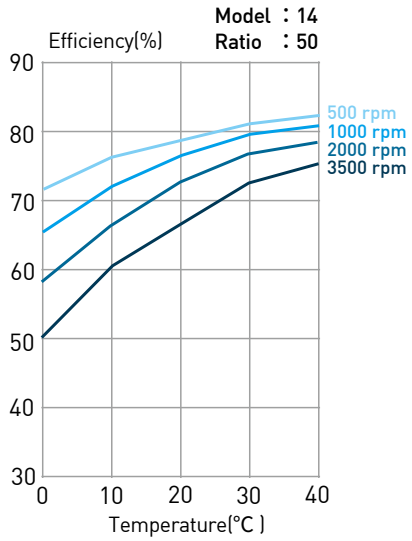
Table 5-10-7 Torsional rigidity

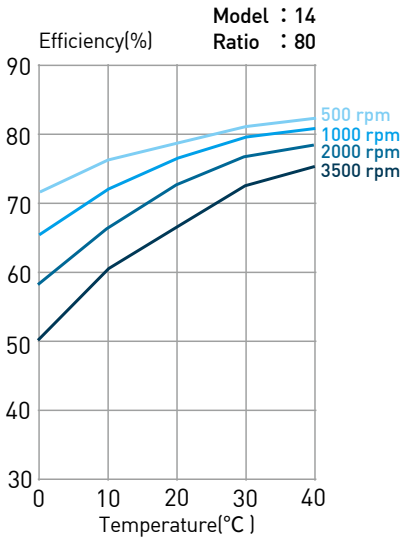
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.20	0.40	0.70	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

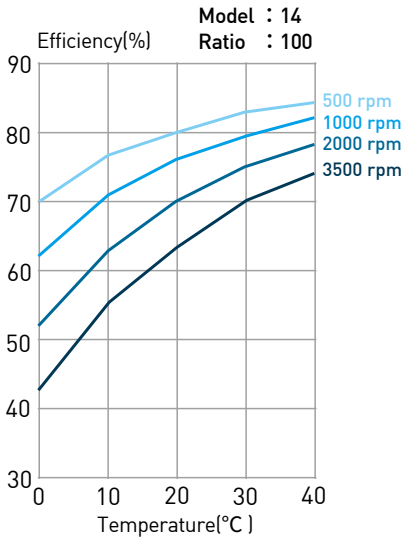
Note : The values are for reference only. The lower limit is 20% under the value in this table.

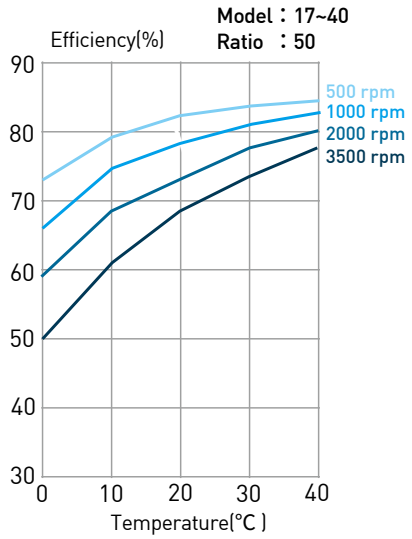
5-10-2 Efficiency E_R

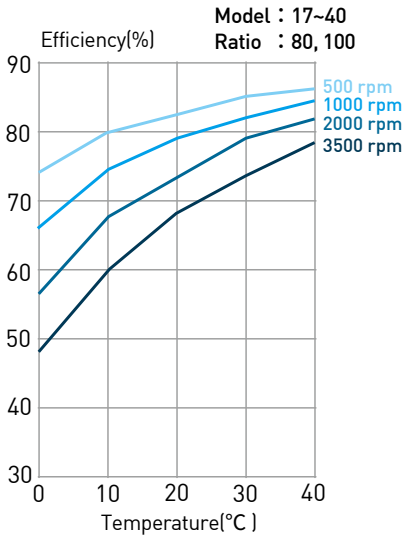
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

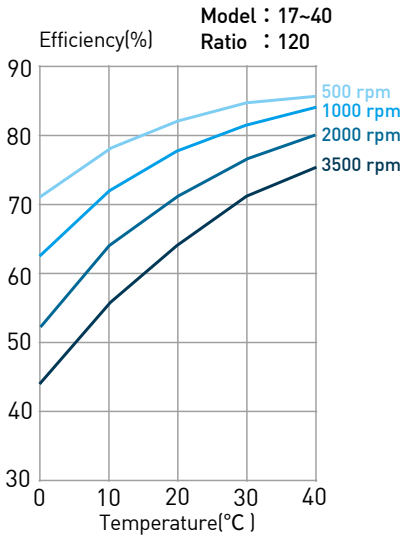


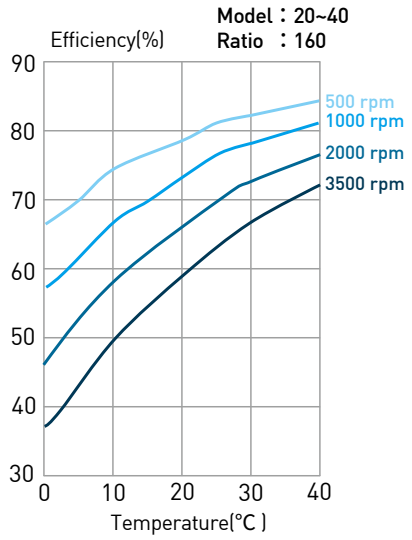










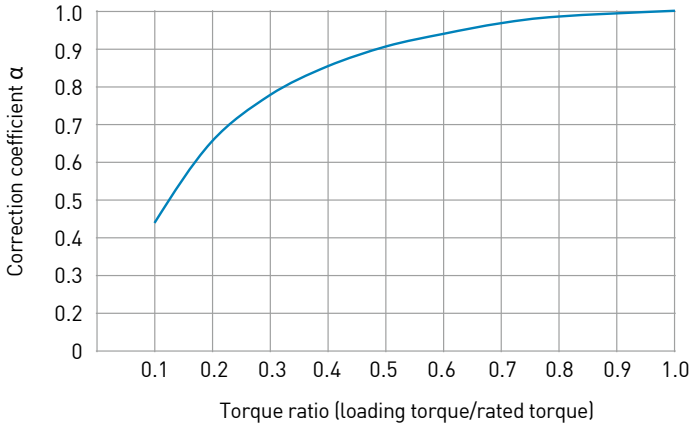


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-10-3 No-load operating torque

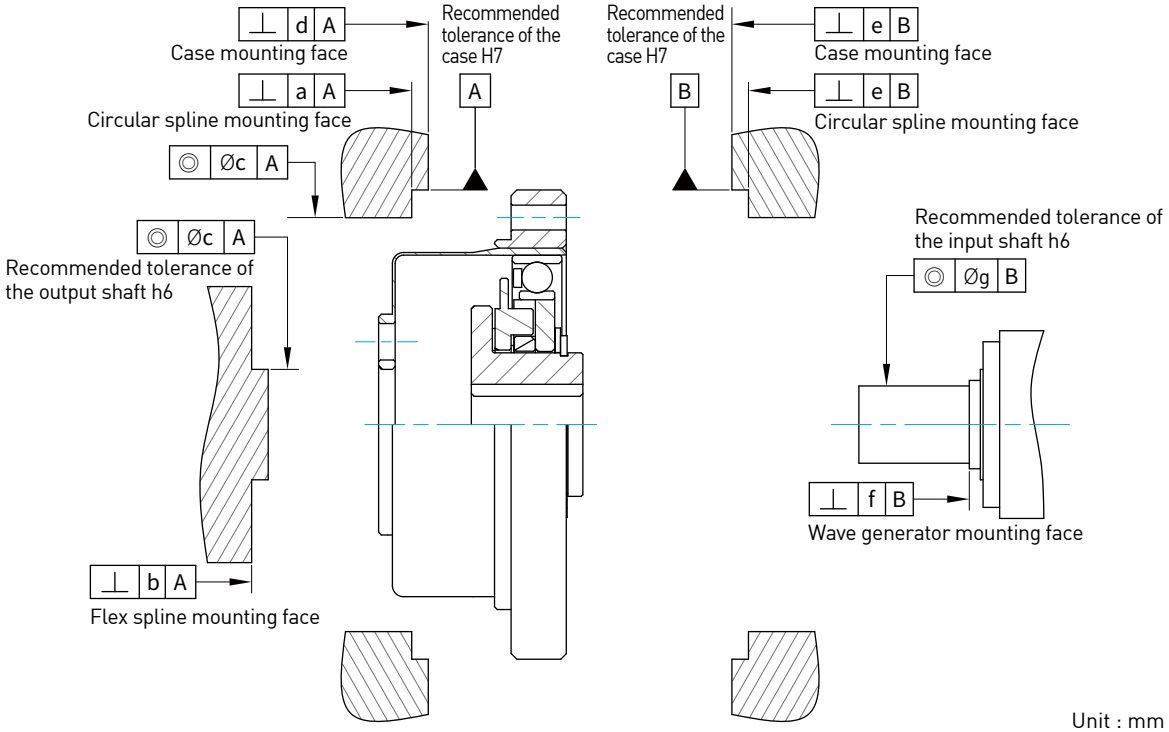
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	1.8	3.4	5.1	9.7	21.2	38
	1000 r/min	2.3	4.4	6.9	12.5	27.2	51
	2000 r/min	3.1	5.8	9.4	18.5	37.2	73
	3500 r/min	4.2	7.9	13.4	25.5	50.2	98
80	500 r/min	1.4	2.6	3.9	7.6	16.8	31.2
	1000 r/min	1.9	3.6	5.7	10.4	22.8	44.2
	2000 r/min	2.7	5	8.2	16.4	32.8	66.2
	3500 r/min	3.8	7.1	12.2	23.4	45.8	91.2
100	500 r/min	1.3	2.5	3.7	7.2	16	30
	1000 r/min	1.8	3.5	5.5	10	22	43
	2000 r/min	2.6	4.9	8	16	32	65
	3500 r/min	3.7	7	12	23	45	90
120	500 r/min	-	2.4	3.5	6.9	15.4	29.1
	1000 r/min	-	3.4	5.2	9.7	21.4	42.1
	2000 r/min	-	4.8	7.8	15.7	31.4	64.1
	3500 r/min	-	6.9	11.8	22.7	44.4	89.1
160	500 r/min	-	-	3.4	6.6	14.8	27.8
	1000 r/min	-	-	5.2	9.4	20.8	40.8
	2000 r/min	-	-	7.7	15.4	30.8	62.8
	3500 r/min	-	-	11.7	22.4	43.8	87.8

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

5-10-4 Installation accuracy

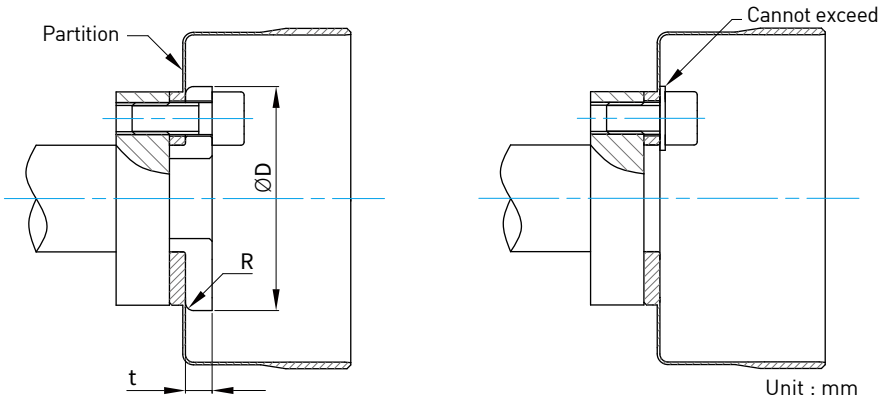


Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.012	0.013	0.014	0.016	0.016
b	0.008	0.011	0.014	0.018	0.022	0.025
c	0.015	0.018	0.019	0.022	0.022	0.024
Ød	0.011	0.015	0.017	0.024	0.026	0.026
e	0.011	0.015	0.017	0.024	0.026	0.026
f	0.017 (0.008)	0.020 (0.010)	0.020 (0.010)	0.024 (0.012)	0.024 (0.012)	0.032 (0.012)
Øg	0.030 (0.016)	0.034 (0.018)	0.044 (0.019)	0.047 (0.022)	0.050 (0.022)	0.063 (0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-10-5 Recommend size of the press plate



Unit : mm

Mark \ Model	14	17	20	25	32	40
$ØD^{0}_{-0.1}$	24.5	29	34	42	55	68
$R^{+0.1}_{0}$	1.2	1.2	1.4	1.5	2	2.5
t	2	2.5	2.5	5	7	7

Note : In order to avoid the sinking or loosening of the bolts on the press plate, it is recommended that: 1. The material is S45C;
2. The heat treatment hardness should be HB200~270.

5-10-6 Installation bolt tightening torque

1. Flex spline flange side

- When the load torque is less than the rated performance value in "Peak torque at start/stop" Table 4-1-1, use only bolts for installation.
- If the load torque may reach the rated performance value in "Instantaneous permissible max torque" Table 4-1-1, please use a combination of bolts and pins for installation.

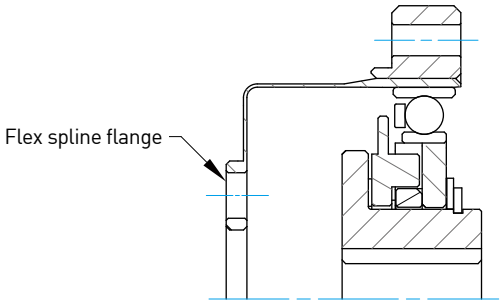


Table 5-10-8 Flex spline flange side bolt tightening torque

Item \ Model		14	17	20	25	32	40
Number of bolts		6	6	8	8	8	8
Bolts size		M4	M5	M5	M6	M8	M10
Installation of bolts PCD	mm	17	19	24	30	40	50
Bolts tightening torque	Nm	5.4	10.8	10.8	18.4	44.4	88.8
	kgfm	0.55	1.10	1.10	1.87	4.53	9.06
Transmission torque	Nm	43	77	130	230	555	1110
	kgfm	4.4	8	13	23	57	113

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

Table 5-10-9 Pin installation of fex spline flange

Item \ Model		14	17	20	25	32	40
Number of bolts		4	4	4	4	4	4
Bolts size		3	3	3	4	5	6
Installation of bolts PCD	mm	18.5	21.5	27	34	45	56
Bolt tightening torque	Nm	120	166	242	481	1070	2040
	kgfm	12	17	25	49	110	208

Note : Recommended pin type: parallel pin; material : S45C-Q

2. Circular spline flange side

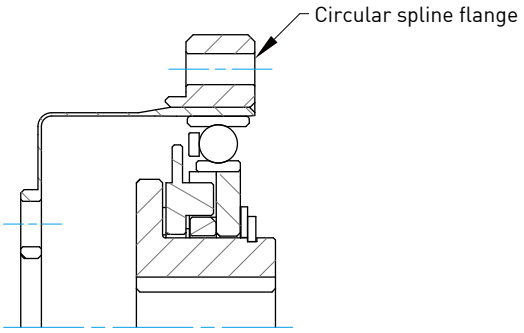
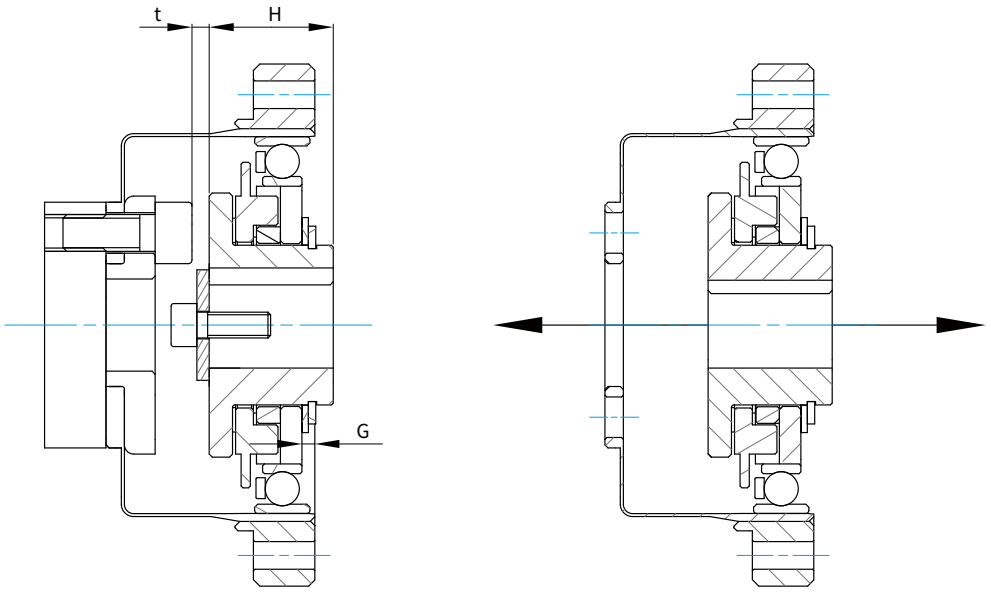


Table 5-10-10 Bolt installation of circular spline flange

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	75	100	120
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.20	0.46	0.92	1.56
Transmission torque	Nm	72	175	196	419	901	1530
	kgfm	7.3	18	20	43	92	156

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-10-7 Installation of wave generator



Unit : mm

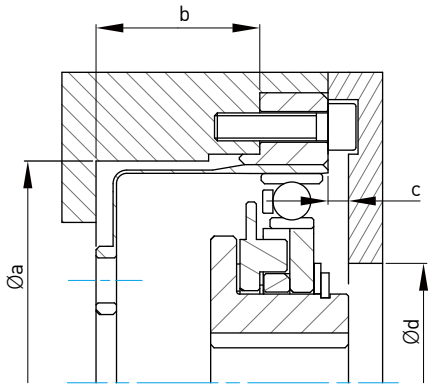
Mark \ Model	14	17	20	25	32	40
G	0.4	0.3	0.1	2.1	2.5	3.3
$H^{0}_{-0.1}$	18.5	20.7	21.5	21.6	23.6	29.7
t	1.6	1.3	1.5	1.4	2.2	2.3

Note: 1. Avoid interference between the Wave generator and the locking bolt of the flex spline.
2. Due to the elastic deformation of the flex spline, the Strain Wave Gear applies thrust to the Wave generator during operation.The thrust will change with the operating conditions. In any case, a mechanism that prevents slipping due to the thrust of the Wave generator must be used.

5-10-8 Lubrication

1. Recommended dimensions for the inner wall of the case

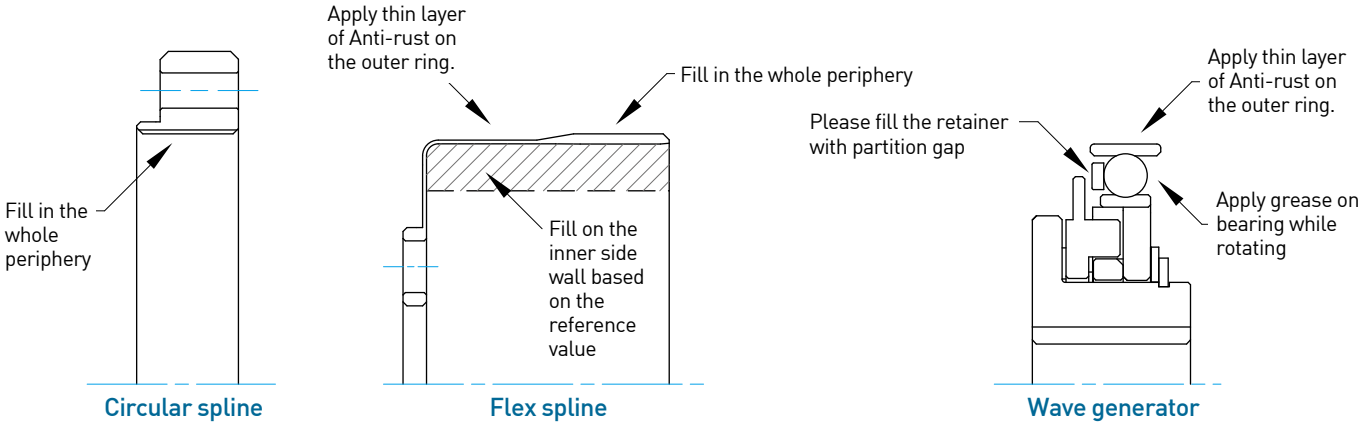
In order to avoid the splashing of excessive lubricant on other parts during operation. It is recommended to adhere to the following dimensions:



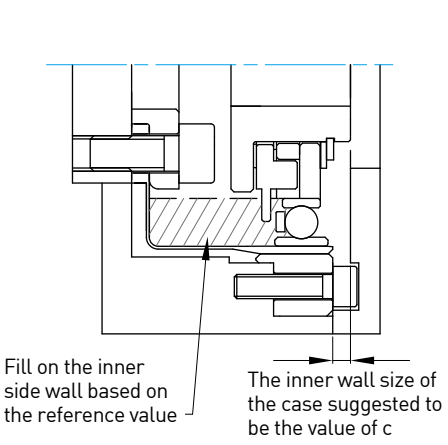
Unit : mm

Mark \ Model	14	17	20	25	32	40
Øa	38	45	53	66	86	106
b	17.1	19	20.5	23	26.8	33
c	1	1	1.5	1.5	1.5	2
Ød	16	26	30	37	37	4.5

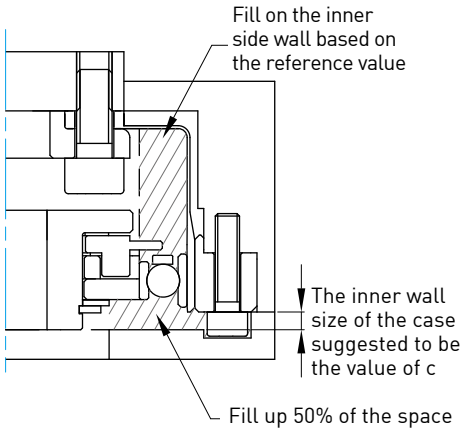
2.Lubricant application



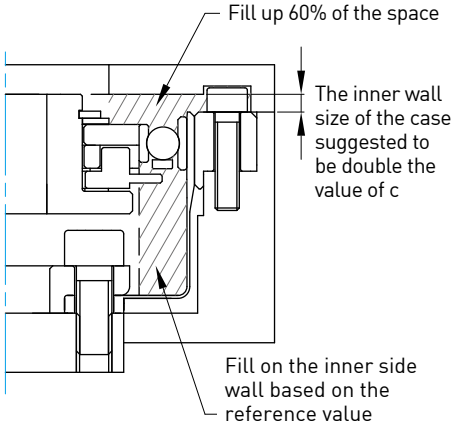
3.The key points of different application methods



When used horizontally



Wave generator face downwards

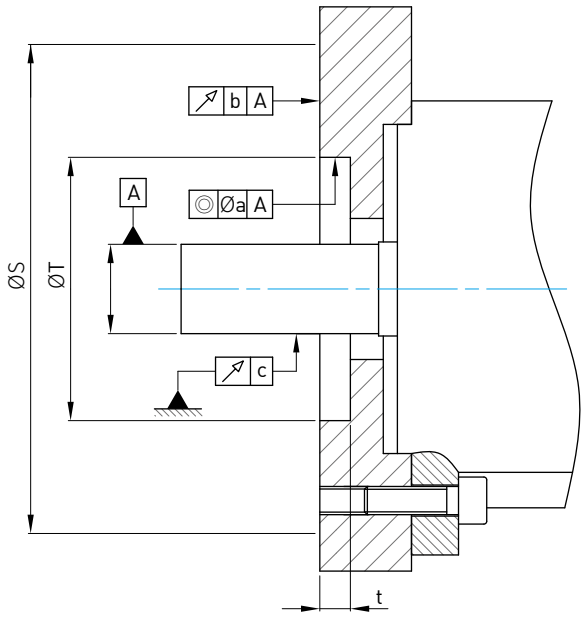


Wave generator face upwards

Unit : g

Instructions \ Model		14	17	20	25	32	40
Used horizontally		5.5	10	16	30	60	110
Used vertical	Wave generator is facing down	7	12	18	35	70	125
	Wave generator is facing up	8.5	14	21	40	80	145

5-10-9 Motor installation

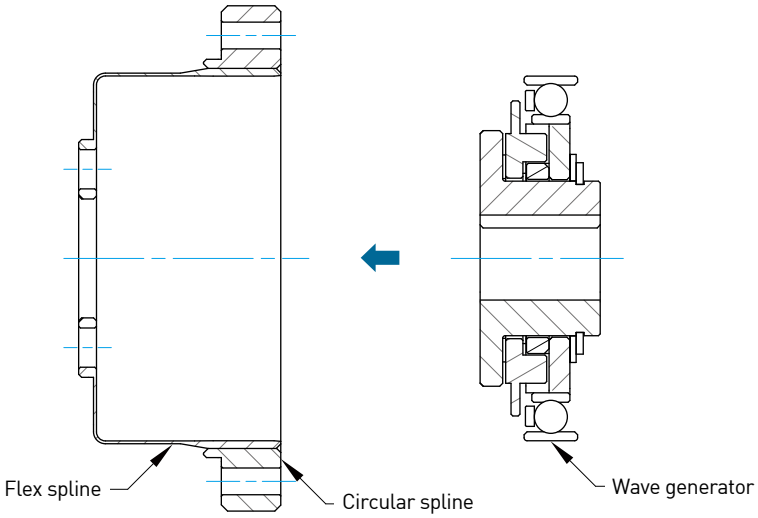


Unit : mm

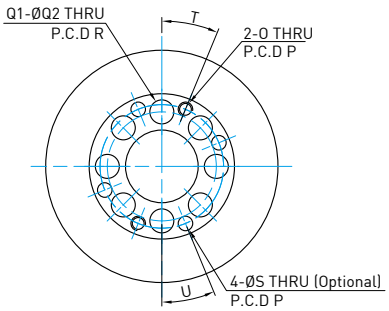
Mark \ Model	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
c	0.015	0.015	0.018	0.018	0.018	0.018
ØT H6	50	60	70	85	110	135

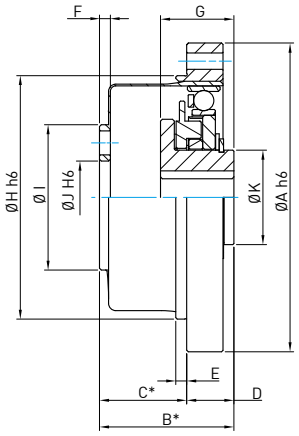
5-10-10 Installation sequence

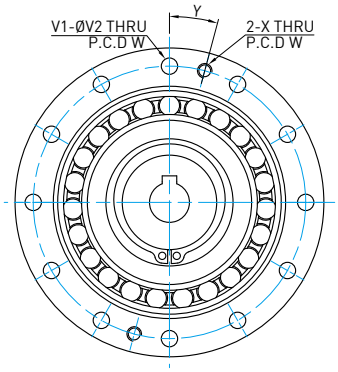
Install the circular spline and flex spline into the mechanism then install the wave generator.

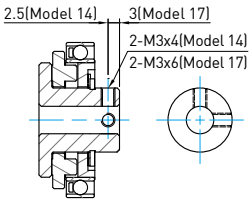


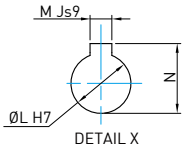
5-10-11 DGC-CO type size chart











Model14、17

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h6	50	60	70	85	110	135
B*	$28.5^{\ 0}_{-0.4}$	$32.5^{\ 0}_{-0.4}$	$33.5^{\ 0}_{-0.4}$	$37^{\ 0}_{-0.5}$	$44^{\ 0}_{-0.6}$	$53^{\ 0}_{-0.6}$
C*	$17.5^{+0.4}_{\ 0}$	$20^{+0.5}_{\ 0}$	$21.5^{+0.6}_{\ 0}$	$24^{+0.6}_{\ 0}$	$28^{+0.6}_{\ 0}$	$34^{+0.6}_{\ 0}$
D	6	6.5	7.5	10	14	17
E	2	2.5	3	3	3	4
F	2.4	3	3	3	3.2	4
G	$18.5^{\ 0}_{-0.1}$	$20.7^{\ 0}_{-0.1}$	$21.5^{\ 0}_{-0.1}$	$21.6^{\ 0}_{-0.1}$	$23.6^{\ 0}_{-0.1}$	$29.7^{\ 0}_{-0.1}$
ØH h6	38	48	54	67	90	110
Ø I	23	27.2	32	40	52	64
ØJ H6	11	10	16	20	26	32
ØK	14	18	21	26	26	32
ØL H7	6	8	9	11	14	14
M Js9	–	–	3	4	5	5
N	–	–	$10.4^{+0.1}_{\ 0}$	$12.8^{+0.1}_{\ 0}$	$16.3^{+0.1}_{\ 0}$	$16.3^{+0.1}_{\ 0}$
O	M3	M3	M3	M4	M5	M6
P (P.C.D)	18.5	21.5	27	34	45	56
Q1	6	6	8	8	8	8
ØQ2	4.5	5.5	5.5	6.6	9	11
R (P.C.D)	17	19	24	30	40	50
S (Optional)	$3^{+0.015}_{\ 0}$	$3^{+0.015}_{\ 0}$	$3^{+0.015}_{\ 0}$	$4^{+0.015}_{\ 0}$	$5^{+0.015}_{\ 0}$	$6^{+0.015}_{\ 0}$
T (Degree)	30°	30°	22.5°	22.5°	22.5°	22.5°
U (Degree)	30°	30°	22.5°	22.5°	22.5°	–
V1	8	16	16	16	16	16
ØV2	3.5	3.5	3.5	4.5	5.5	6.6
W (P.C.D)	44	54	62	75	100	120
X	M3	M3	M3	M4	M5	M6
Y (Degree)	22.5°	11.25°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (Kg)	0.09	0.15	0.28	0.45	0.89	1.7

*1. The dimension B, C is the fitting position and permissible tolerance in the axial direction.

*2. If the load torque may reach the rated performance value in "Instantaneous permissible max torqueplease use a combination of bolts and pins for installation.

5-11 DGC-CE-L Type

5-11-1 Technical data

Table 5-11-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9.0	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	125	13		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-11-2 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-11-3 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0

Table 5-11-4 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32
50	3.6	5.6	7.3	13	29
80	2.6	3.6	4.5	8.5	18
100	2.3	3.2	4.1	7.6	17
120	-	3.0	3.6	6.9	14
160	-	-	3.2	6.1	13

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

Table 5-11-5 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	1.5	2.8	4.4	8.3	18
80	1.5	2.8	4.6	8.5	18
100	1.9	3.1	5.0	9.2	20
120	-	3.4	5.4	10	21
160	-	-	6.4	12	25

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

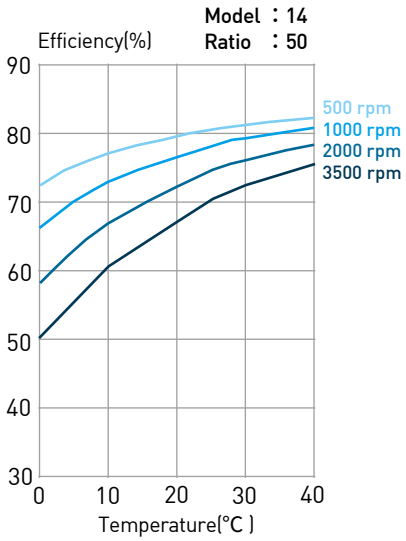
Table 5-11-6 Torsional rigidity

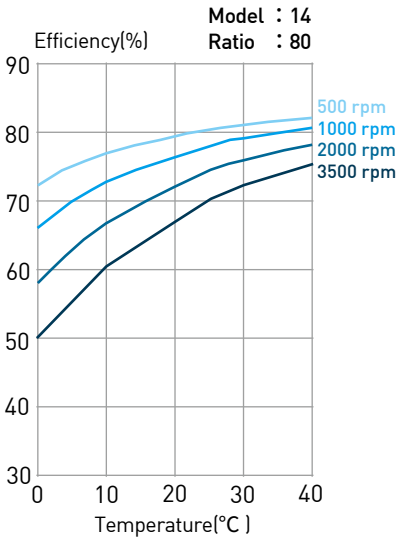
Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.20	0.40	0.70	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5
		arc min	2.0	1.7	1.8	1.9	1.9
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7
		arc min	5.6	4.2	5.3	5.4	5.4
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4
		arc min	1.4	1.3	1.5	1.5	1.5
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6
		arc min	4.2	3.3	3.9	3.8	4.0

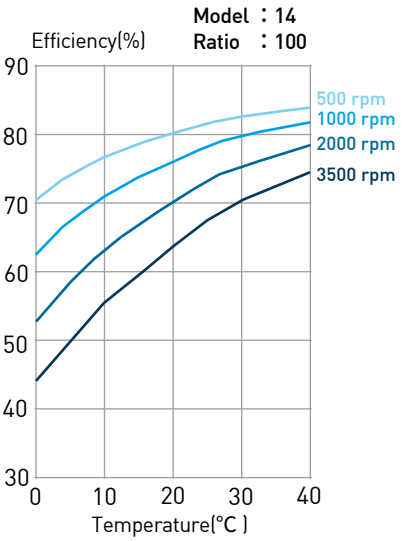
Note : The values are for reference only. The lower limit is 20% under the value in this table.

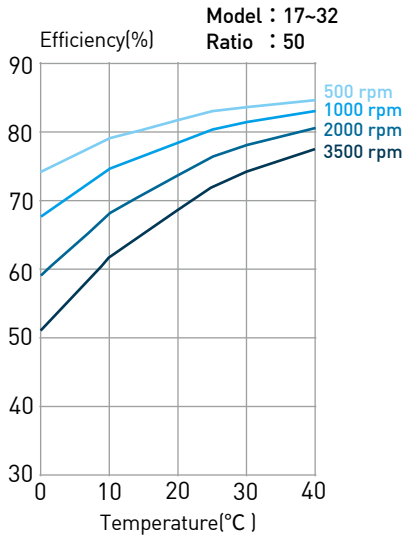
5-11-2 Efficiency E_R

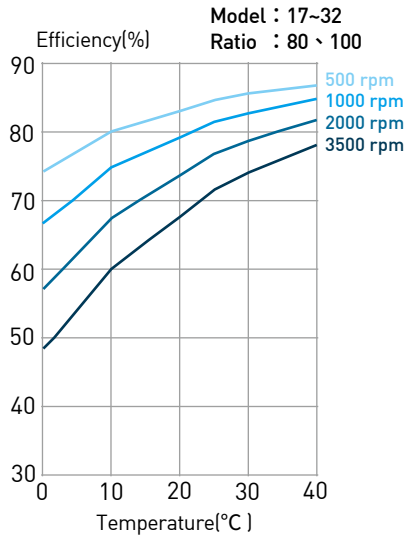
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

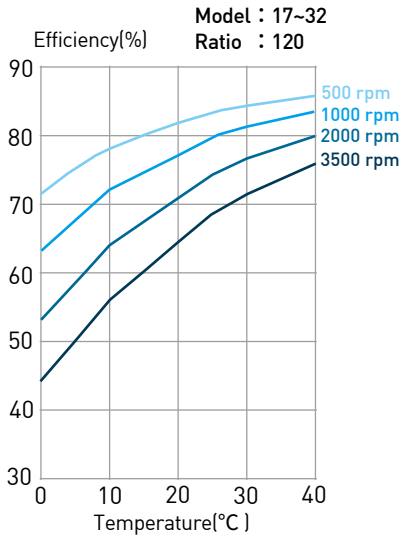


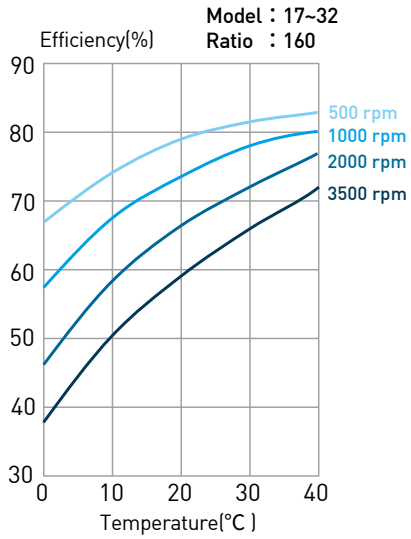










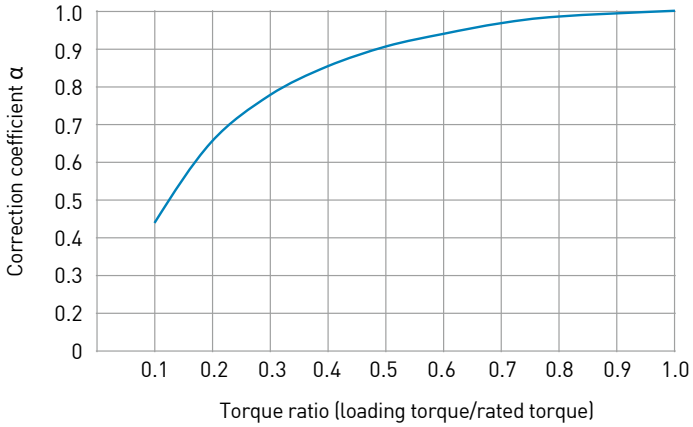


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-11-3 No-load operating torque

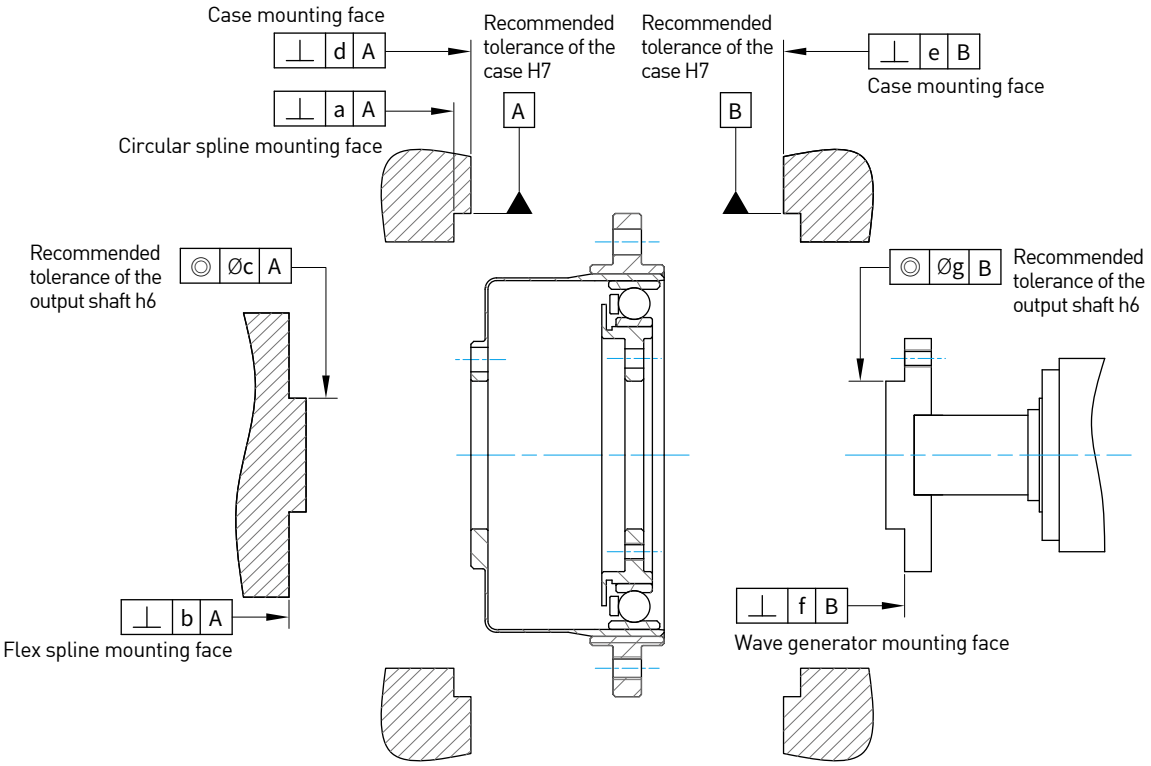
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	2	2.8	5.2	9.7	21.5
	1000 r/min	2.3	3.6	6.8	14.2	28.5
	2000 r/min	3.3	5.1	10	19.2	39.5
	3500 r/min	4.7	6.8	14.2	27.2	51.5
80	500 r/min	1.6	2.1	4.2	7.8	17.7
	1000 r/min	1.9	2.9	5.8	12.3	24.7
	2000 r/min	2.9	4.4	9	17.3	35.7
	3500 r/min	4.3	6.1	13.2	25.3	47.7
100	500 r/min	1.5	2	4	7.5	17
	1000 r/min	1.8	2.8	5.6	12	24
	2000 r/min	2.8	4.3	8.8	17	35
	3500 r/min	4.2	6	13	25	47
120	500 r/min	-	1.9	3.9	7.3	16.5
	1000 r/min	-	4.7	5.5	11.8	23.5
	2000 r/min	-	4.2	8.7	16.8	34.5
	3500 r/min	-	5.9	12.9	24.8	46.5
160	500 r/min	-	-	3.7	6.9	15.8
	1000 r/min	-	-	5.3	11.4	22.8
	2000 r/min	-	-	8.5	16.4	33.8
	3500 r/min	-	-	12.7	24.4	45.8

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

5-11-4 Installation accuracy

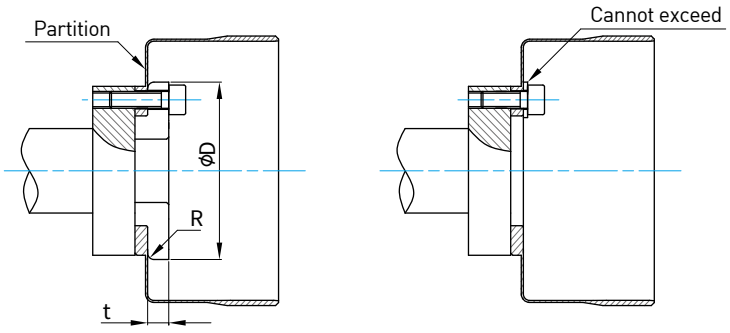


Unit : mm

Mark \ Model	14	17	20	25	32
a	0.011	0.012	0.013	0.014	0.016
b	0.008	0.011	0.014	0.018	0.022
Øc	0.015	0.018	0.019	0.022	0.022
d	0.011	0.015	0.017	0.024	0.026
e	0.011	0.015	0.017	0.024	0.026
f	0.008	0.01	0.01	0.012	0.012
Øg	0.016	0.018	0.019	0.022	0.022

5-11-5 Install the flex spline

It is recommended to install directly with bolts. The head of the bolt should not exceed Dimension D.



Unit : mm

Mark \ Model	14	17	20	25	32
$ØD_{-0.1}^{0}$	24.5	29	34	42	55
$R_{0}^{+0.1}$	1.2	1.2	1.4	1.5	2
t	3	3	3	5	7

5-11-6 Installation bolt tightening torque

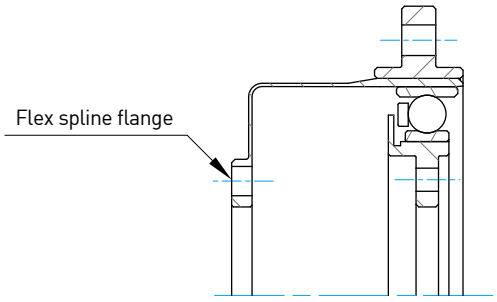


Table 5-11-7 Flex spline flange side bolt tightening torque

Item \ Model		14	17	20	25	32
Number of bolts		12	14	12	12	12
Bolts size		M2.5	M2.5	M3	M4	M5
Installation of bolts PCD	mm	18.9	23.1	27	33.6	44.9
Bolts tightening torque	Nm	1.2	1.2	2.2	5.1	10
	kgfm	0.12	0.12	0.22	0.52	1.02
Transmission torque	Nm	95	135	200	446	952
	kgfm	9.69	13.77	20.39	45.48	97.08

Note : $\mu \geq 0.4$ with friction shim.

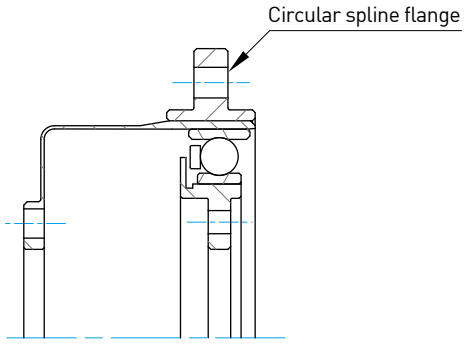


Table 5-11-8 Bolt installation of Circular spline flange

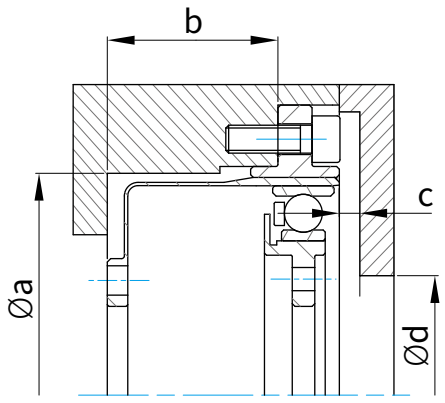
Item \ Model		14	17	20	25	32
Number of bolts		12	12	16	16	16
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	44	54	62	75	100
Bolts tightening torque	Nm	2.1	2.1	2.1	5.1	10
	kgfm	0.21	0.21	0.21	0.52	1.02
Transmission torque	Nm	110	130	200	430	920
	kgfm	11.22	13.26	20.39	43.85	93.82

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-11-7 Lubrication

1. Recommended dimensions for the inner wall of the case

In order to avoid the splashing of excessive lubricant on other parts during operation. It is recommended to adhere to the following dimensions:

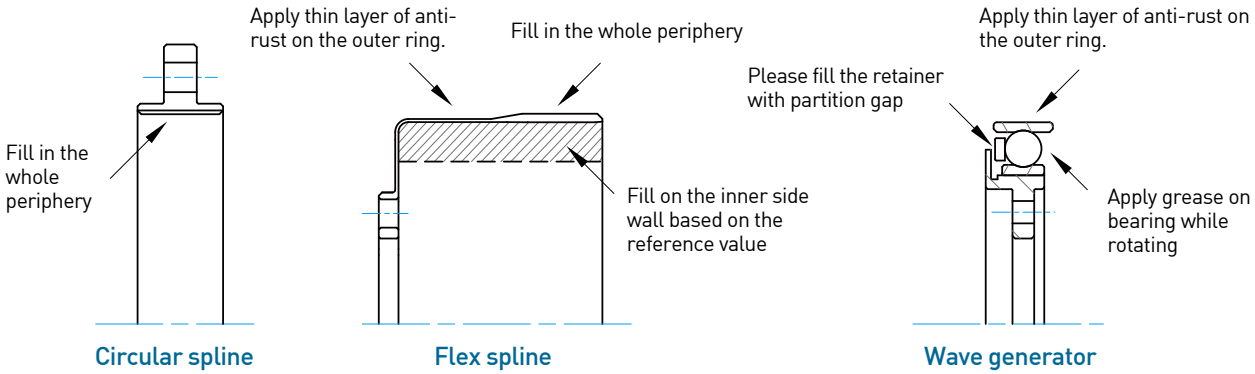


Unit : mm

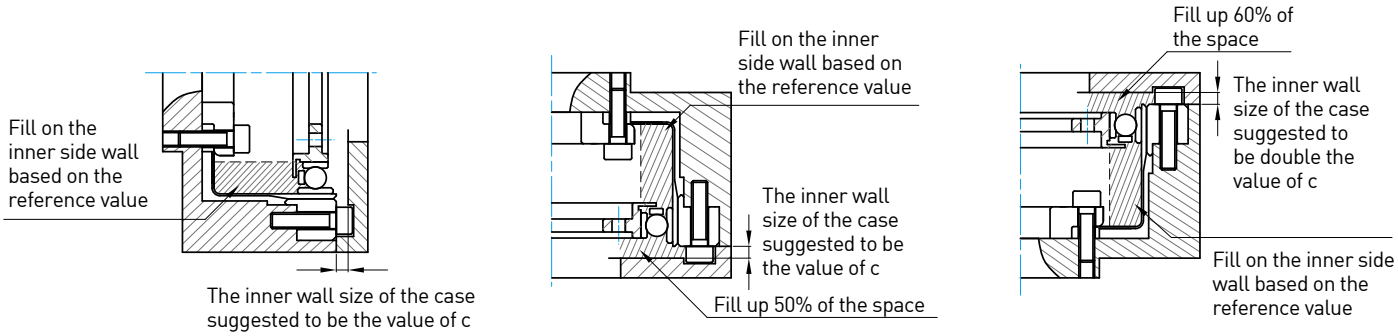
Mark \ Model	14	17	20	25	32
Øa	38	45	53	66	86
b	17.1	19	20.5	23	26.8
c	1 (3)	1 (3)	1.5 (4.5)	1.5 (4.5)	1.5 (4.5)
$Ød^{+0.5}_{0}$	16	26	30	37	37

Note: The value in ( ) is the value of the wave generator is facing up.

2. Lubricant application



3. The key points of different application methods

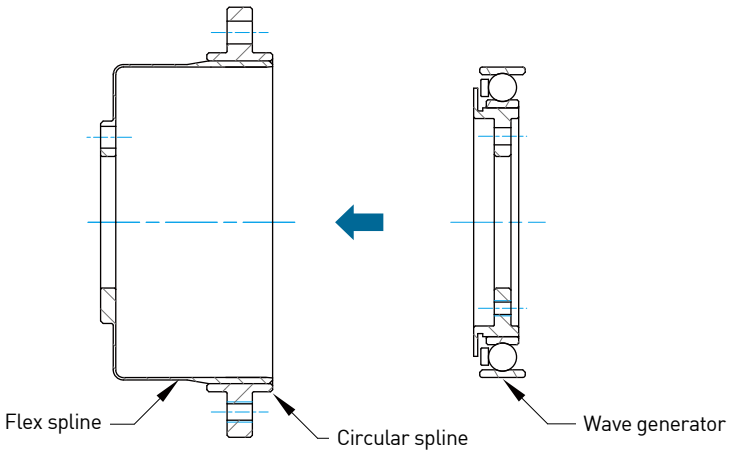


Unit : g

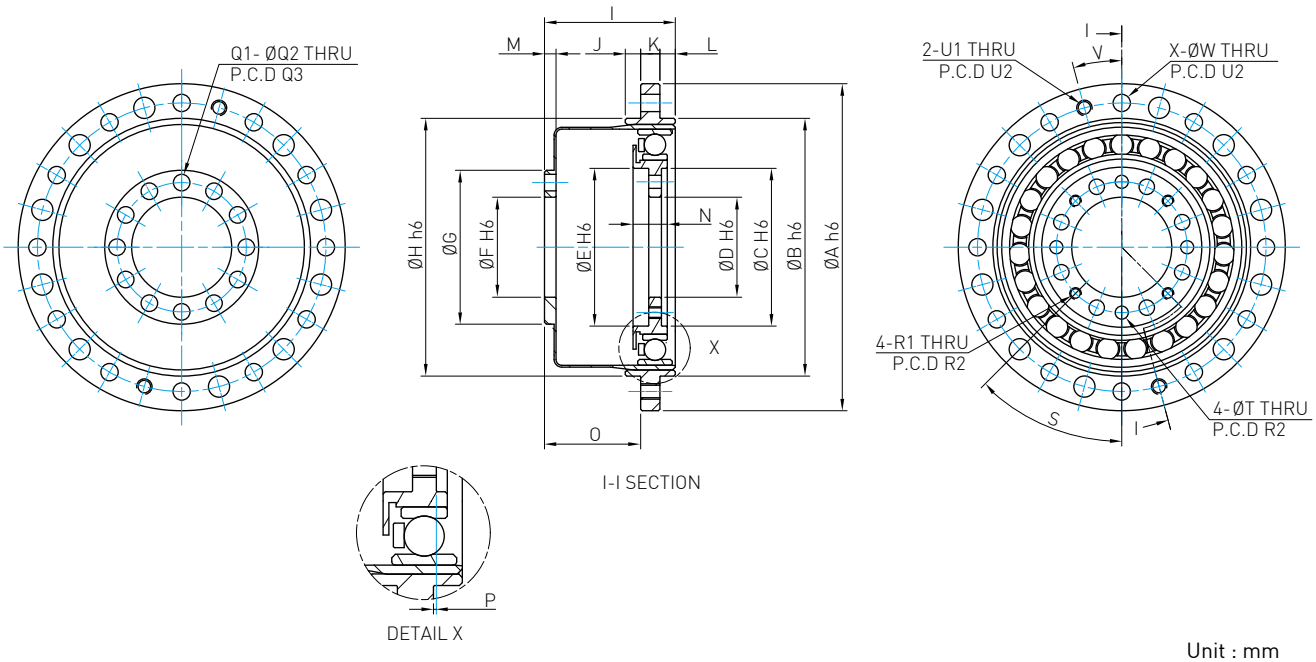
Instructions \ Model		14	17	20	25	32
Used horizontally		5.5	10	16	30	60
Used vertical	Wave generator is facing down	7	12	18	35	70
	Wave generator is facing up	8.5	14	21	40	80

5-11-8 Installation sequence

Install the circular spline and flex spline into the mechanism then install the wave generator.



5-11-9 DGC-CE-L type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h6	50	60	70	85	110
ØB h6	38	48	54	67	90
ØC H6	22.6	27	32	41	53
ØD H6	13.5	18	21	26	36
ØE H6	22.6	27	32	41	53
ØF H6	13.5	18	21	26	36
ØG	23	27.2	32	40	52
ØH H6	38	48	54	67	90
I	23.5	26.5	29	34	42
J	2.5	2.75	3.25	4	5.5
K	3	3.5	4	5	6
L	2.5	2.75	3.25	4	5.5
M	2.4	3	3	3	3.2
N	7.4	7.6	9.1	8.9	11.5
O	$18^{+0.4}_{0}$	$20.25^{+0.5}_{0}$	$21.75^{+0.6}_{0}$	$25^{+0.6}_{0}$	$30.5^{+0.6}_{0}$
P	$0.1^{+0.4}_{0}$	$0.2^{0}_{-0.45}$	$0.6^{0}_{-0.5}$	$0.4^{0}_{-0.5}$	$0.5^{0}_{-0.55}$
Q1	12	14	12	12	12
ØQ2	2.7	2.7	3.5	4.3	5.3
Q3 (P.C.D)	18.9	23.1	27	33.6	44.9
R1	M2	M2	M2.5	M3	M4
R2 (P.C.D)	18	22.5	26.75	34	44.5
S (Degree)	45°	45°	45°	45°	45°
ØT	2.4	2.4	2.9	3.4	4.5
U1	M3	M3	M3	M4	M5
U2 (P.C.D)	44	54	62	75	100
V (Degree)	15°	15°	11.25°	11.25°	11.25°
ØW	3.4	3.4	3.4	4.5	5.5
X	12	12	16	16	16
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.020	0.049	0.112	0.263	0.924
Weight (Kg)	0.055	0.10	0.14	0.24	0.54

5-12 DGC-PO Type

5-12-1 Technical data

Table 5-12-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	58	5.9		
	100	10	1.0	36	3.7	14	1.4	58	5.9		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	109	11		
	100	31	3.2	70	7.2	51	5.2	109	11		
	120	31	3.2	70	7.2	51	5.2	109	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	842	86		
	160	178	18	484	49	281	29	842	86		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1510	154		
	160	382	39	841	86	586	60	1510	154		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-12-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.035	0.0425	0.05	0.062	0.08	0.096
Offset amount		R	m	0.0095	0.0095	0.0095	0.0115	0.013	0.0145
Basic load ratings	Dynamic load	C	kN	4.7	5.3	5.8	9.6	15.0	21.3
			kgf	480	540	590	980	1530	2170
	Static load	Co	kN	6.1	7.6	9.0	15.1	25.0	36.5
			kgf	620	770	920	1540	2550	3720
Moment rigidity		K	$\times 10^4$ Nm/rad	4.38	7.75	12.8	24.2	53.9	91.0
			kgfm/arc min	1.3	2.3	3.8	7.2	16	27
Permissible dynamic tilting moment		M	Nm	41	64	91	156	313	450
Permissible static tilting moment		Mo	Nm	53	80	113	234	500	876
Permissible axial load		Fa	kN	1.004	1.130	1.235	2.051	3.205	4.550
Permissible radial load		Fr	kN	0.673	0.757	0.827	1.374	2.147	3.049

Table 5-12-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-12-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-12-5 Maximum backlash

Unit : Nm

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	-	3.9	3.9	3.9	2.9	2.9
	arc sec	-	8	8	8	6	6
160	$\times 10^{-5}$ rad	-	-	2.9	2.9	2.4	2.4
	arc sec	-	-	6	6	5	5

Table 5-12-6 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.5	6.7	8.6	17	34	61
80	3.1	4.4	5.4	10	21	39
100	2.8	3.7	4.7	8.8	20	34
120	-	3.4	4.2	8.0	17	31
160	-	-	3.6	6.9	15	26

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

Table 5-12-7 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.8	3.3	5.2	9.9	20	36
80	1.8	3.3	5.3	10	21	36
100	2	3.6	5.6	11	22	40
120	-	3.9	6.1	12	24	43
160	-	-	7	14	29	51

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

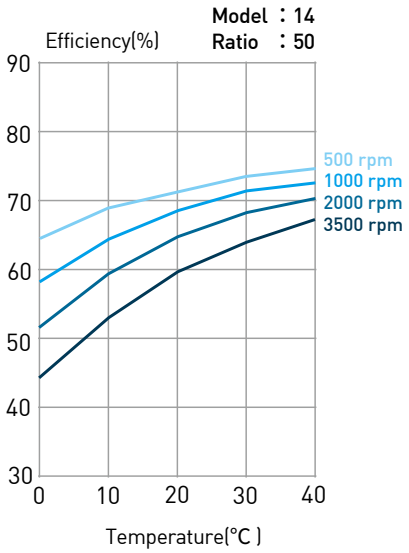
Table 5-12-8 Torsional rigidity

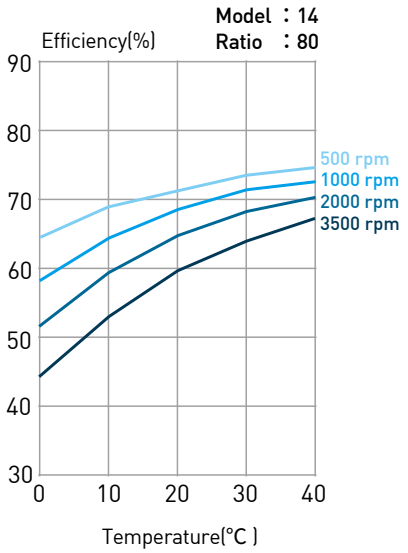
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.20	0.40	0.70	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

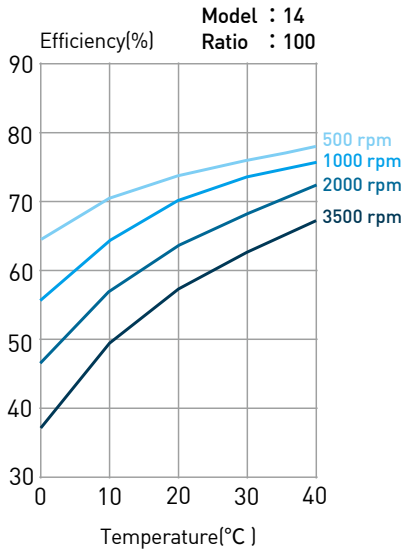
Note : The values are for reference only. The lower limit is 20% under the value in this table.

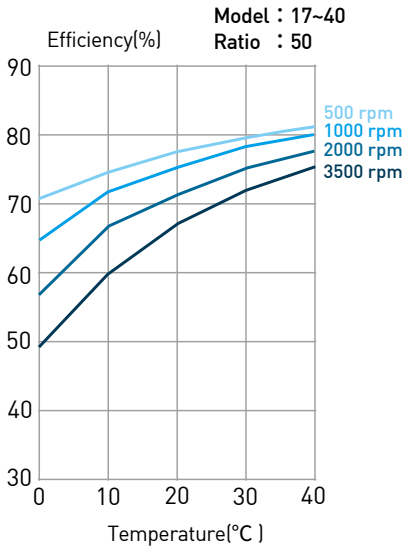
5-12-2 Efficiency E_R

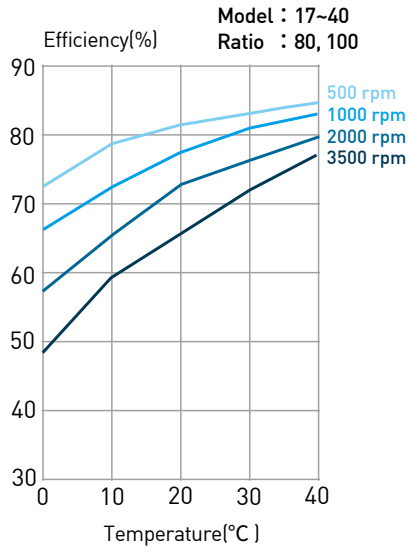
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .

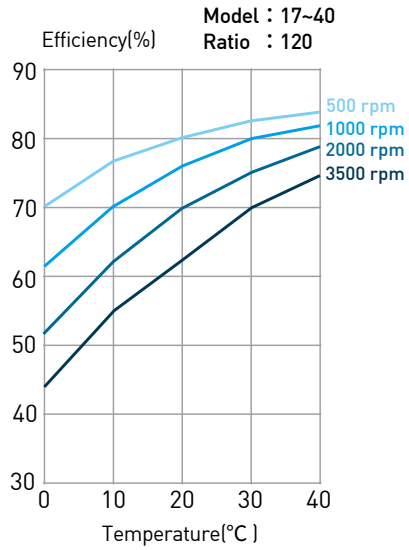


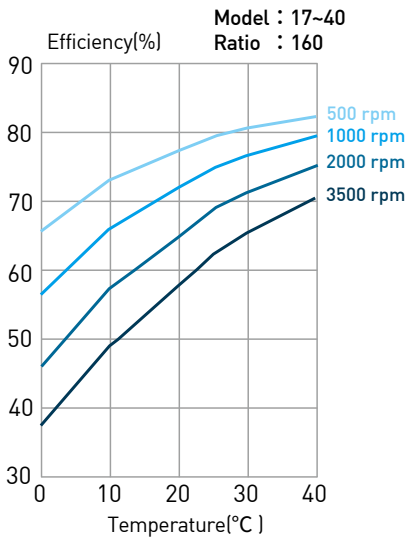










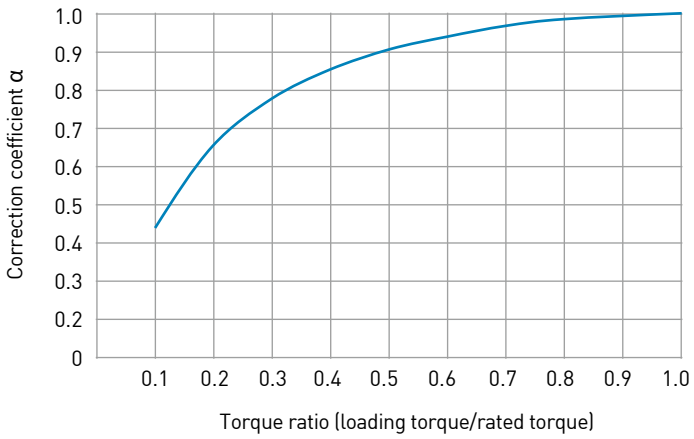


Efficiency correction coefficient α

Efficiency = α x E_R

α is correction coefficient

E_R is efficiency at the rated torque



5-12-3 No-load operating torque

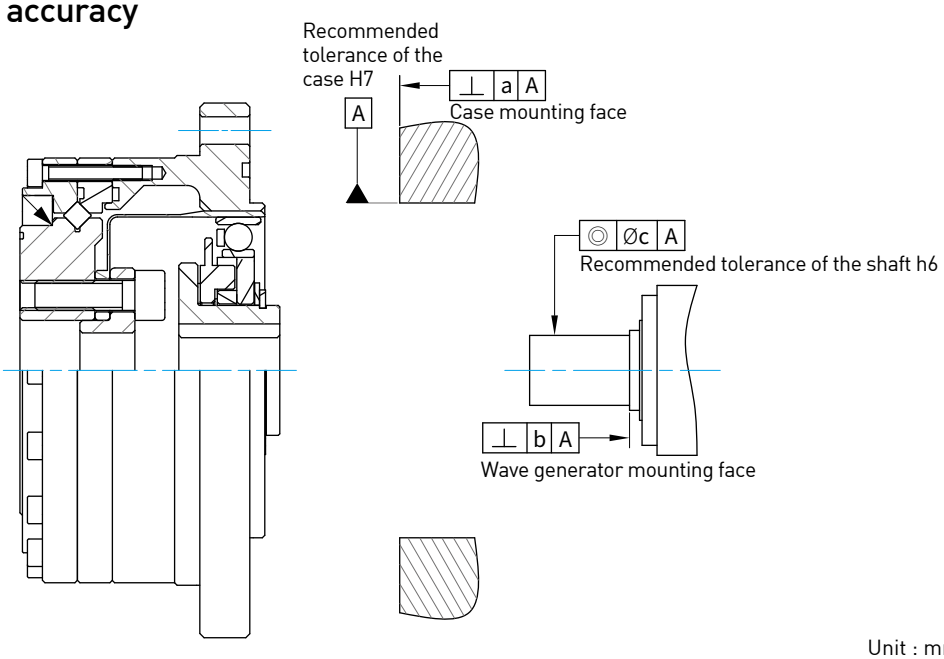
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	3.2	5.1	7.3	12.8	26.1	46
	1000 r/min	3.9	6.1	9.1	17.8	33.1	57
	2000 r/min	4.6	7.6	11.8	21.8	44.1	77
	3500 r/min	5.9	9.6	12.7	28.8	57.1	102
80	500 r/min	2.3	3.8	5.5	9.7	20.3	36.1
	1000 r/min	3	4.8	7.3	14.7	27.3	47.1
	2000 r/min	3.7	6.3	10	18.7	38.3	67.1
	3500 r/min	5	8.3	10.9	25.7	51.3	92.1
100	500 r/min	2.1	3.5	5	9	19	34
	1000 r/min	2.8	4.5	6.8	14	26	45
	2000 r/min	3.5	6	9.5	18	37	65
	3500 r/min	4.8	8	10.4	25	50	90
120	500 r/min	-	3.3	4.7	8.5	18.1	32.5
	1000 r/min	-	4.3	6.5	13.5	25.1	43.5
	2000 r/min	-	5.8	9.2	17.5	36.1	63.5
	3500 r/min	-	7.8	10.1	24.5	49.1	88.5
160	500 r/min	-	-	4.2	7.8	16.8	30.5
	1000 r/min	-	-	6	12.8	23.8	41.5
	2000 r/min	-	-	8.7	16.8	34.8	61.5
	3500 r/min	-	-	9.6	23.8	47.8	86.5

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

5-12-4 Installation accuracy

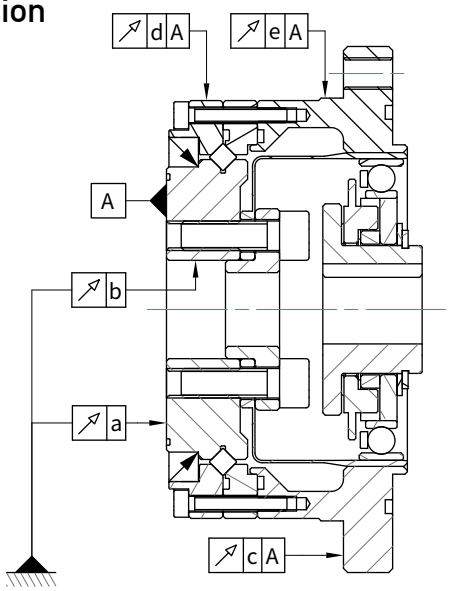


Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.032
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
c	0.030	0.034	0.044	0.047	0.050	0.063
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.024)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-12-5 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.010	0.010	0.010	0.015	0.015	0.015
b	0.010	0.012	0.012	0.013	0.013	0.015
c	0.024	0.026	0.038	0.045	0.056	0.060
d	0.010	0.010	0.010	0.010	0.010	0.015
e	0.038	0.038	0.047	0.049	0.054	0.060

5-12-6 Installation bolt tightening torque

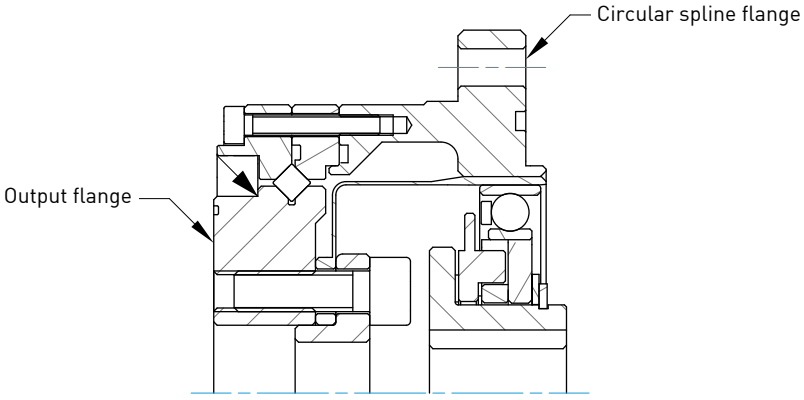


Table 5-12-9 Bolt tightening torque for output flange

Item \ Model		14	17	20	25	32	40
Number of bolts		6	6	8	8	8	8
Bolts size		M4	M5	M6	M8	M10	M10
Installation of bolts PCD	mm	23	27	32	42	55	68
Bolts tightening torque	Nm	5.4	10.8	18.4	45	89	89
	kgfm	0.55	1.1	1.88	4.5	9.1	9.1
Transmission torque	Nm	58	109	245	580	1220	1510
	kgfm	5.9	11.2	25	59	124	154

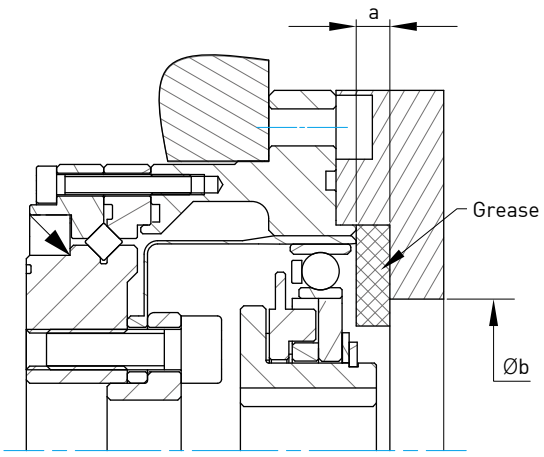
Table 5-12-10 Bolt tightening torque for circular spline flange

Item \ Model		14	17	20	25	32	40
Number of bolts		8	8	8	10	12	10
Bolts size		M4	M4	M5	M5	M6	M8
Installation of bolts PCD	mm	65	71	82	96	125	144
Bolts tightening torque	Nm	4.5	4.5	9.0	9.0	15.3	37
	kgfm	0.46	0.46	0.92	0.92	1.56	3.8
Transmission torque	Nm	182	196	365	538	1200	2100
	kgfm	19	20	37	55	122	214

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-12-7 Lubrication

Keep the space between the reducer and mounting flange as narrow as possible so that grease can be kept inside during operation.



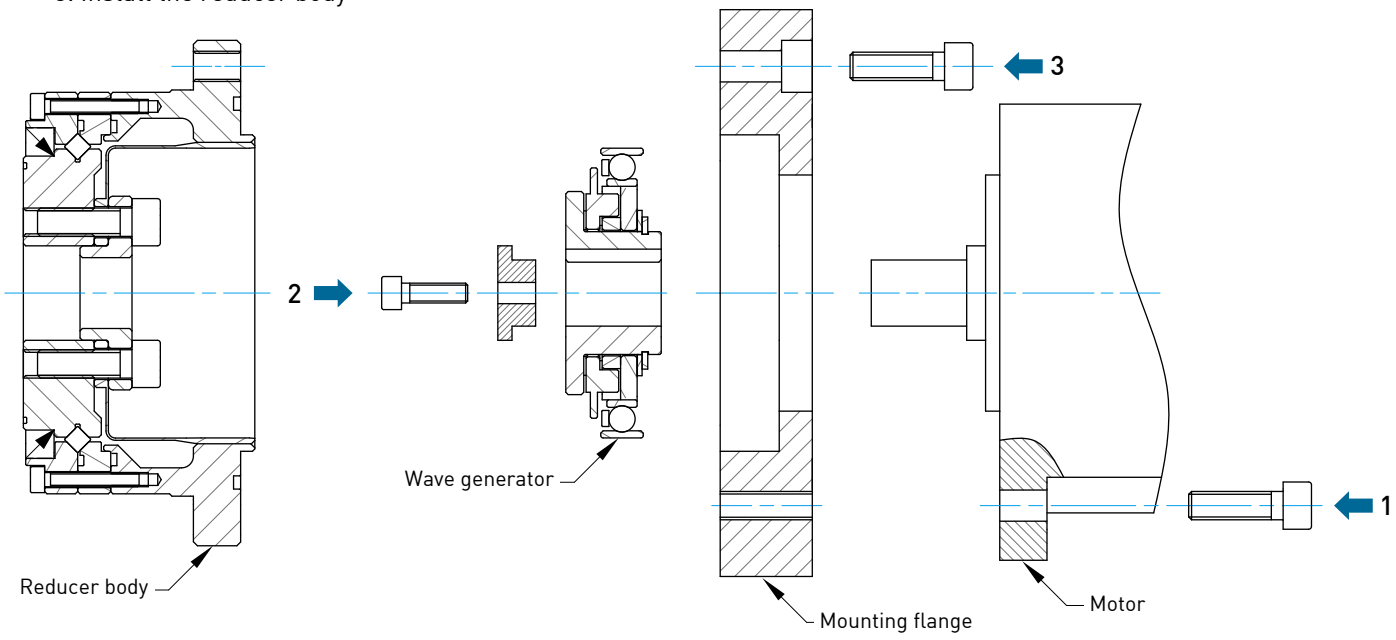
Unit : mm

Item \ Model	14	17	20	25	32	40
a ※1	1	1	1.5	1.5	1.5	2
a ※2	3	3	4.5	4.5	4.5	6
Øb	16	26	30	37	37	45

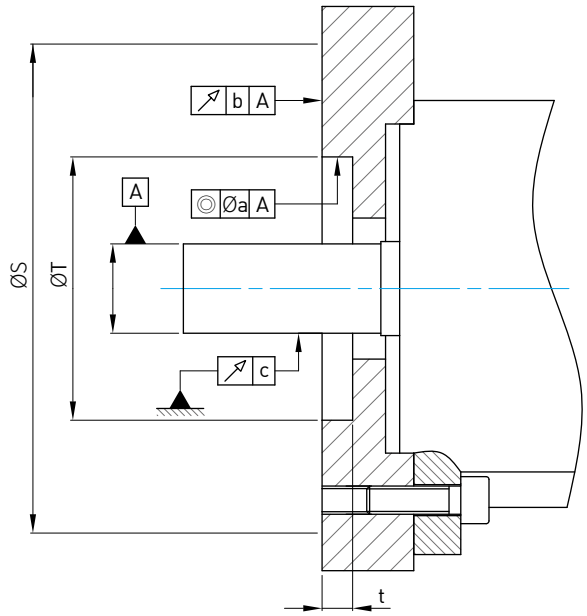
※1 Center shaft horizontal or vertical: when the wave generator is facing downward
※2 Center shaft vertical: when the wave generator is facing upward

5-12-8 Installation procedure

1. Install the mounting flange on the motor mounting surface
2. Install the wave generator on the motor output shaft
3. Install the reducer body



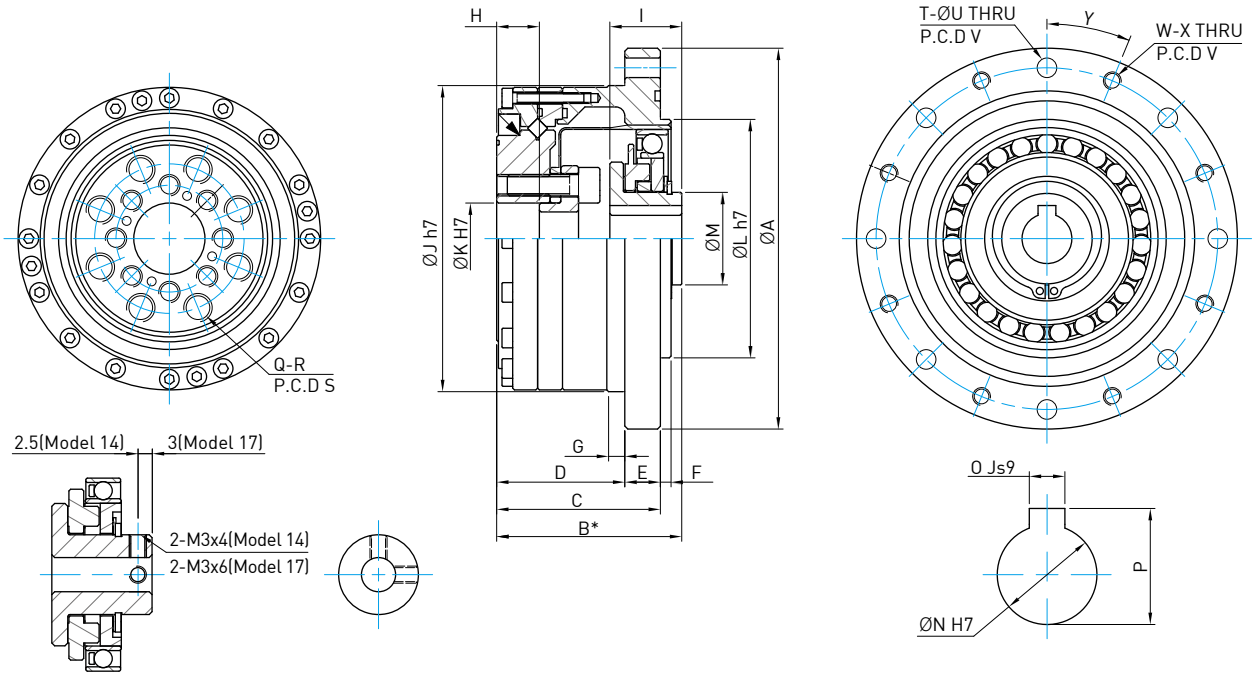
5-12-9 Motor installation



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.03	0.04	0.04	0.04	0.04	0.05
b	0.03	0.04	0.04	0.04	0.04	0.05
c	0.015	0.015	0.018	0.018	0.018	0.018
ØS	73	79	93	107	138	160
t	3	3	4.5	4.5	4.5	6
ØT H7	38	48	56	67	90	110

5-12-10 DGC-PO type size chart



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA	73	79	93	107	138	160
B*	41 $^{0}_{-0.9}$	45 $^{0}_{-0.9}$	45.5 $^{0}_{-1}$	52 $^{0}_{-1}$	62 $^{0}_{-1.1}$	72.5 $^{0}_{-1.1}$
C	34	37	38	46	57	66.5
D	27	29	28	36	45	50.5
E	7	8	10	10	12	16
F	2	2	3	3	3	4
G	3.5	4	5	5	5	5
H	9.4	9.5	9	12	15	5
I	18.5 $^{0}_{-0.1}$	20.7 $^{0}_{-0.1}$	21.5 $^{0}_{-0.1}$	21.6 $^{0}_{-0.1}$	23.6 $^{0}_{-0.1}$	29.7 $^{0}_{-0.1}$
ØJ h7	56	63	72	86	113	127
ØK H7	11	10	14	20	26	32
ØL h7	38	48	56	67	90	110
ØM	14	18	21	26	26	32
ØN H7	6	8	12	14	14	14
O Js9	–	–	4	5	5	5
P	–	–	13.8 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$	16.3 $^{+0.1}_{0}$
Q	6	6	8	8	8	8
R	M4 x 8 DP	M5 x 10 DP	M6 x 9 DP	M8 x 12 DP	M10 x 15 DP	M10 x 15 DP
S (P.C.D)	23	27	32	42	55	68
T	8	8	8	10	12	10
ØU	4.5	4.5	5.5	5.5	6.6	9
V (P.C.D)	65	71	82	96	125	144
W	8	8	8	10	12	10
X	M4	M4	M5	M5	M6	M8
Y (Degree)	22.5°	22.5°	22.5°	18°	15°	18°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (kg)	0.52	0.68	0.98	1.5	3.2	5.0

*The dimension B is the fitting position and permissible tolerance in the axial direction.

5-13 DGH-PO Type

5-13-1 Technical data

Table 5-13-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	143	15		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1530	156		
	160	382	39	841	86	586	60	1530	156		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-13-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-13-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-13-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-13-5 Maximum backlash

Unit : Nm

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-5}$ rad	17.5	9.7	8.2	8.2	6.8	6.8
	arc sec	36	20	17	17	14	14
80	$\times 10^{-5}$ rad	11.2	6.3	5.3	5.3	4.4	4.4
	arc sec	23	13	11	11	9	9
100	$\times 10^{-5}$ rad	8.7	4.8	4.4	4.4	3.4	3.4
	arc sec	18	10	9	9	7	7
120	$\times 10^{-5}$ rad	-	3.9	3.9	3.9	2.9	2.9
	arc sec	-	8	8	8	6	6
160	$\times 10^{-5}$ rad	-	-	2.9	2.9	2.4	2.4
	arc sec	-	-	6	6	5	5

Table 5-13-6 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.5	6.7	8.6	17	34	61
80	3.1	4.4	5.4	10	21	39
100	2.8	3.7	4.7	8.8	20	34
120	-	3.4	4.2	8.0	17	31
160	-	-	3.6	6.9	15	26

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

Table 5-13-7 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.8	3.3	5.2	9.9	20	36
80	1.8	3.3	5.3	10	21	36
100	2	3.6	5.6	11	22	40
120	-	3.9	6.1	12	24	43
160	-	-	7	14	29	51

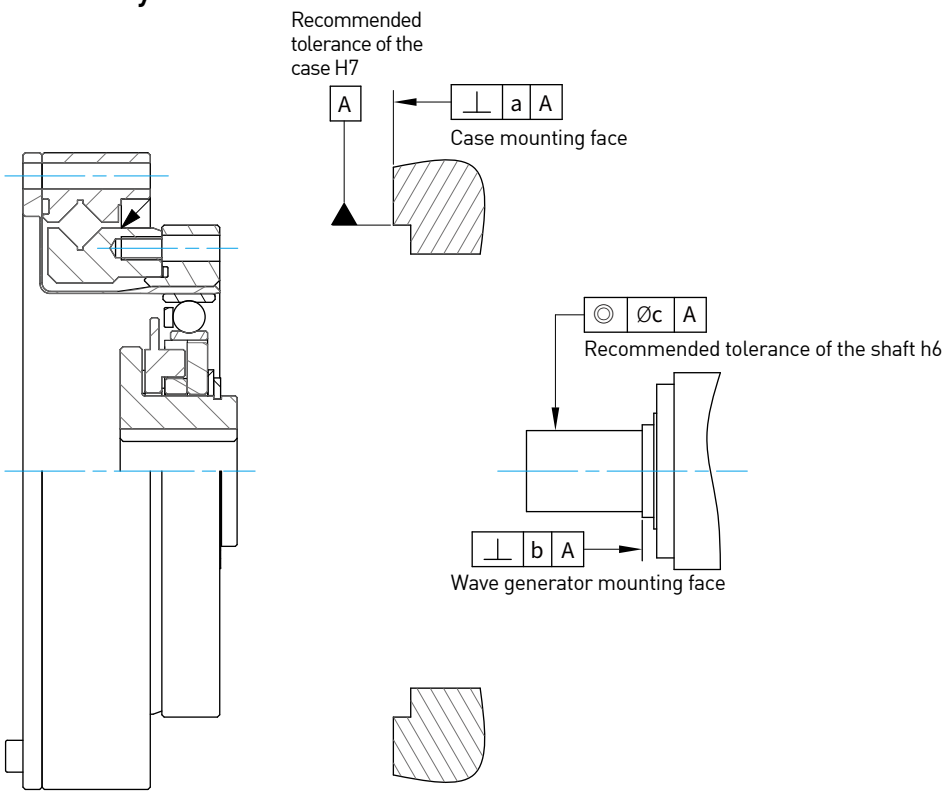
Note : The values in this table will vary depending on the working conditions and are for reference only. The upper limit is 20% above the value in this table.

Table 5-13-8 Torsional rigidity

Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-13-2 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026
b	0.017	0.020	0.020	0.024	0.024	0.024
	(0.008)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
C	0.030	0.034	0.044	0.047	0.047	0.05
	(0.016)	(0.018)	(0.019)	(0.022)	(0.022)	(0.022)

Note: The value in ( ) is the value of the wave generator (without oldham coupling).

5-13-3 Installation bolt tightening torque

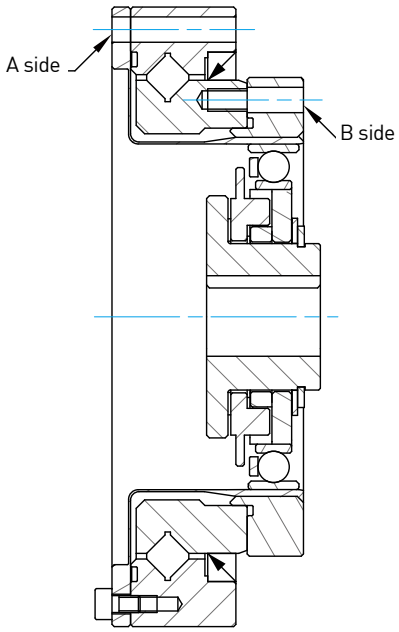


Table 5-13-9 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.4
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	128	222	252	516	1069	1813
	kgfm	13	23	26	53	109	185

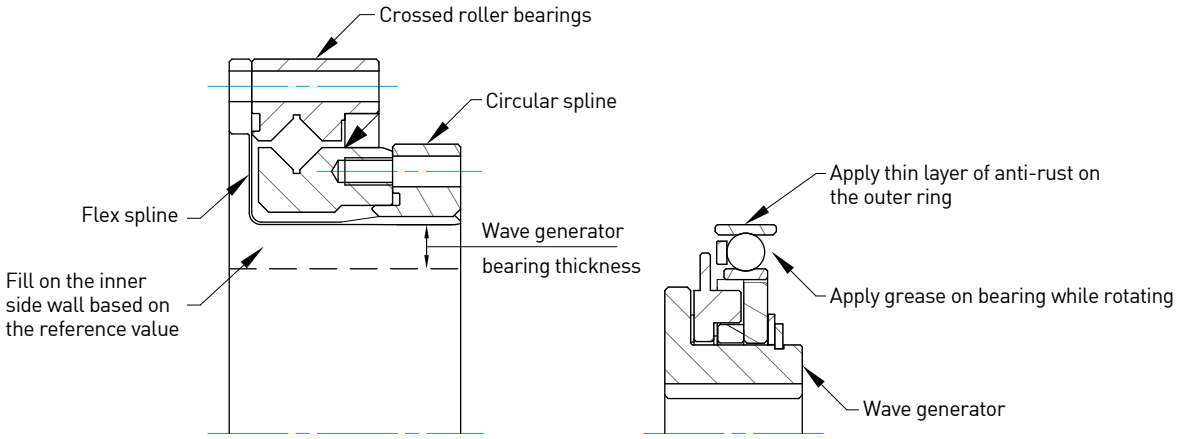
Table 5-13-10 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.36
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	88	216	248	520	1080	1867
	kgfm	9.0	22	25.3	53	110	191

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-13-4 Lubrication

Other than the tooth space of DSH-PO Type, all other parts are not packed with lubricant. Please follow the below points for applying the lubricant.

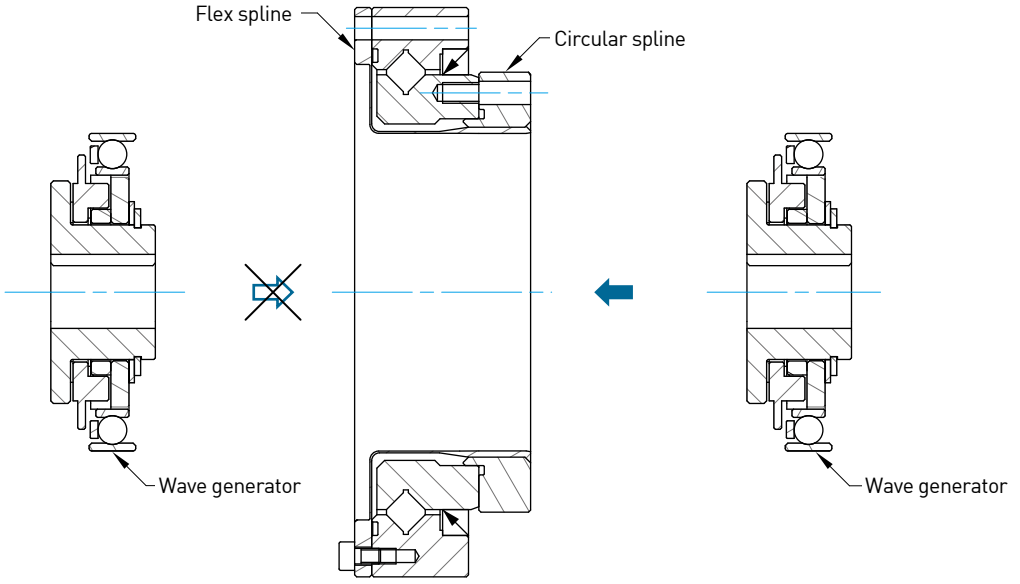


Unit : g

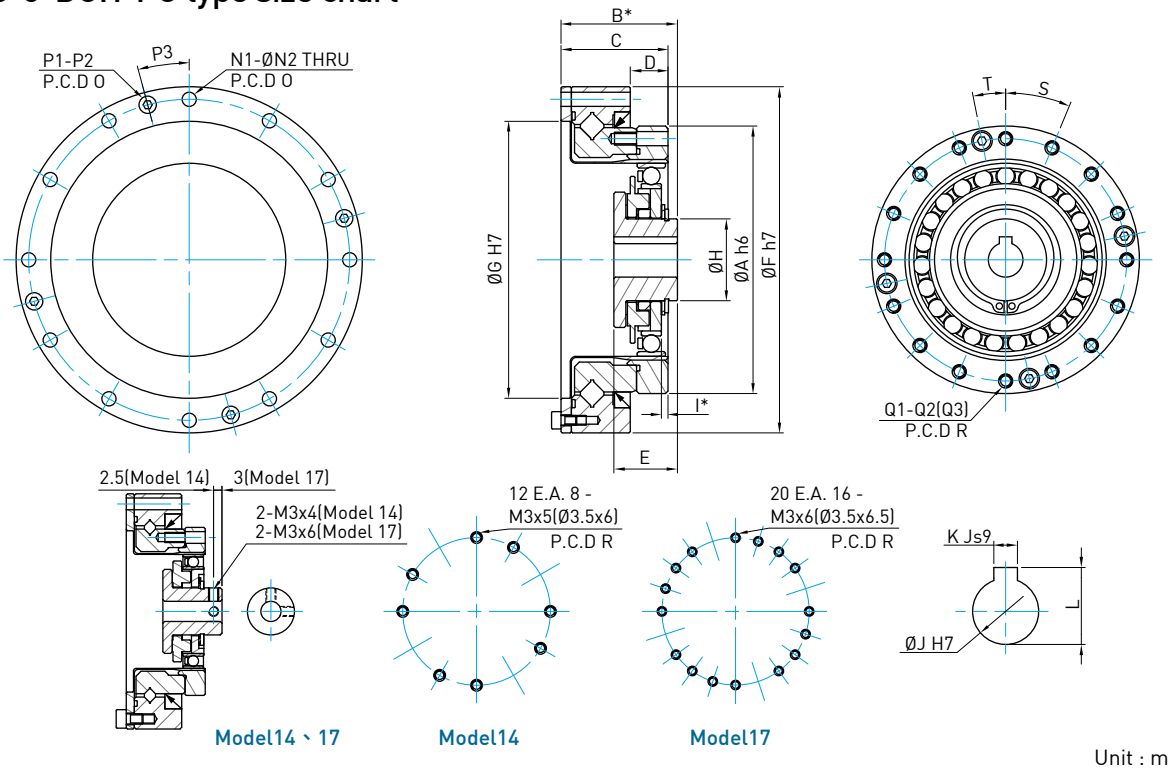
Instructions \ Model		14	17	20	25	32	40
Used horizontally		5.8	11	18	32	64	120
Used vertical	Wave generator is facing down	7.5	13	19	37	74	130
	Wave generator is facing up	8.9	15	22	42	84	150

5-13-5 Installation sequence

Install the wave generator only after installing the reducer body into the case. Please note the installation sequence to avoid damage on the tooth face.



5-13-6 DGH-PO type size chart



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h6	50	60	70	85	110	135
B*	$28.5^{\ 0}_{-0.4}$	$32.5^{\ 0}_{-0.4}$	$33.5^{\ 0}_{-0.4}$	$37^{\ 0}_{-0.5}$	$44^{\ 0}_{-0.6}$	$53^{\ 0}_{-0.6}$
C	23.5	26.5	29	34	42	51
D	7	7.5	8.5	12	15	18
E	$18.5^{\ 0}_{-0.1}$	$20.7^{\ 0}_{-0.1}$	$21.5^{\ 0}_{-0.1}$	$21.6^{\ 0}_{-0.1}$	$23.6^{\ 0}_{-0.1}$	$29.7^{\ 0}_{-0.1}$
ØF h7	70	80	90	110	142	170
ØG H7	48	60	70	88	114	140
ØH	14	18	21	26	26	32
I*	0.4	0.3	0.1	2.1	2.5	3.3
ØJ H7	6	8	9	11	14	14
K Js9	-	-	3	4	5	5
L	-	-	$10.4^{\ +0.1}_{\ 0}$	$12.8^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$	$16.3^{\ +0.1}_{\ 0}$
N1	8	12	12	12	12	12
ØN2	3.5	3.5	3.5	4.5	5.5	6.6
O (P.C.D)	64	74	84	102	132	158
P1	2	4	4	4	4	6
P2	M3	M3	M3	M3	M4	M4
P3 (Degree)	22.5°	15°	15°	15°	15°	15°
Q1	12 E.A. 8	20 E.A. 16	16	16	16	16
Q2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
Q3	Ø3.5 x 6 DP	Ø3.5 x 6.5 DP	Ø3.5 x 7.5 DP	Ø4.5 x 10 DP	Ø5.5 x 14 DP	Ø6.6 x 17 DP
ØR	44	54	62	77	100	122
S (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
T (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.033	0.079	0.193	0.413	1.69	4.50
Weight (Kg)	0.41	0.57	0.81	1.31	2.94	5.1

*The dimension B, I is the fitting position and permissible tolerance in the axial direction.

5-14 DGH-PH Type

5-14-1 Technical data

Table 5-14-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	143	15		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1530	156		
	160	382	39	841	86	586	60	1530	156		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-14-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-14-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-14-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-14-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	4.5	6.7	8.6	17	34	61
80	3.1	4.4	5.4	10	21	39
100	2.8	3.7	4.7	8.8	20	34
120	-	3.4	4.2	8.0	17	31
160	-	-	3.6	6.9	15	26

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

Table 5-14-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	1.8	3.3	5.2	9.9	20	36
80	1.8	3.3	5.3	10	21	36
100	2	3.6	5.6	11	22	40
120	-	3.9	6.1	12	24	43
160	-	-	7	14	29	51

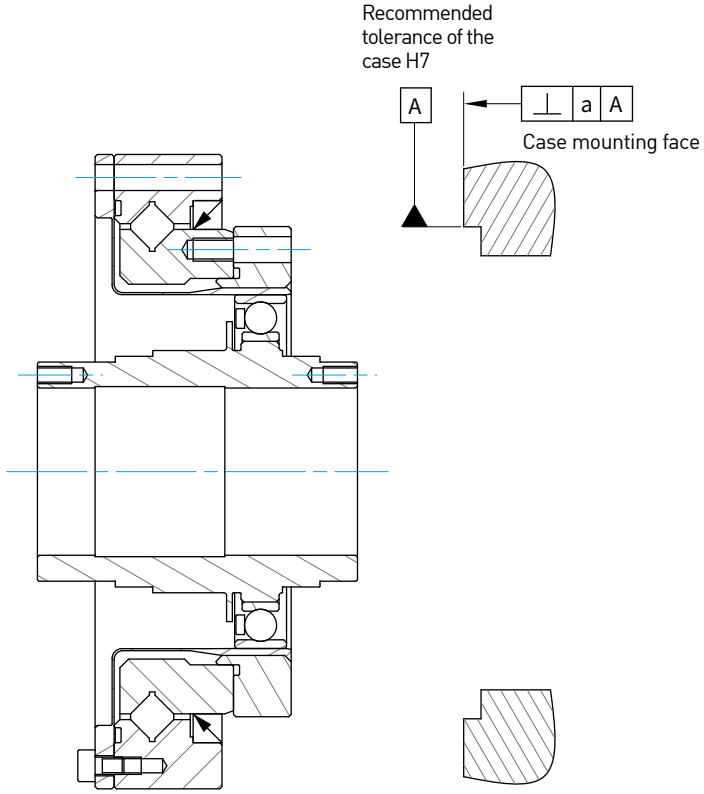
Note : The values in this table will vary depending on the working conditions and are for reference only. The upper limit is 20% above the value in this table.

Table 5-14-7 Torsional rigidity

Reduction ratio		Model	14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.2	0.4	0.7	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-14-2 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.011	0.015	0.017	0.024	0.026	0.026

5-14-3 Installation bolt tightening torque

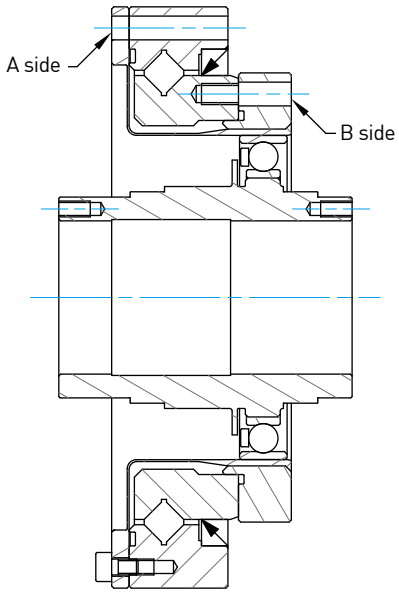


Table 5-14-9 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.4
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	128	222	252	516	1069	1813
	kgfm	13	23	26	53	109	185

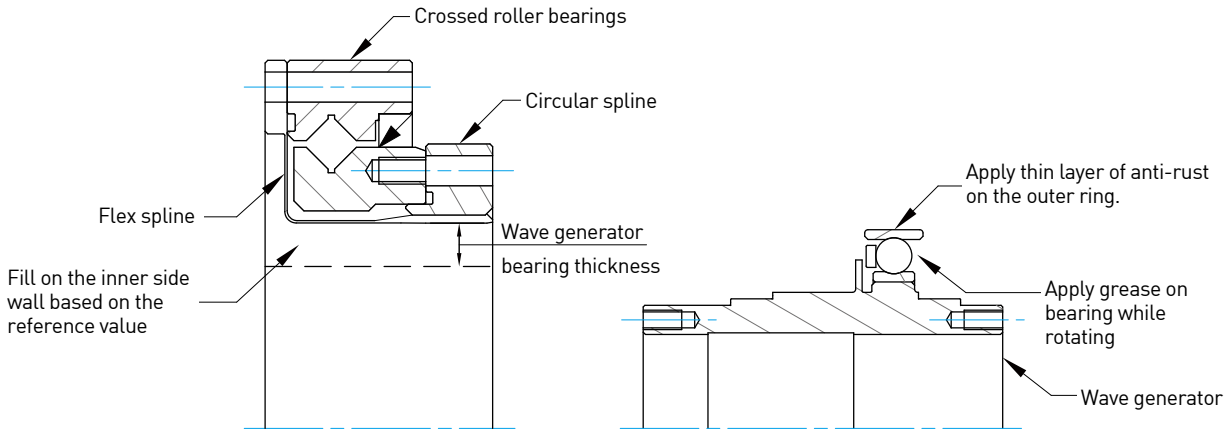
Table 5-14-10 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.36
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	88	216	248	520	1080	1867
	kgfm	9.0	22	25.3	53	110	191

Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-14-4 Lubrication

Other than the tooth space of DSH-PH Type, all other parts are not packed with lubricant. Please follow the below points for applying the lubricant.

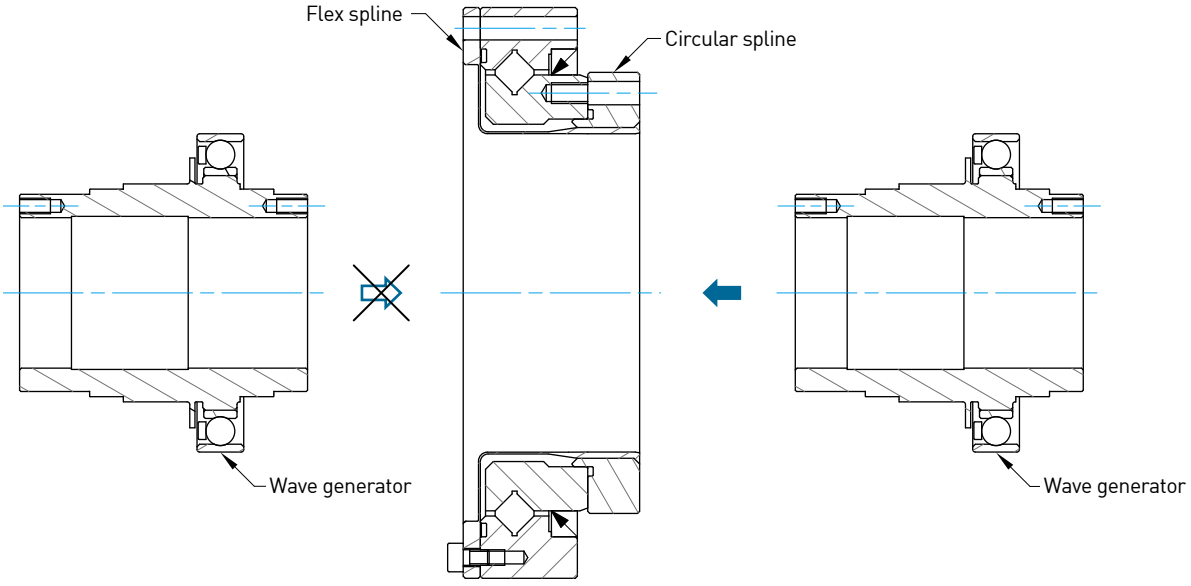


Unit : g

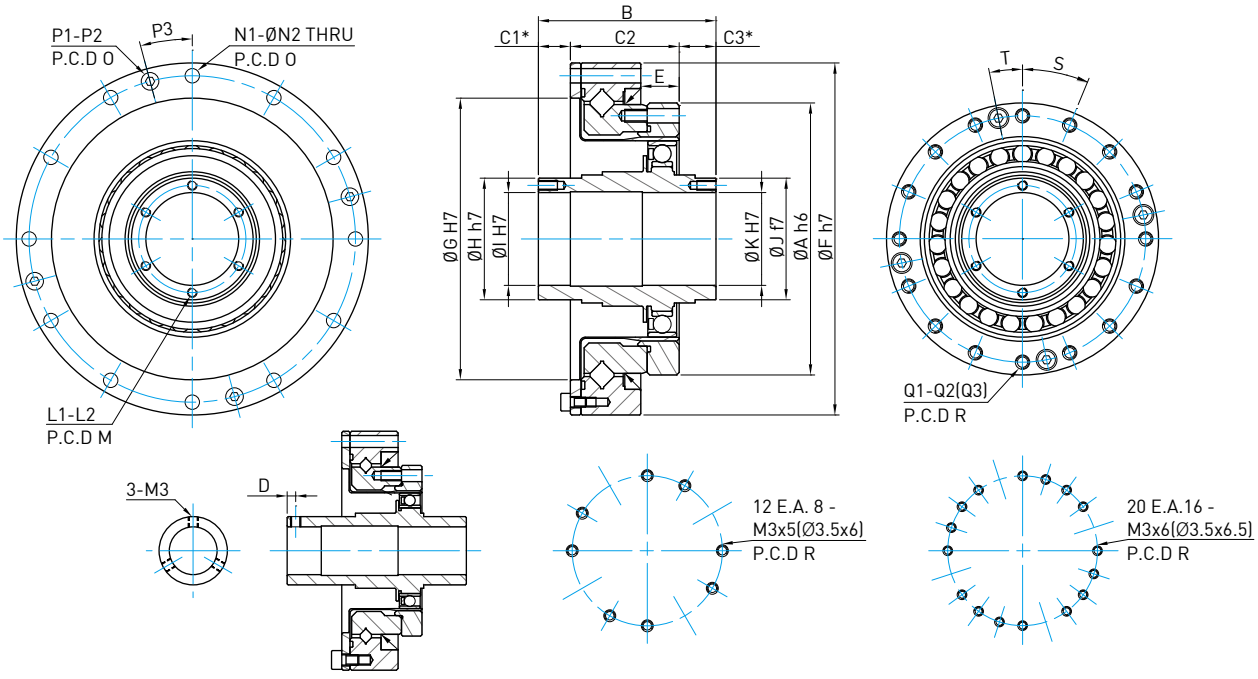
Instructions \ Model		14	17	20	25	32	40
Used horizontally		5.8	11	18	32	64	120
Used vertical	Wave generator is facing down	7.5	13	19	37	74	130
	Wave generator is facing up	8.9	15	22	42	84	150

5-14-5 Installation sequence

Install the wave generator only after installing the reducer body into the case. Please note the installation sequence to avoid damage on the tooth face.

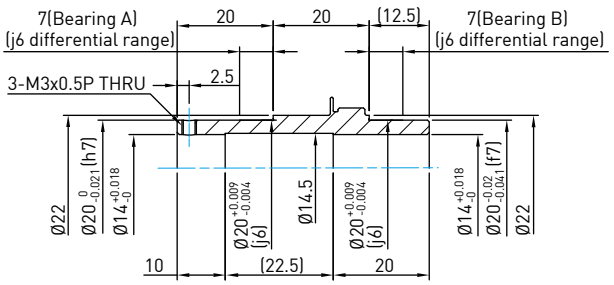


5-14-6 DGH-PH type size chart

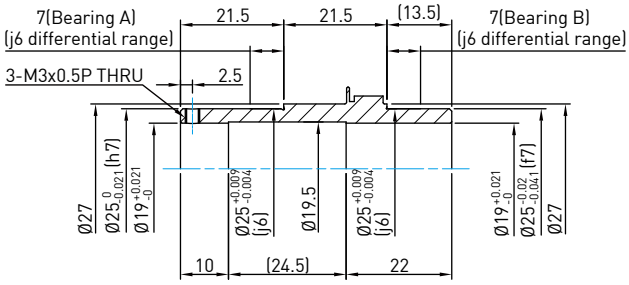


Model14、17 Model14 Model17

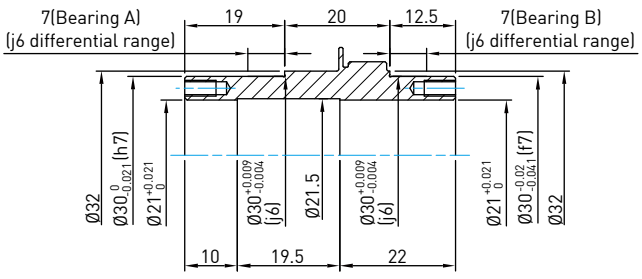
Model 14



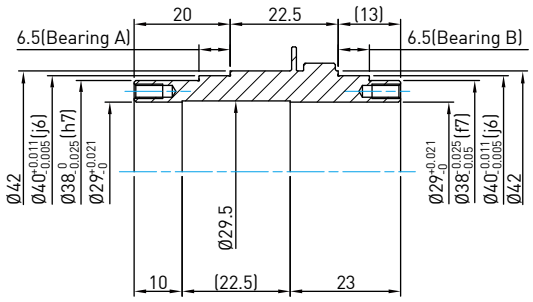
Model 17



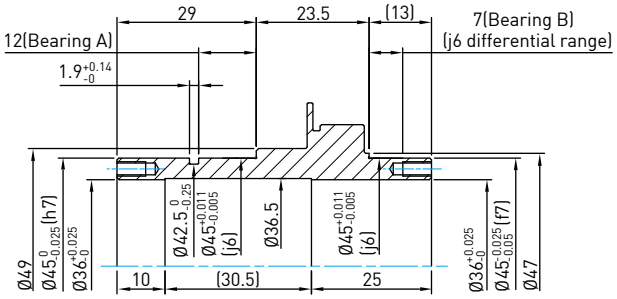
Model 20



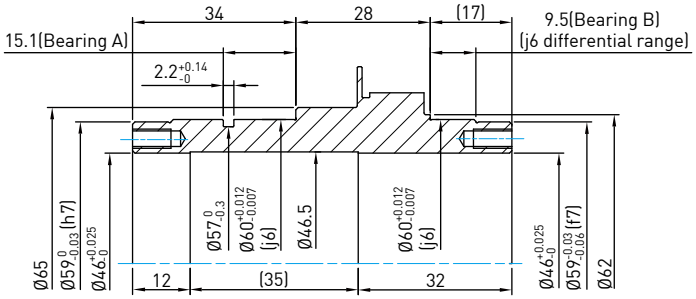
Model 25



Model 32



Model 40



Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h6	50	60	70	85	110	135
B	$52.5^{\ 0}_{-0.1}$	$56.5^{\ 0}_{-0.1}$	$51.5^{\ 0}_{-0.1}$	$55.5^{\ 0}_{-0.1}$	$65.5^{\ 0}_{-0.1}$	$79^{\ 0}_{-0.1}$
C1*	$16^{+0.4}_{\ 0}$	$16^{+0.4}_{\ 0}$	$9.5^{+0.4}_{\ 0}$	$10^{+0.5}_{\ 0}$	$12^{+0.6}_{\ 0}$	$13^{+0.6}_{\ 0}$
C2	23.5	26.5	29	34	42	51
C3*	13	14	13	11.5	11.5	15
D	2.5	2.5	–	–	–	–
E	7	7.5	8.5	12	15	18
ØF h7	70	80	90	110	142	170
ØG H7	48	60	70	88	114	140
ØH h7	20	25	30	38	45	59
ØI H7	14	19	21	29	36	46
ØJ f7	20	25	30	38	45	59
ØK H7	14	19	21	29	36	46
L1	3	3	2x6	2x6	2x6	2x6
L2	M3	M3	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP	M4 x 8 DP
M (P.C.D)	–	–	25.5	33.5	40.5	52
N1	8	12	12	12	12	12
ØN2	3.5	3.5	3.5	4.5	5.5	6.6
O (P.C.D)	64	74	84	102	132	158
P1	2	4	4	4	4	6
P2	M3	M3	M3	M3	M4	M4
P3 (Degree)	22.5°	15°	15°	15°	15°	15°
Q1	12 E.A. 8	20 E.A. 16	16	16	16	16
Q2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
Q3	Ø3.5 x 6 DP	Ø3.5 x 6.5 DP	Ø3.5 x 7.5 DP	Ø4.5 x 10 DP	Ø5.5 x 14 DP	Ø6.6 x 17 DP
ØR	44	54	62	77	100	122
S (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
T (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Bearing A**	6804ZZ	6805ZZ	6806ZZ	6808ZZ	6909ZZ	6912ZZ
Bearing B**	6804ZZ	6805ZZ	6806ZZ	6808ZZ	6809ZZ	6812ZZ
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.091	0.193	0.404	1.070	2.85	9.28
Weight (Kg)	0.45	0.63	0.89	1.44	3.1	5.4

*The dimension C1, C3 is the fitting position and permissible tolerance in the axial direction.
**It is recommended to use a deep groove bearing model.

5-15 DGH-AH Type

5-15-1 Technical data

Table 5-15-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	143	15		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1530	156		
	160	382	39	841	86	586	60	1530	156		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-15-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-15-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-15-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-15-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32	40
50	8.8	27	36	56	85	136
80	7.5	25	33	50	74	117
100	6.9	24	32	49	72	112
120	-	24	31	48	68	110
160	-	-	31	47	67	105

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

Table 5-15-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	5.3	16	22	34	51	82
80	7.2	24	31	48	70	112
100	8.2	29	38	59	86	134
120	-	34	45	69	97	158
160	-	-	59	90	128	201

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

Table 5-15-7 Torsional rigidity

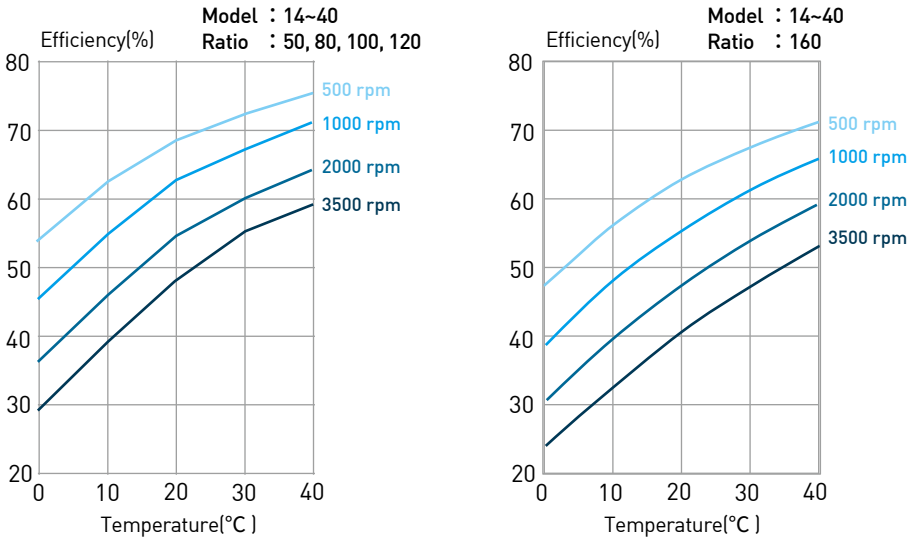
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.20	0.40	0.70	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-15-2 Efficiency

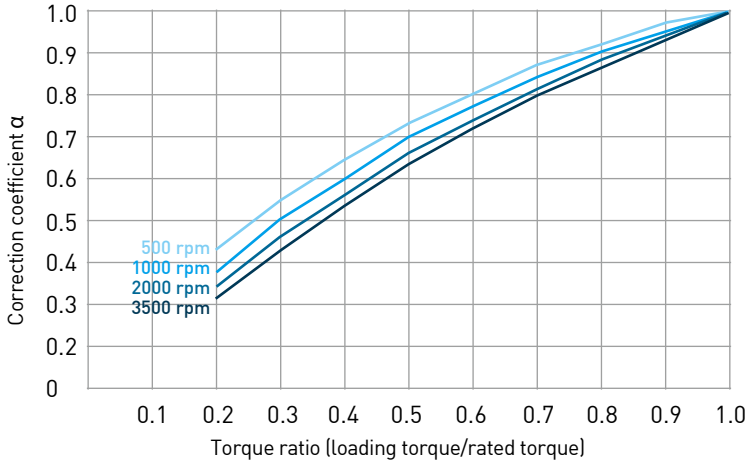
1. Rated torque E_R

DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .



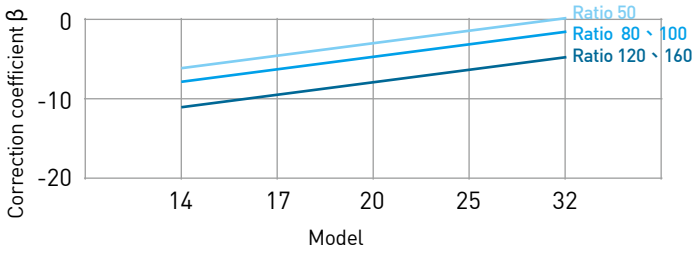
2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.



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

5-15-3 No-load operating torque

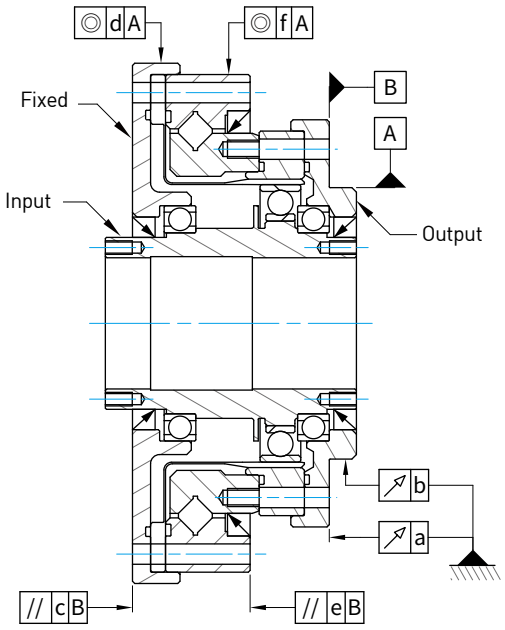
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit: cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	6.3	17.8	23.6	37.2	58	103.3
	1000 r/min	7.8	21.8	28.6	49.2	76	168.3
	2000 r/min	10.1	27.8	37.6	62.2	98	183.3
	3500 r/min	14.1	36.8	48.6	89.2	138	236.3
80	500 r/min	5.4	16.4	21.5	33.8	51.5	92.4
	1000 r/min	6.9	20.4	26.5	45.8	69.5	157.4
	2000 r/min	9.2	26.4	35.5	58.8	91.5	172.4
	3500 r/min	13.2	35.4	46.5	85.8	131.5	225.4
100	500 r/min	5.2	16	21	33	50	90
	1000 r/min	6.7	20	26	45	68	155
	2000 r/min	9	26	35	58	90	170
	3500 r/min	13	35	46	85	130	223
120	500 r/min	-	15.8	20.6	32.4	48.9	88.3
	1000 r/min	-	19.8	25.6	44.4	66.9	153.3
	2000 r/min	-	25.8	34.6	57.4	88.9	168.3
	3500 r/min	-	34.8	45.6	84.4	128.9	221.3
160	500 r/min	-	-	20.2	31.7	47.5	86
	1000 r/min	-	-	25.2	43.7	65.5	151
	2000 r/min	-	-	34.2	56.7	87.5	166
	3500 r/min	-	-	45.2	83.7	127.5	219

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

5-15-4 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.033	0.038	0.040	0.046	0.054	0.057
b	0.035	0.035	0.039	0.041	0.047	0.050
c	0.064	0.071	0.079	0.085	0.104	0.111
d	0.053	0.050	0.059	0.061	0.072	0.075
e	0.040	0.045	0.051	0.057	0.065	0.071
f	0.038	0.038	0.047	0.049	0.054	0.060

5-15-5 Installation bolt tightening torque

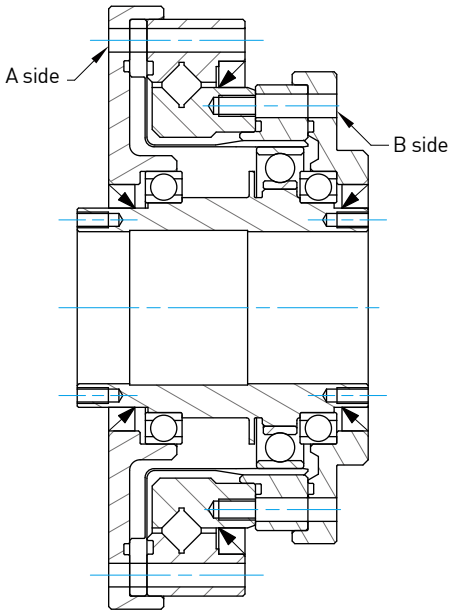


Table 5-15-9 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.4
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	128	222	252	516	1069	1813
	kgfm	13	23	26	53	109	185

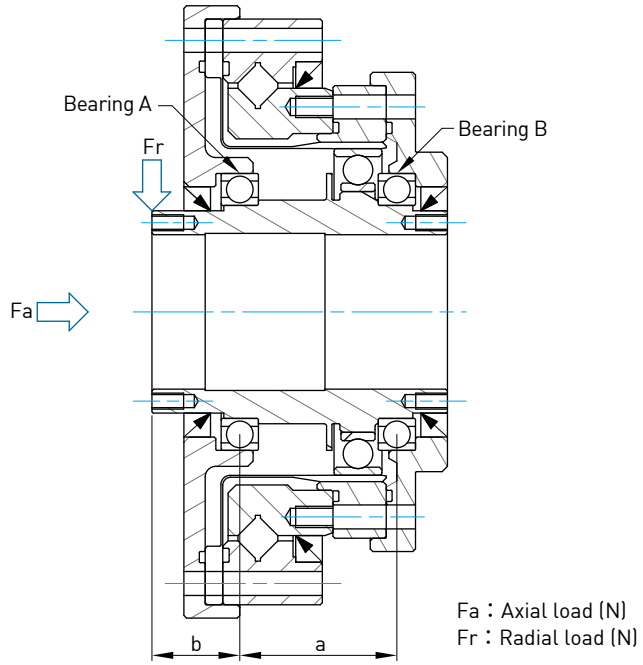
Table 5-15-10 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.36
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	88	216	248	520	1080	1867
	kgfm	9.0	22	25.3	53	110	191

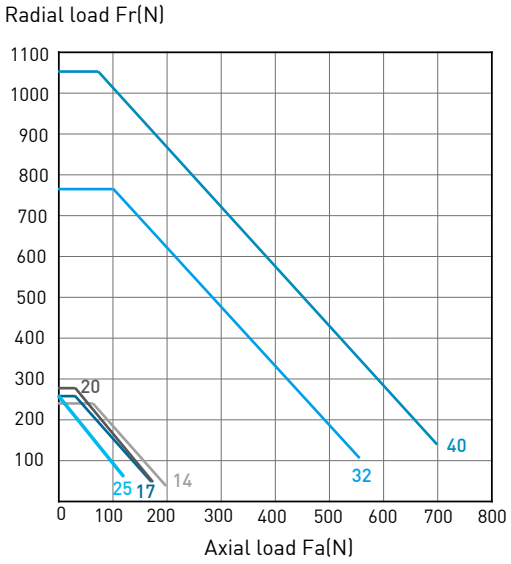
Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-15-6 Permissible input load

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

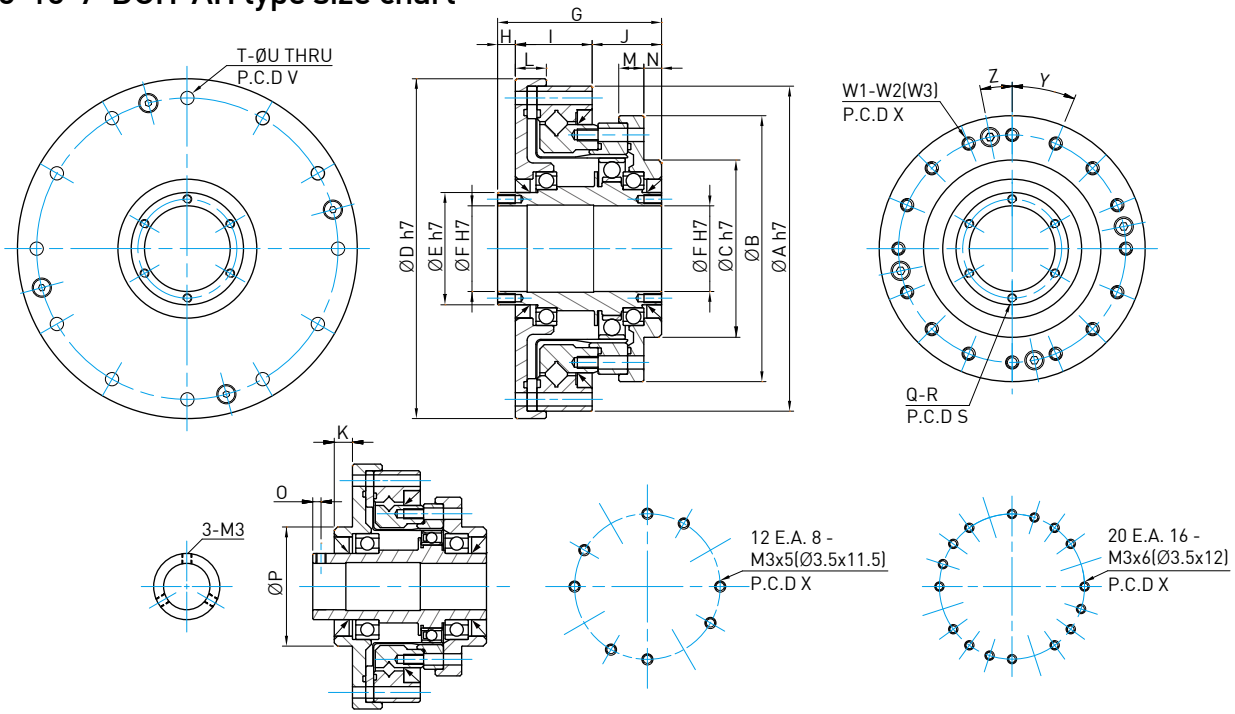


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 10000hour.



Item / Model	Bearing A		Bearing B		a (mm)	b (mm)	Maximum radial load Fr (N)
	Dynamic load C (kN)	Static load Co (kN)	Dynamic load C (kN)	Static load Co (kN)			
14	4000	2470	4000	2470	27	16.5	230
17	4300	2950	4300	2950	29	17.5	250
20	4500	3450	4500	3450	27	15.5	275
25	4900	4350	4900	4350	29.5	16.5	250
32	14100	10900	5350	5250	33	23	770
40	16400	14300	11500	10900	39.5	27.5	1060

5-15-7 DGH-AH type size chart



Model14、17 Model14 Model17

Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	70	80	90	110	142	170
ØB	54	64	75	90	115	140
ØC h7	36	45	50	60	85	100
ØD h7	74	84	95	115	147	175
ØE h7	20	25	30	38	45	59
ØF H7	14	19	21	29	36	46
G	52.5	56.5	51.5	55.5	65.5	79
H	12	12	5	6	7	8
I	20.5	23	25	26	32	38
J	20	21.5	21.5	23.5	26.5	33
K	6.5	6.5	–	–	–	–
L	9	10	10.5	10.5	12	14
M	8	8.5	9	8.5	9.5	13
N	7.5	8.5	7	6	5	7
O	2.5	2.5	–	–	–	–
P	36	45	–	–	–	–
Q	3	3	2x6	2x6	2x6	2x6
R	M3	M3	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP	M4 x 8 DP
S (P.C.D)	–	–	25.5	33.5	40.5	52
T	8	12	12	12	12	12
ØU	3.5	3.5	3.5	4.5	5.5	6.6
V (P.C.D)	64	74	84	102	132	158
W1	12 E.A. 8	20 E.A. 16	16	16	16	16
W2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
W3	Ø3.5 x 11.5 DP	Ø3.5 x 12 DP	Ø3.5 x 13.5 DP	Ø4.5 x 15.5 DP	Ø5.5 x 20.5 DP	Ø6.6 x 25 DP
X (P.C.D)	44	54	62	77	100	122
Y (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
Z (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.091	0.193	0.404	1.07	2.85	9.28
Weight (Kg)	0.71	1.0	1.38	2.1	4.5	7.7

5-16 DGH-AJ Type

5-16-1 Technical data

Table 5-16-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	7.0	0.7	23	2.3	9	0.9	46	4.7	8500	3500
	80	10	1.0	30	3.1	14	1.4	61	6.2		
	100	10	1.0	36	3.7	14	1.4	70	7.2		
17	50	21	2.1	44	4.5	34	3.4	91	9	7300	3500
	80	29	2.9	56	5.7	35	3.6	113	12		
	100	31	3.2	70	7.2	51	5.2	143	15		
	120	31	3.2	70	7.2	51	5.2	112	11		
20	50	33	3.3	73	7.4	44	4.5	127	13	6500	3500
	80	44	4.5	96	9.8	61	6.2	165	17		
	100	52	5.3	107	10.9	64	6.5	191	20		
	120	52	5.3	113	11.5	64	6.5	191	20		
	160	52	5.3	120	12.2	64	6.5	191	20		
25	50	51	5.2	127	13	72	7.3	242	25	5600	3500
	80	82	8.4	178	18	113	12	332	34		
	100	87	8.9	204	21	140	14	369	38		
	120	87	8.9	217	22	140	14	395	40		
	160	87	8.9	229	23	140	14	408	42		
32	50	99	10	281	29	140	14	497	51	4800	3500
	80	153	16	395	40	217	22	738	75		
	100	178	18	433	44	281	29	841	86		
	120	178	18	459	47	281	29	892	91		
	160	178	18	484	49	281	29	892	91		
40	50	178	18	523	53	255	26	892	91	4000	3000
	80	268	27	675	69	369	38	1270	130		
	100	345	35	738	75	484	49	1400	143		
	120	382	39	802	82	586	60	1530	156		
	160	382	39	841	86	586	60	1530	156		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-16-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32	40
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.111	0.133
Offset amount		R	m	0.0217	0.0239	0.0255	0.0296	0.0364	0.0440
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2	43.3
			kgf	590	1060	1490	2230	3900	4410
	Static load	Co	kN	8.6	16.3	22.0	35.8	65.4	81.6
			kgf	880	1670	2250	3660	6680	8330
Moment rigidity		K	$\times 10^4$ Nm/rad	8.5	15.4	25.2	39.2	100	179
			kgfm/arc min	2.5	4.6	7.5	11.6	29.6	53.2
Permissible dynamic tilting moment		M	Nm	74	124	187	258	580	849
Permissible static tilting moment		Mo	Nm	144	328	515	1070	2425	3623
Permissible axial load		Fa	kN	1.239	2.222	3.119	4.657	8.161	9.250
Permissible radial load		Fr	kN	0.83	1.489	2.090	3.120	5.468	6.198

Table 5-16-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32	40
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1	1

Table 5-16-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32	40
50	$\times 10^{-4}$ rad	5.8	5.8	5.8	5.8	5.8	5.8
	arc min	2.0	2.0	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	2.9	2.9	2.9	2.9	2.9	2.9
	arc min	1.0	1.0	1.0	1.0	1.0	1.0

Table 5-16-5 Starting torque

Unit : cNm

Reduction ratio	Model	14	17	20	25	32	40
50		5.7	9.7	14	22	41	72
80		4.4	7.2	11	15	29	52
100		3.7	6.5	9.9	14	27	47
120		-	6.2	9.3	13	24	44
160		-	-	8.6	12	23	39

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

Table 5-16-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32	40
50	3.4	5.8	8.4	13	25	43
80	4.2	6.9	10	15	28	50
100	4.5	7.8	12	17	33	56
120	-	8.9	13	19	34	63
160	-	-	17	23	43	75

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

Table 5-16-7 Torsional rigidity

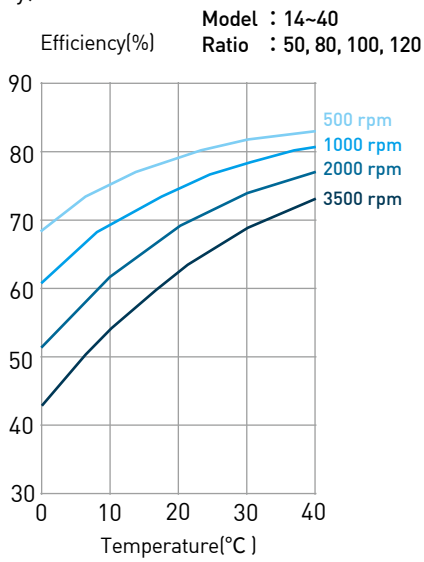
Reduction ratio \ Model			14	17	20	25	32	40
T_1		Nm	2.0	3.9	7.0	14	29	54
		kgfm	0.20	0.40	0.70	1.4	3.0	5.5
T_2		Nm	6.9	12	25	48	108	196
		kgfm	0.7	1.2	2.5	4.9	11	20
50	K_1	$\times 10^4$ Nm/rad	0.34	0.81	1.3	2.5	5.4	10
		kgfm/arc min	0.1	0.24	0.38	0.74	1.6	3.0
	K_2	$\times 10^4$ Nm/rad	0.47	1.1	1.8	3.4	7.8	14
		kgfm/arc min	0.14	0.32	0.52	1.0	2.3	4.2
	K_3	$\times 10^4$ Nm/rad	0.57	1.3	2.3	4.4	9.8	18
		kgfm/arc min	0.17	0.4	0.67	1.3	2.9	5.3
	θ_1	$\times 10^{-4}$ rad	5.8	4.9	5.2	5.5	5.5	5.2
		arc min	2.0	1.7	1.8	1.9	1.9	1.8
	θ_2	$\times 10^{-4}$ rad	16	12	15.4	15.7	15.7	15.4
		arc min	5.6	4.2	5.3	5.4	5.4	5.3
80 up	K_1	$\times 10^4$ Nm/rad	0.47	1	1.6	3.1	6.7	13
		kgfm/arc min	0.14	0.3	0.47	0.92	2.0	3.8
	K_2	$\times 10^4$ Nm/rad	0.61	1.4	2.5	5.0	11	20
		kgfm/arc min	0.18	0.4	0.75	1.5	3.2	6.0
	K_3	$\times 10^4$ Nm/rad	0.71	1.6	2.9	5.7	12	23
		kgfm/arc min	0.21	0.46	0.85	1.7	3.7	6.8
	θ_1	$\times 10^{-4}$ rad	4.1	3.9	4.4	4.4	4.4	4.1
		arc min	1.4	1.3	1.5	1.5	1.5	1.4
	θ_2	$\times 10^{-4}$ rad	12	9.7	11.3	11.1	11.6	11.1
		arc min	4.2	3.3	3.9	3.8	4.0	3.8

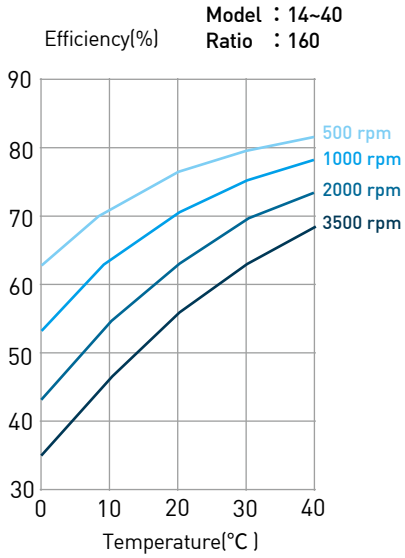
Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-16-2 Efficiency

1. Rated torque E_R

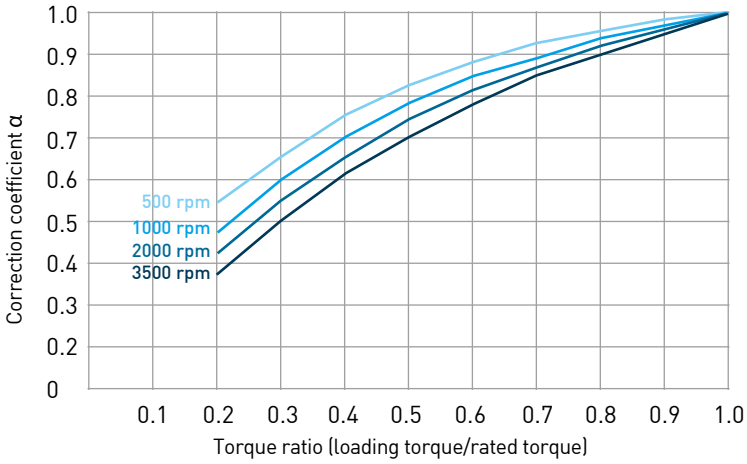
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .





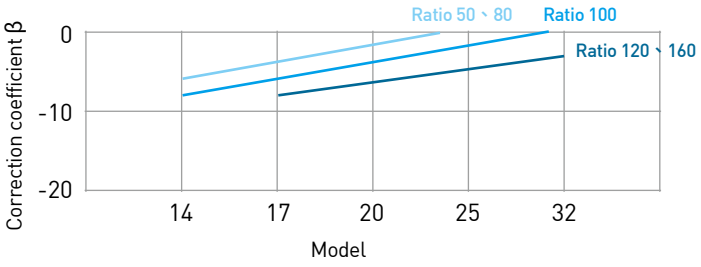
2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.



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

5-16-3 No-load operating torque

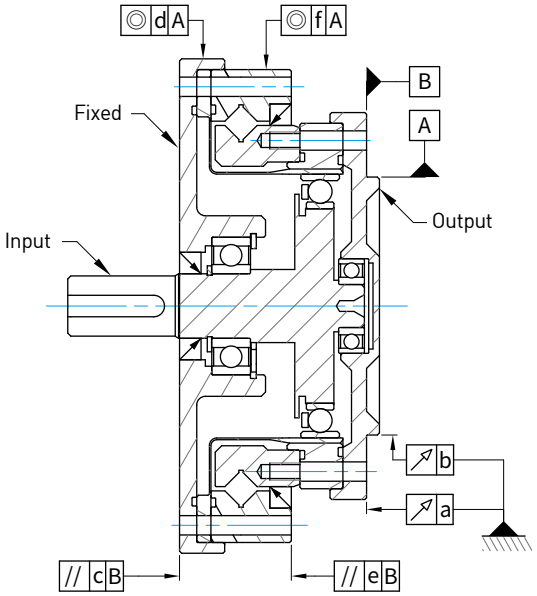
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model					
		14	17	20	25	32	40
50	500 r/min	3.9	8	11.6	18.2	31	55.3
	1000 r/min	4.7	9.8	14.6	22.2	38	71.3
	2000 r/min	5.8	12.8	19.6	28.2	53	93.3
	3500 r/min	7	14.8	22.6	35.2	68	137.3
80	500 r/min	3	6.6	9.5	14.8	24.5	44.4
	1000 r/min	3.8	8.4	12.5	18.8	31.5	60.4
	2000 r/min	4.9	11.4	17.5	24.8	46.5	82.4
	3500 r/min	6.1	13.4	20.5	31.8	61.5	126.4
100	500 r/min	2.8	6.2	9	14	23	42
	1000 r/min	3.6	8	12	18	30	58
	2000 r/min	4.7	11	17	24	45	80
	3500 r/min	5.9	13	20	31	60	124
120	500 r/min	-	6	8.6	13.4	21.9	40.3
	1000 r/min	-	7.8	11.6	17.4	28.9	56.3
	2000 r/min	-	10.8	16.6	23.4	43.9	78.3
	3500 r/min	-	12.8	19.6	30.4	58.9	122.3
160	500 r/min	-	-	8.2	12.7	20.5	38
	1000 r/min	-	-	11.2	16.7	27.5	54
	2000 r/min	-	-	16.2	22.7	42.5	76
	3500 r/min	-	-	19.2	29.7	57.5	120

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

5-16-4 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32	40
a	0.033	0.038	0.040	0.046	0.054	0.057
b	0.035	0.035	0.039	0.041	0.047	0.050
c	0.064	0.071	0.079	0.085	0.104	0.111
d	0.053	0.050	0.059	0.061	0.072	0.075
e	0.040	0.045	0.051	0.057	0.065	0.071
f	0.038	0.038	0.047	0.049	0.054	0.060

5-16-5 Installation bolt tightening torque

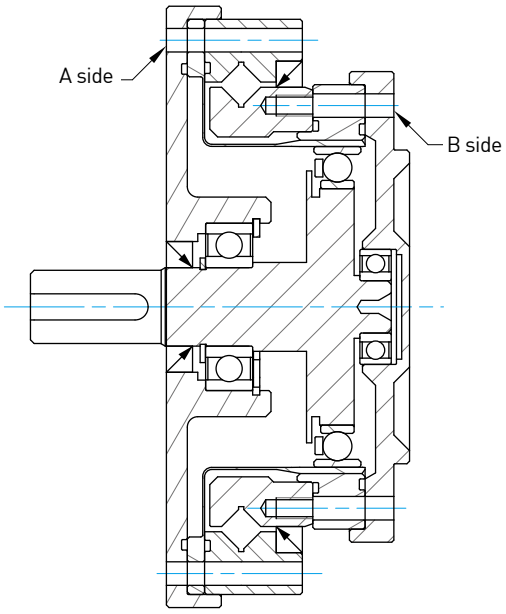


Table 5-16-9 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	12	12	12	12	12
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	64	74	84	102	132	158
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.4
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	128	222	252	516	1069	1813
	kgfm	13	23	26	53	109	185

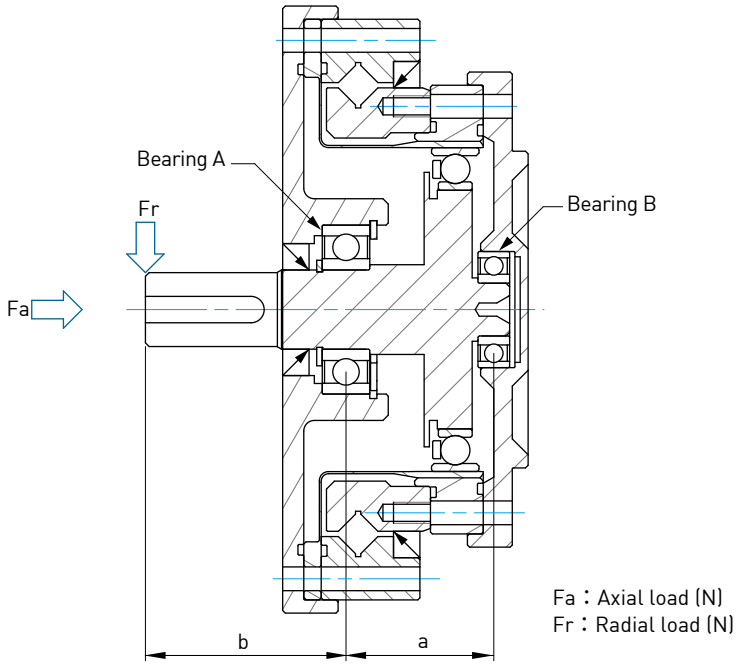
Table 5-16-10 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32	40
Number of bolts		8	16	16	16	16	16
Bolts size		M3	M3	M3	M4	M5	M6
Installation of bolts PCD	mm	44	54	62	77	100	122
Bolts tightening torque	Nm	2.4	2.4	2.4	5.4	10.8	18.36
	kgfm	0.24	0.24	0.24	0.55	1.10	1.87
Transmission torque	Nm	88	216	248	520	1080	1867
	kgfm	9.0	22	25.3	53	110	191

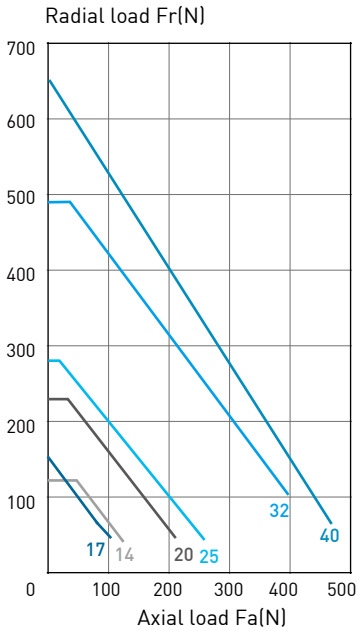
Note : 1. Recommended tightening torques for the 12.9 DIN EN ISO 4762 fastening bolts DIN912 in accordance with VDI 2230 for μK = μG = 0.125
2. Bolt-in depth at least 2 x thread diameter

5-16-6 Permissible input load

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

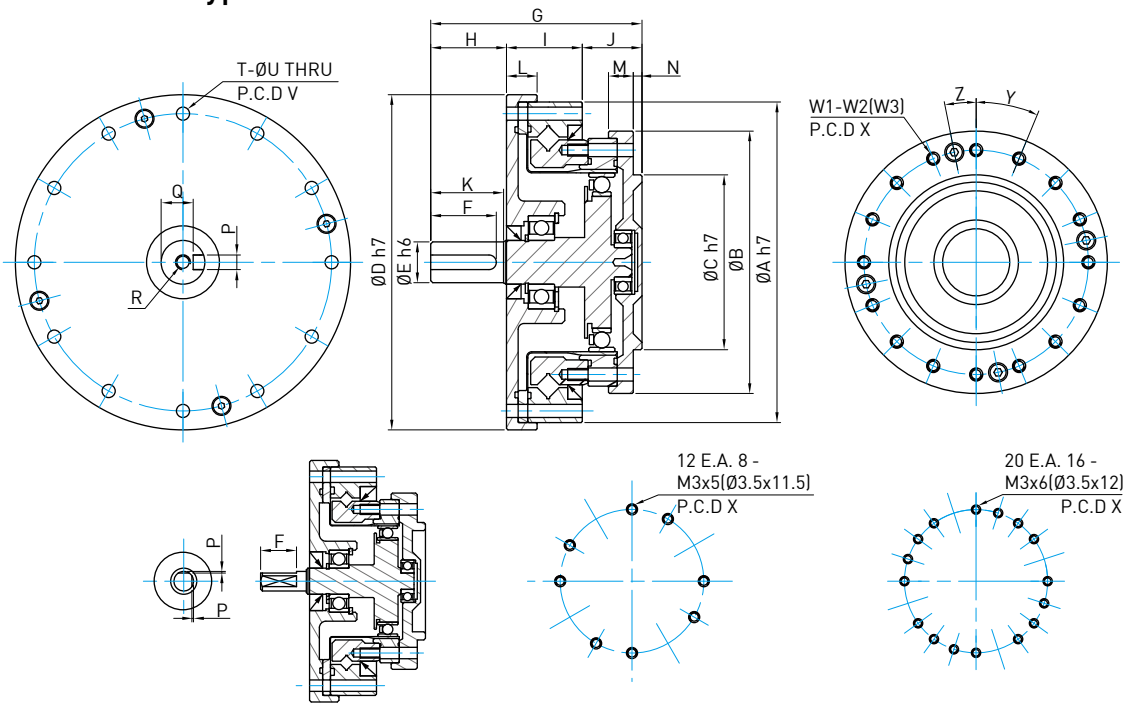


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 10000hour.



Item / Model	Bearing A		Bearing B		a (mm)	b (mm)	Maximum radial load Fr (N)
	Dynamic load C (kN)	Static load Co (kN)	Dynamic load C (kN)	Static load Co (kN)			
14	2240	910	1080	430	20	14	110
17	2700	1270	1610	710	23.5	21	135
20	4350	2260	2240	910	26.5	23.3	210
25	5600	2830	2700	1270	28	28	270
32	9400	5000	4350	2260	36	27	490
40	13200	8300	6000	3250	43	32.5	660

5-16-7 DGH-AJ type size chart



Model14、17 Model14 Model17 Unit : mm

Mark \ Model	14	17	20	25	32	40
ØA h7	70	80	90	110	142	170
ØB	54	64	75	90	115	140
ØC h7	36	45	50	60	85	100
ØD h7	74	84	95	115	147	175
ØE h6	6	8	10	14	14	16
ØF	11	12	16.5	22.5	22.5	27.5
G	50.5	56	63.5	72.5	84.5	100
H	15	17	21	26	26	31
I	20.5	23	25	26	32	38
J	15	16	17.5	20.5	26.5	31
K	14	16	20	25	25	30
L	9	10	10.5	10.5	12	14
M	8	8.5	9	8.5	9.5	13
N	2.5	3	3	3	5	5
P	0.5	0.5	$3^{\ 0}_{-0.025}$	$5^{\ 0}_{-0.03}$	$5^{\ 0}_{-0.03}$	$5^{\ 0}_{-0.03}$
Q	–	–	$8.2^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$11^{\ 0}_{-0.1}$	$13^{\ 0}_{-0.1}$
R	–	–	M3 x 6 DP	M5 x 10 DP	M5 x 10 DP	M5 x 10 DP
T	8	12	12	12	12	12
ØU	3.5	3.5	3.5	4.5	5.5	6.6
V (P.C.D)	64	74	84	102	132	158
W1	12 E.A. 8	20 E.A. 16	16	16	16	16
W2	M3 x 5 DP	M3 x 6 DP	M3 x 6 DP	M4 x 7 DP	M5 x 8 DP	M6 x 10 DP
W3	Ø3.5 x 11.5 DP	Ø3.5 x 12 DP	Ø3.5 x 13.5 DP	Ø4.5 x 15.5 DP	Ø5.5 x 20.5 DP	Ø6.6 x 25 DP
X (P.C.D)	44	54	62	77	100	122
Y (Degree)	30°	18°	22.5°	22.5°	22.5°	22.5°
Z (Degree)	30°	18°	11.25°	11.25°	11.25°	11.25°
Moment of inertia ($\times 10^{-4}$ kgm^2)	0.025	0.059	0.137	0.32	1.2	3.41
Weight (Kg)	0.66	0.94	1.38	2.1	4.4	7.3

5-17 DTC-CE Type

5-17-1 Technical data

Table 5-17-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500
	80	5.4	0.55	16	1.6	7.7	0.79	31	3.2		
	100	5.4	0.55	19	1.9	7.7	0.79	31	3.2		
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500
	80	15	1.5	29	3.0	19	1.9	55	5.6		
	100	16	1.6	37	3.8	27	2.8	55	5.6		
	120	16	1.6	37	3.8	27	2.8	55	5.6		
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500
	80	24	2.4	51	5.2	33	3.4	76*	7.7*		
	100	28	2.9	57	5.8	34	3.5	76*	7.7*		
	120	28	2.9	60	6.1	34	3.5	76*	7.7*		
	160	28	2.9	64	6.5	34	3.5	76*	7.7*		
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500
	80	44	4.5	96	9.8	60	6.1	152*	15*		
	100	47	4.8	110	11	75	7.6	152*	15*		
	120	47	4.8	117	12	75	7.6	152*	15*		
	160	47	4.8	123	13	75	7.6	152*	15*		
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500
	80	83	8.5	213	22	117	12	359*	37*		
	100	96	9.8	233	24	151	15	359*	37*		
	120	96	9.8	247	25	151	15	359*	37*		
	160	96	9.8	261	27	151	15	359*	37*		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact
※5 *The value is limited by the tightening torque of Flex spline

Table 5-17-2 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-17-3 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32
50	$\times 10^{-4}$ rad	7.3	5.8	5.8	5.8	5.8
	arc min	2.5	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0

Table 5-17-4 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32
50	3.7	5.7	7.3	14	28
80	2.7	3.8	4.8	8.8	19
100	2.4	3.3	4.3	7.9	18
120	-	3.1	3.8	7.2	16
160	-	-	3.4	6.4	14

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

Table 5-17-5 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	2.5	3.8	4.4	8.3	17
80	2.6	3.7	4.9	8.8	19
100	3.1	4.1	5.2	9.6	21
120	-	4.5	5.7	11	22
160	-	-	6.6	12	28

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

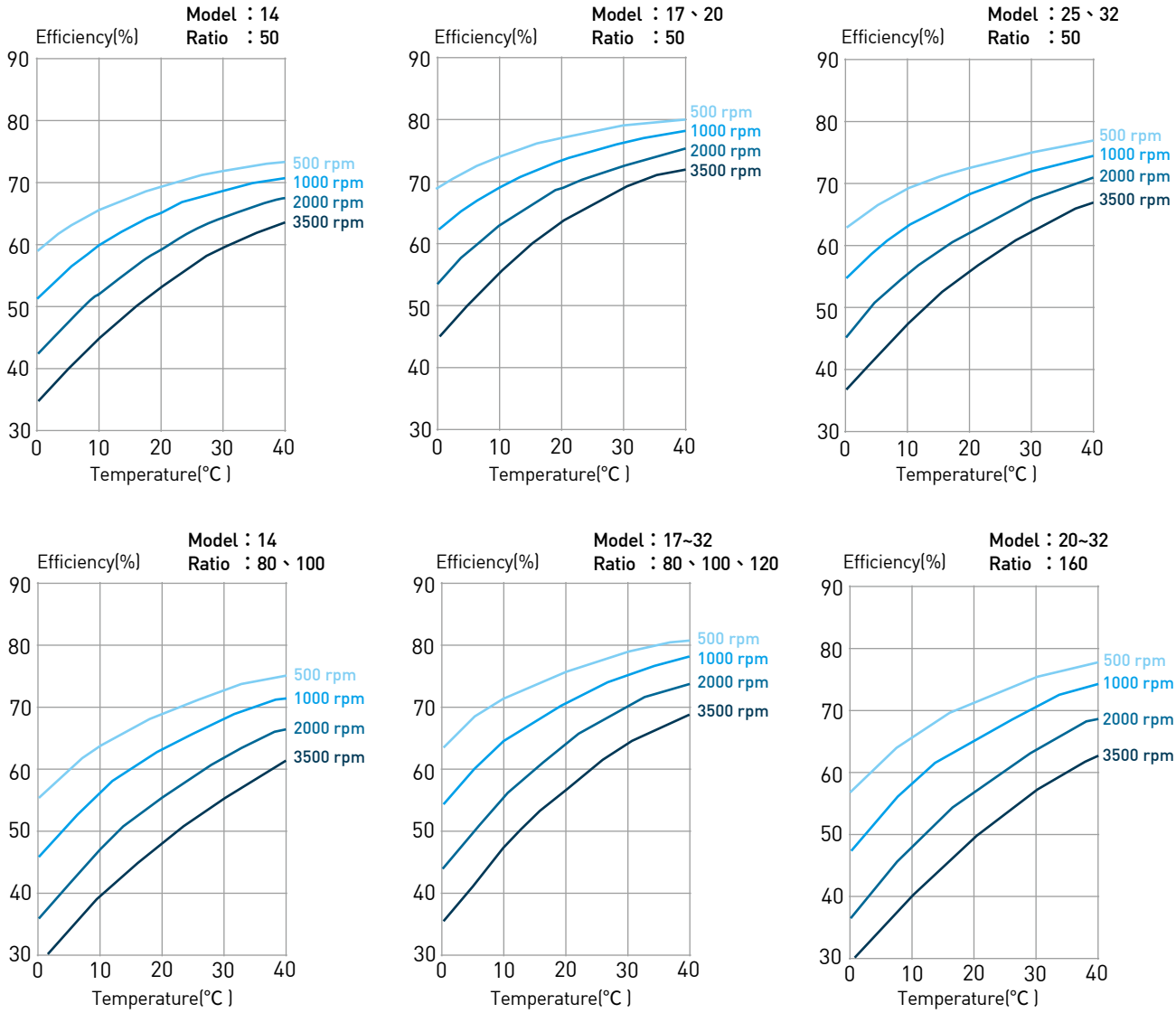
Table 5-17-6 Torsional rigidity

Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.29	0.67	1.1	2.0	4.7
		kgfm/arc min	0.085	0.2	0.32	0.6	1.4
	K_2	$\times 10^4$ Nm/rad	0.37	0.88	1.3	2.7	6.1
		kgfm/arc min	0.11	0.26	0.4	0.8	1.8
	K_3	$\times 10^4$ Nm/rad	0.47	1.2	2.0	3.7	8.4
		kgfm/arc min	0.14	0.34	0.6	1.1	2.5
	θ_1	$\times 10^{-4}$ rad	6.9	5.8	6.4	7.0	6.2
		arc min	2.4	2.0	2.2	2.4	2.1
	θ_2	$\times 10^{-4}$ rad	19	14	19	18	18
		arc min	6.4	4.6	6.6	6.1	6.1
80 up	K_1	$\times 10^4$ Nm/rad	0.4	0.84	1.3	2.7	6.1
		kgfm/arc min	0.12	0.25	0.4	0.8	1.8
	K_2	$\times 10^4$ Nm/rad	0.44	0.94	1.7	3.7	7.8
		kgfm/arc min	0.13	0.28	0.5	1.1	2.3
	K_3	$\times 10^4$ Nm/rad	0.61	1.3	2.5	4.7	11
		kgfm/arc min	0.18	0.39	0.75	1.4	3.3
	θ_1	$\times 10^{-4}$ rad	5.0	4.6	5.4	5.2	4.8
		arc min	1.7	1.6	1.8	1.8	1.7
	θ_2	$\times 10^{-4}$ rad	16	13	15	13	14
		arc min	5.4	4.3	5.0	4.5	4.8

Note : The values are for reference only. The lower limit is 20% under the value in this table.

5-17-2 Efficiency E_R

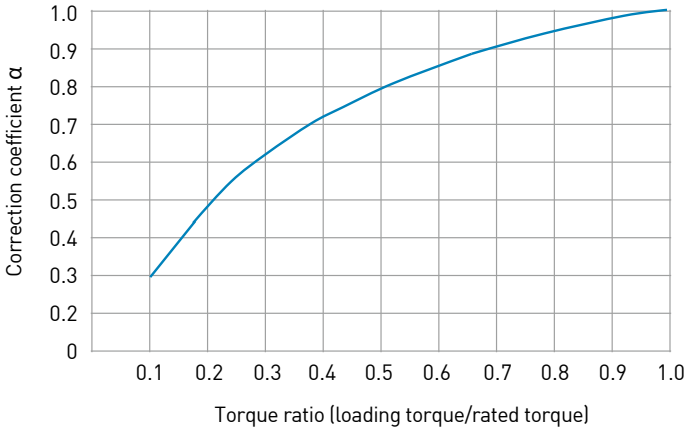
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .



Correction coefficient β

Efficiency correction coefficient β by specification

Efficiency = α x (E_R X β)



5-17-3 No-load operating torque

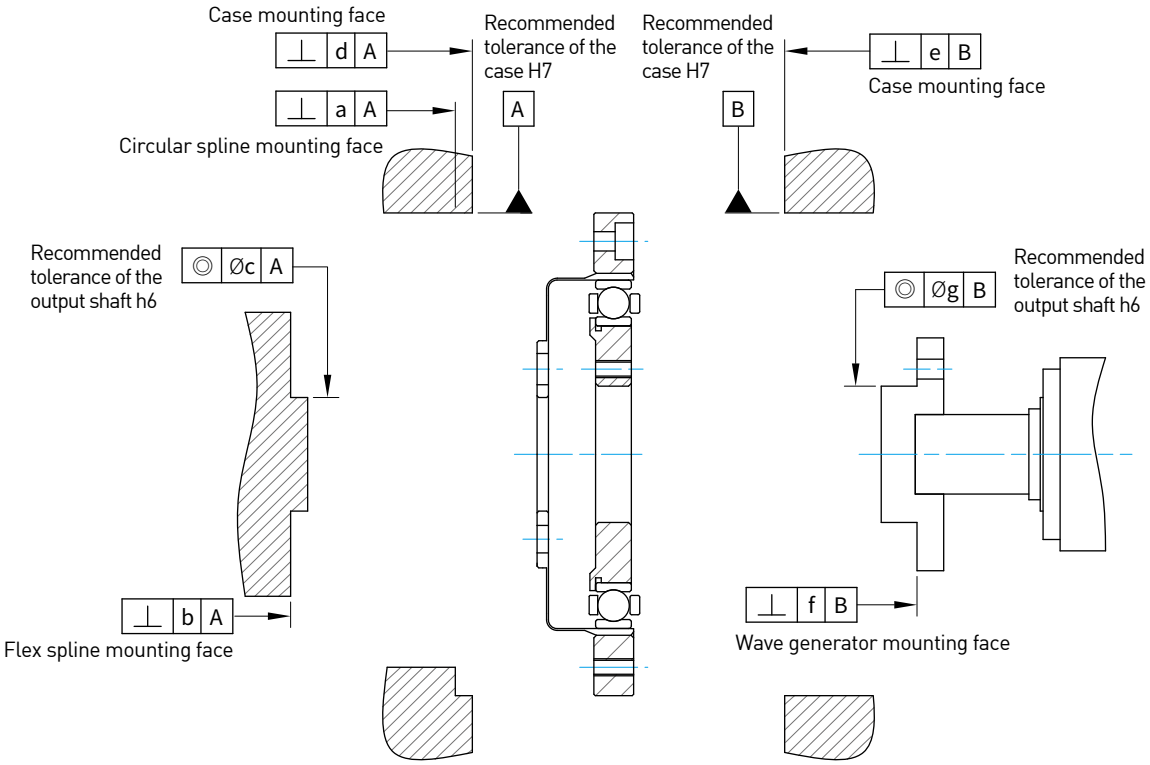
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	2.26	3.75	5.6	10.6	23.4
	1000 r/min	2.86	4.75	7.4	14.6	30.4
	2000 r/min	3.66	6.05	9.9	19.6	40.4
	3500 r/min	4.76	8.35	14.4	26.6	55.4
80	500 r/min	1.8	2.9	4.4	8.4	18.8
	1000 r/min	2.4	3.9	6.2	12.4	25.8
	2000 r/min	3.2	5.2	8.7	17.4	35.8
	3500 r/min	4.3	7.5	13.2	24.4	50.8
100	500 r/min	1.7	2.8	4.2	8	18
	1000 r/min	2.3	3.8	6	12	25
	2000 r/min	3.1	5.1	8.5	17	35
	3500 r/min	4.2	7.4	13	24	50
120	500 r/min	-	2.7	4	7.7	17.4
	1000 r/min	-	3.7	5.8	11.7	24.4
	2000 r/min	-	5	8.3	16.7	34.4
	3500 r/min	-	7.3	12.8	23.7	49.4
160	500 r/min	-	-	3.81	7.28	16.5
	1000 r/min	-	-	5.61	11.28	23.5
	2000 r/min	-	-	8.11	16.28	33.5
	3500 r/min	-	-	12.61	23.28	48.5

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

5-17-4 Installation accuracy

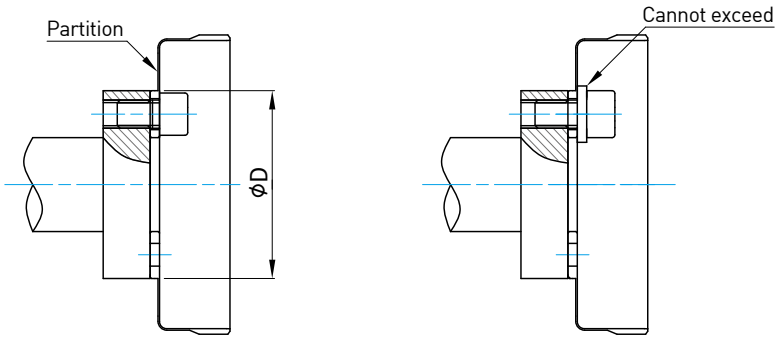


Unit : mm

Mark \ Model	14	17	20	25	32
a	0.011	0.012	0.013	0.014	0.016
b	0.008	0.011	0.014	0.018	0.022
Øc	0.015	0.018	0.019	0.022	0.022
d	0.011	0.015	0.017	0.024	0.026
e	0.011	0.015	0.017	0.024	0.026
f	0.008	0.010	0.010	0.012	0.012
Øg	0.016	0.018	0.019	0.022	0.022

5-17-5 Installation of flexspline

It is recommended to install directly with bolts. The head of the bolt should not exceed Dimension D.



Unit : mm

Mark \ Model	14	17	20	25	32
ØD	23	27.2	32	40	52

Note : The screw head shall not exceed dimension D.

5-17-6 Installation bolt tightening torque

1. Flex spline flange side

- When the load torque is less than the rated performance value in "Peak torque at start/stop" Table 4-1-1, use only bolts for installation.
- If the load torque may reach the rated performance value in "Instantaneous permissible max torque" Table 4-1-1, please use a combination of bolts and pins for installation.

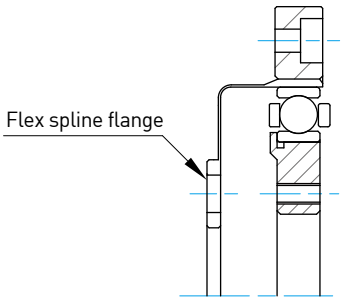


Table 5-17-7 Flex spline flange side bolt tightening torque

Item \ Model		14	17	20	25	32
Number of bolts		9	8	9	9	11
Bolts size		M3	M4	M4	M5	M6
Installation of bolts PCD	mm	17	19.5	24	30	41
Bolts tightening torque	Nm	2.0	4.5	4.5	9.0	15.3
	kgfm	0.20	0.46	0.46	0.92	1.56
Transmission torque	Nm	32	55	76	152	359
	kgfm	3.3	5.6	7.7	16	37

Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or higher.
2. The bolt depth should be at least twice the thread diameter.

2. Circular spline flange side

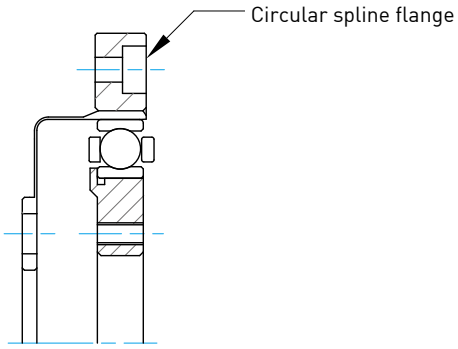


Table 5-17-10 Bolt tightening torque of circular spline flange

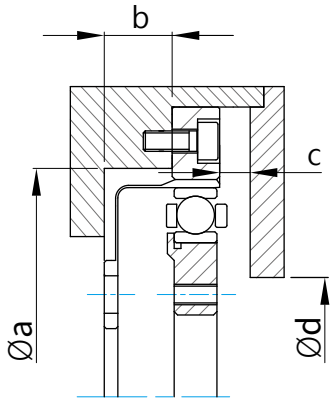
Item \ Model		14	17	20	25	32
Number of bolts		6	8	12	12	12
Bolts size		M3	M3	M3	M3	M4
Installation of bolts PCD	mm	44	54	62	75	100
Bolts tightening torque	Nm	2.0	2.0	2.0	2.0	4.5
	kgfm	0.20	0.20	0.20	0.20	0.46
Transmission torque	Nm	55	90	155	188	422
	kgfm	5.6	9.2	16	19	43

Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or higher.
2. The bolt depth should be at least twice the thread diameter.

5-17-7 Lubrication

1. Recommended dimensions for the inner wall of the case

In order to avoid the splashing of excessive lubricant on other parts during operation. It is recommended to adhere to the following dimensions:

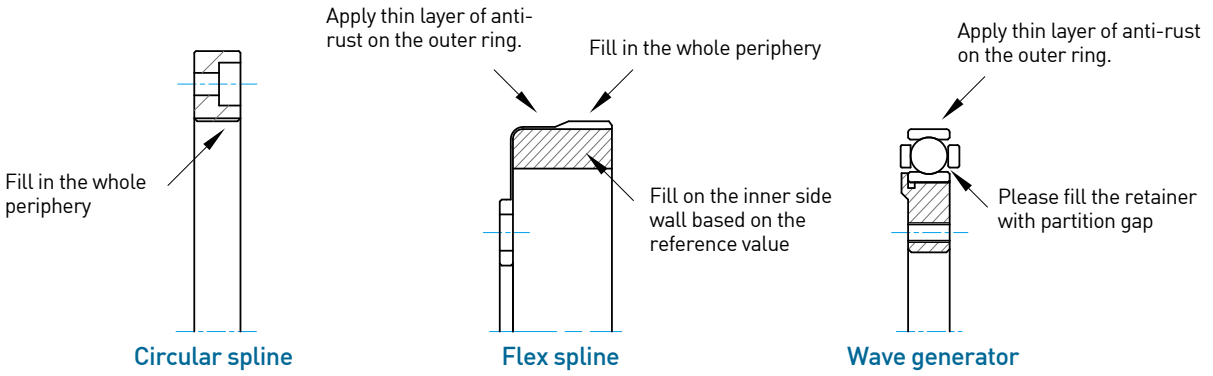


Unit : mm

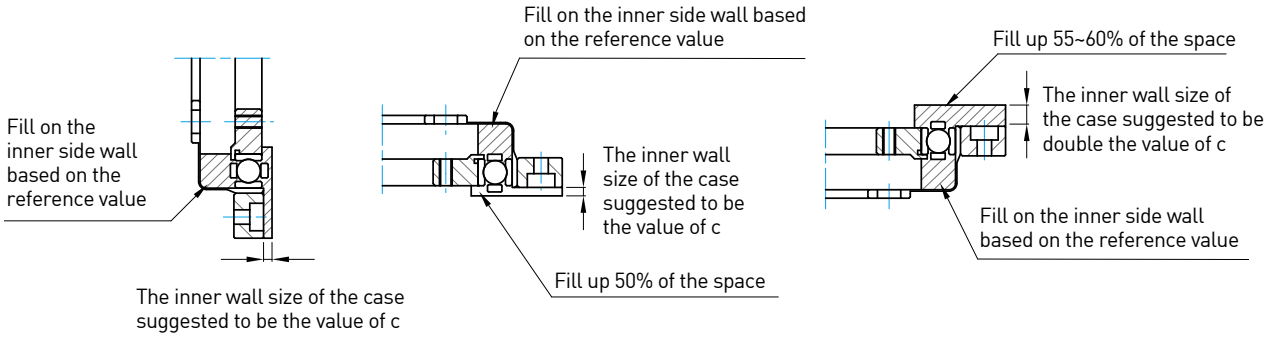
Mark \ Model	14	17	20	25	32
Øa	38	45	53	66	86
b	6.5	7.5	8	10	13
c	1(3)	1(3)	1.5(4.5)	1.5(4.5)	2(6)
$Ød^{+0.5}_{0}$	16	26	30	37	37

Note: The value in ( ) is when the wave generator is facing upward.

2. Lubricant application



3. The key points of different application methods

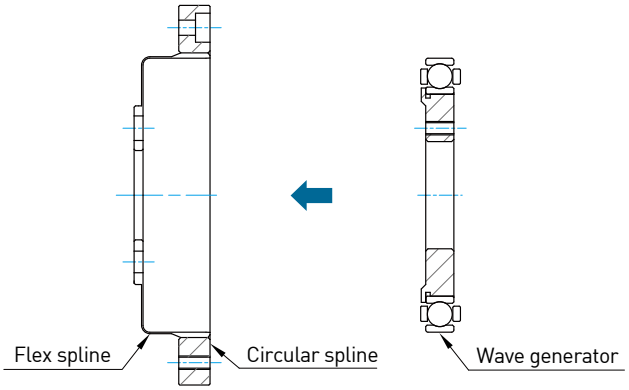


Unit : g

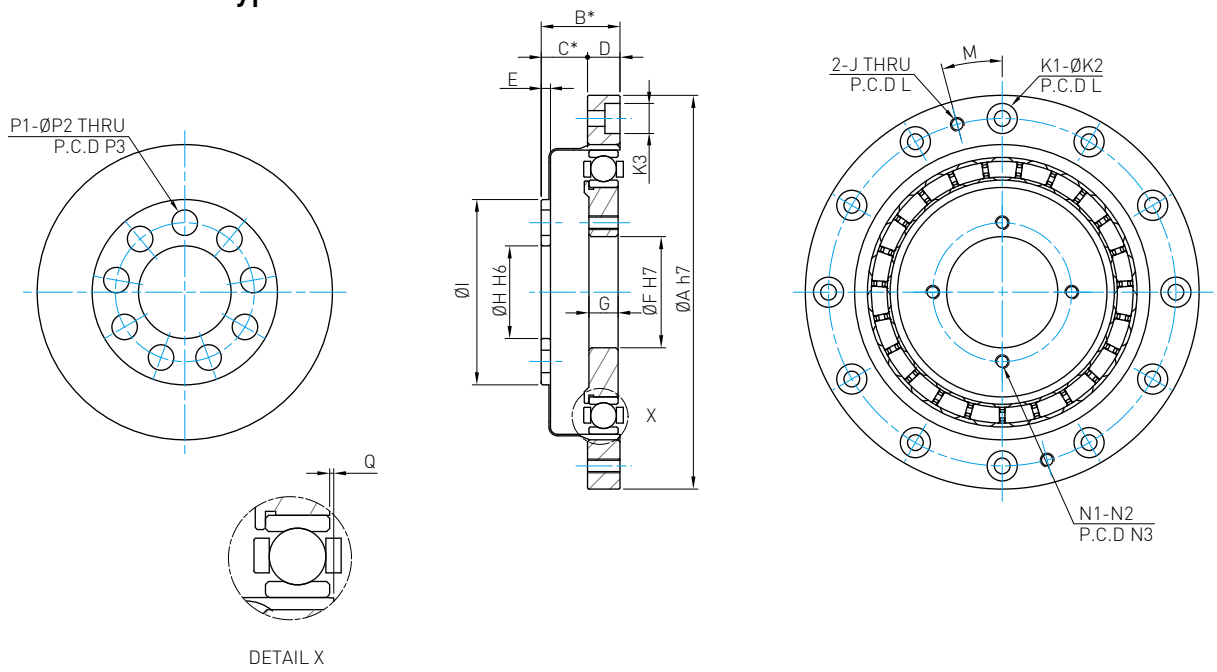
Instructions \ Model		14	17	20	25	32
Used horizontally		3.5	5.2	9	17	37
Used vertical	Wave generator is facing down	3.9	6	10	19	42
	Wave generator is facing up	4.6	7.1	12	22	48

5-17-8 Installation sequence

Install the circular spline and flex spline into the mechanism then install the wave generator.



5-17-9 DTC-CE type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h7	50	60	70	85	110
B*	11	12.5	14	17	22
C*	$6.5^{+0.2}_{0}$	$7.5^{+0.2}_{0}$	$8^{+0.3}_{0}$	$10^{+0.3}_{0}$	$13^{+0.3}_{0}$
D	4.5	5	6	7	9
E	1.4	1.7	2	2	2.5
ØF H7	11	15	20	24	32
G	$4^{0}_{-0.1}$	$5^{0}_{-0.1}$	$5.2^{0}_{-0.1}$	$6.35^{0}_{-0.1}$	$8.6^{0}_{-0.1}$
ØH H6	11	11	16	20	30
ØI	23	27.2	32	40	52
J	M3	M3	M3	M3	M4
K1	6	8	12	12	12
ØK2	3.4	3.4	3.4	3.4	4.5
K3	-	-	6.5	6.5	8
L	44	54	62	75	100
M (Degree)	30°	22.5°	15°	15°	15°
N1	4	4	4	4	4
N2	M3	M3	M3	M3	M4
N3 (P.C.D)	17	21	26	30	40
P1	9	8	9	9	11
ØP2	3.4	4.5	4.5	5.5	6.6
P3 (P.C.D)	17	19.5	24	30	41
Q	$0.3^{+0.2}_{0}$	$0.3^{+0.2}_{0}$	$0.3^{+0.2}_{0}$	$0.4^{+0.2}_{0}$	$0.5^{+0.2}_{0}$
Moment of inertia ($\times 10^{-4}$ m^2)	0.021	0.054	0.090	0.282	1.09
Weight (Kg)	0.06	0.10	0.13	0.24	0.51

*The dimensions B and C of the mark indicate the fitting positions and permissible tolerances in the axial direction.

5-18 DTC-PE Type

5-18-1 Technical data

Table 5-18-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6		
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6		
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500
	80	15	1.5	29	3.0	19	1.9	61	6.2		
	100	16	1.6	37	3.8	27	2.8	71	7.2		
	120	16	1.6	37	3.8	27	2.8	71	7.2		
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500
	80	24	2.4	51	5.2	33	3.4	89	9.1		
	100	28	2.9	57	5.8	34	3.5	95	9.7		
	120	28	2.9	60	6.1	34	3.5	95	9.7		
	160	28	2.9	64	6.5	34	3.5	95	9.7		
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500
	80	44	4.5	96	9.8	60	6.1	179	18		
	100	47	4.8	110	11	75	7.6	184	19		
	120	47	4.8	117	12	75	7.6	204	21		
	160	47	4.8	123	13	75	7.6	204	21		
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500
	80	83	8.5	213	22	117	12	398	41		
	100	96	9.8	233	24	151	15	420	43		
	120	96	9.8	247	25	151	15	445	45		
	160	96	9.8	261	27	151	15	445	45		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-18-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32
Pitch circle diameter of roller		Dpw	m	0.035	0.0425	0.05	0.062	0.08
Offset amount		R	m	0.0095	0.0099	0.0102	0.0130	0.0144
Basic load ratings	Dynamic load	C	kN	4.7	5.3	5.8	9.6	15.0
			kgf	480	540	590	980	1530
	Static load	Co	kN	6.1	7.6	9.0	15.1	25.0
			kgf	620	770	920	1540	2550
Moment rigidity		K	$\times 10^4$ Nm/rad	4.38	7.75	12.8	24.2	53.9
			kgfm/arc min	1.3	2.3	3.8	7.2	16
Permissible dynamic tilting moment		M	Nm	41	64	91	156	313
Permissible static tilting moment		Mo	Nm	50	88	130	230	471
Permissible axial load		Fa	kN	1.01	1.13	1.24	2.05	3.21
Permissible radial load		Fr	kN	0.674	0.758	0.828	1.38	2.15

Table 5-18-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-18-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32
50	$\times 10^{-4}$ rad	7.3	5.8	5.8	5.8	5.8
	arc min	2.5	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0

Table 5-18-5 Starting torque

Unit : cNm

Reduction ratio	Model	14	17	20	25	32
50		4.4	6.7	8.9	16	32
80		3.2	4.4	5.7	10	22
100		2.8	3.8	5.1	9.1	20
120		-	3.6	4.5	8.2	17
160		-	-	3.9	7.2	15

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

Table 5-18-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	2.9	4.3	5.2	9.5	19
80	2.9	4.1	5.7	10	21
100	3.5	4.6	6.0	11	23
120	-	5.1	6.4	12	24
160	-	-	7.4	13	30

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

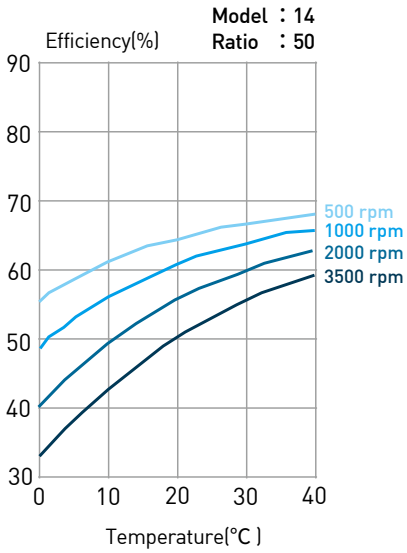
Table 5-18-7 Torsional rigidity

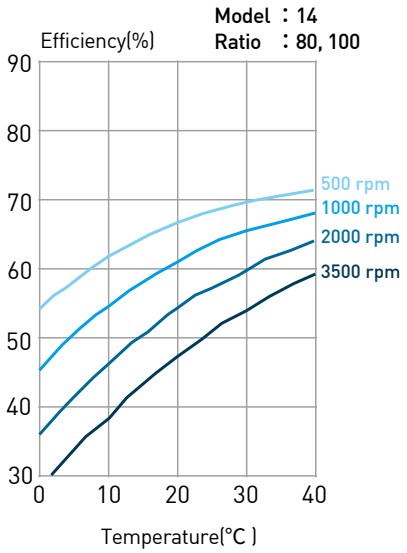
Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.29	0.67	1.1	2.0	4.7
		kgfm/arc min	0.085	0.2	0.32	0.6	1.4
	K_2	$\times 10^4$ Nm/rad	0.37	0.88	1.3	2.7	6.1
		kgfm/arc min	0.11	0.26	0.4	0.8	1.8
	K_3	$\times 10^4$ Nm/rad	0.47	1.2	2.0	3.7	8.4
		kgfm/arc min	0.14	0.34	0.6	1.1	2.5
	θ_1	$\times 10^{-4}$ rad	6.9	5.8	6.4	7.0	6.2
		arc min	2.4	2.0	2.2	2.4	2.1
	θ_2	$\times 10^{-4}$ rad	19	14	19	18	18
		arc min	6.4	4.6	6.6	6.1	6.1
80 up	K_1	$\times 10^4$ Nm/rad	0.4	0.84	1.3	2.7	6.1
		kgfm/arc min	0.12	0.25	0.4	0.8	1.8
	K_2	$\times 10^4$ Nm/rad	0.44	0.94	1.7	3.7	7.8
		kgfm/arc min	0.13	0.28	0.5	1.1	2.3
	K_3	$\times 10^4$ Nm/rad	0.61	1.3	2.5	4.7	11
		kgfm/arc min	0.18	0.39	0.75	1.4	3.3
	θ_1	$\times 10^{-4}$ rad	5.0	4.6	5.4	5.2	4.8
		arc min	1.7	1.6	1.8	1.8	1.7
	θ_2	$\times 10^{-4}$ rad	16	13	15	13	14
		arc min	5.4	4.3	5.0	4.5	4.8

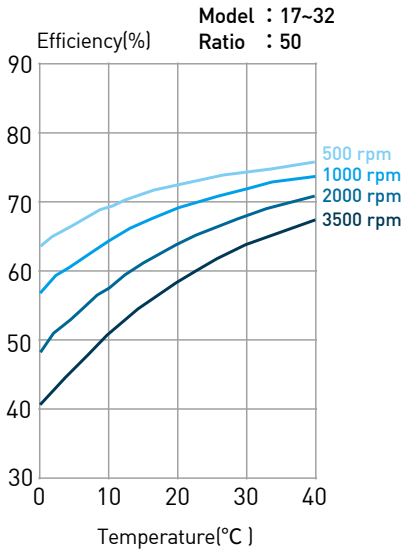
Note : The values are for reference only. The lower limit is 20% under the value in this table.

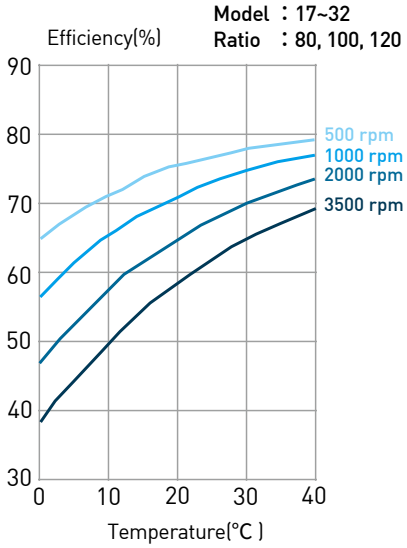
5-18-2 Efficiency E_R

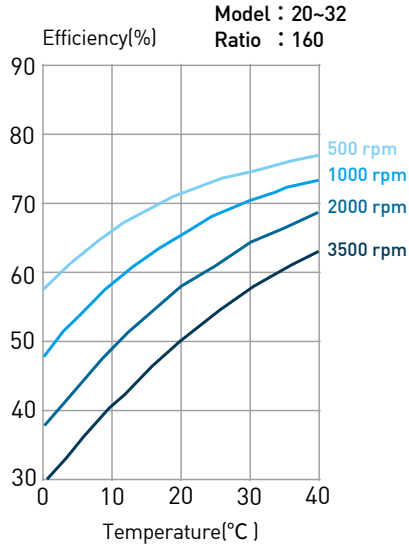
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .







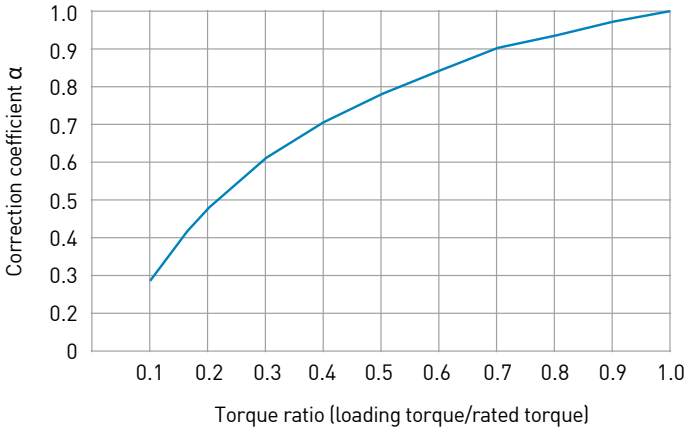




Correction coefficient β

Efficiency correction coefficient β by model

Efficiency = α x (E_R X β)



Unit : %

Reduction ratio \ Model	14	17	20	25	32
50	0.0	3.0	2.4	-0.3	-1.4
80	3.1	2.3	2.3	1.8	-0.1
100	0.0	0.4	1.8	-0.1	-0.8
120	-	-2.2	-0.7	-2.7	-3.4
160	-	-	1.3	-0.7	-1.6

5-18-3 No-load operating torque

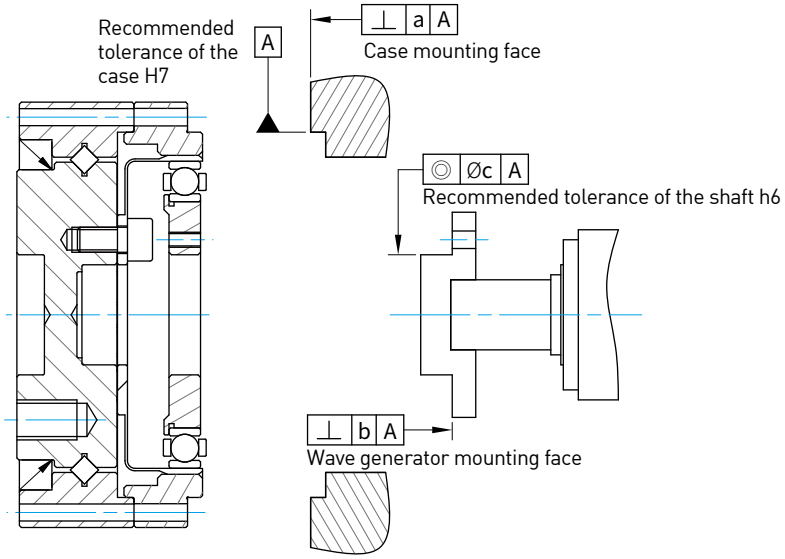
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	2.93	4.7	7.4	13.3	26.8
	1000 r/min	3.43	5.7	9.1	17.8	33.3
	2000 r/min	4.43	7.5	11.8	21.8	45.3
	3500 r/min	5.73	9.5	16.3	28.8	59.3
80	500 r/min	2.2	3.5	5.5	10.2	20.8
	1000 r/min	2.7	4.5	7.2	14.7	27.3
	2000 r/min	3.7	6.3	9.9	18.7	39.3
	3500 r/min	5	8.3	14.4	25.7	53.3
100	500 r/min	2	3.2	5.1	9.5	19.5
	1000 r/min	2.5	4.2	6.8	14	26
	2000 r/min	3.5	6	9.5	18	38
	3500 r/min	4.8	8	14	25	52
120	500 r/min	-	3	4.8	9	18.6
	1000 r/min	-	4	6.5	13.5	25.1
	2000 r/min	-	5.8	9.2	17.5	37.1
	3500 r/min	-	7.8	13.7	24.5	51.1
160	500 r/min	-	-	4.4	8.3	17.3
	1000 r/min	-	-	6.1	12.8	23.8
	2000 r/min	-	-	8.8	16.8	35.8
	3500 r/min	-	-	13.3	23.8	49.8

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

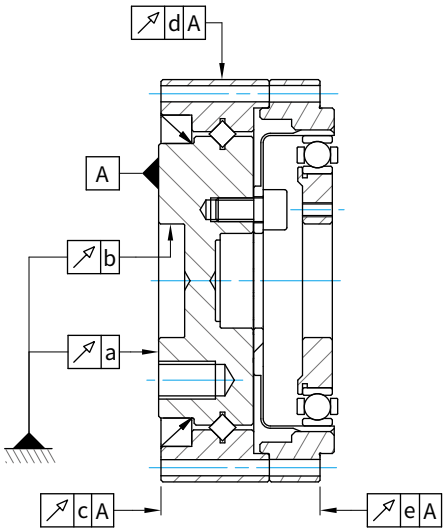
5-18-4 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.008	0.010	0.012	0.012	0.012
Øc	0.016	0.018	0.019	0.022	0.022

5-18-5 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32
a	0.010	0.010	0.010	0.015	0.015
b	0.010	0.012	0.012	0.013	0.013
c	0.007	0.007	0.007	0.007	0.007
d	0.010	0.010	0.010	0.010	0.010
e	0.025	0.025	0.025	0.035	0.037

5-18-6 Installation bolt tightening torque

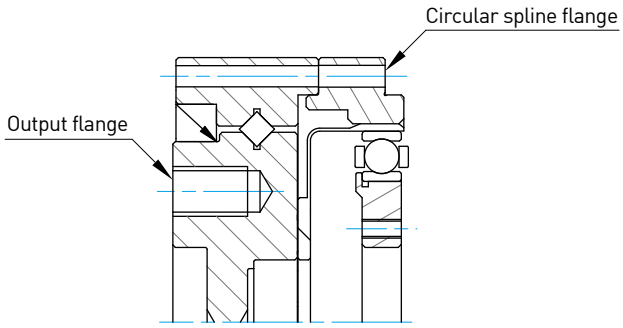


Table 5-18-8 Bolt tightening torque for Output flange

Item \ Model		14	17	20	25	32
Number of bolts		10	8	8	8	10
Bolts size		M3	M5	M6	M8	M8
Installation of bolts PCD	mm	25	27	34	42	57
Bolts tightening torque	Nm	2.0	9.0	15.3	37	37
	kgfm	0.20	0.92	1.56	3.8	3.8
Transmission torque	Nm	52	121	216	485	823
	kgfm	5.3	12.4	22.1	49.5	84.0

Table 5-18-9 Bolt tightening torque for Circular spline flange

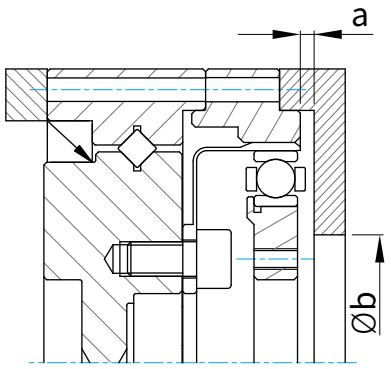
Item \ Model		14	17	20	25	32
Number of bolts		6	10	12	18	18
Bolts size		M3	M3	M3	M3	M4
Installation of bolts PCD	mm	49	56	64	79	104
Bolts tightening torque	Nm	2.0	2.0	2.0	2.0	4.5
	kgfm	0.20	0.20	0.20	0.20	0.46
Transmission torque	Nm	61	116	160	296	658
	kgfm	6.2	11.9	16.3	30.0	67.0

Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or higher.
2. The bolt depth should be at least twice the thread diameter.

5-18-7 Lubrication

1. Recommended dimensions for the inner wall of the case

Keep the space between the reducer and mounting flange as narrow as possible so that grease can be kept inside during operation.

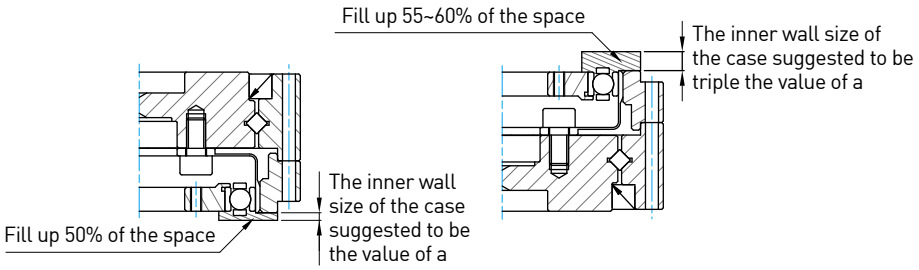


Unit : mm

Mark \ Model	14	17	20	25	32
a ※1	1	1	1.5	1.5	2
a ※2	3	3	4.5	4.5	6
Øb	16	26	30	37	37

※1 Center shaft horizontal or vertical: when the wave generator is facing downward
※2 Center shaft vertical: when the wave generator is facing upward

2. The key points of different application methods

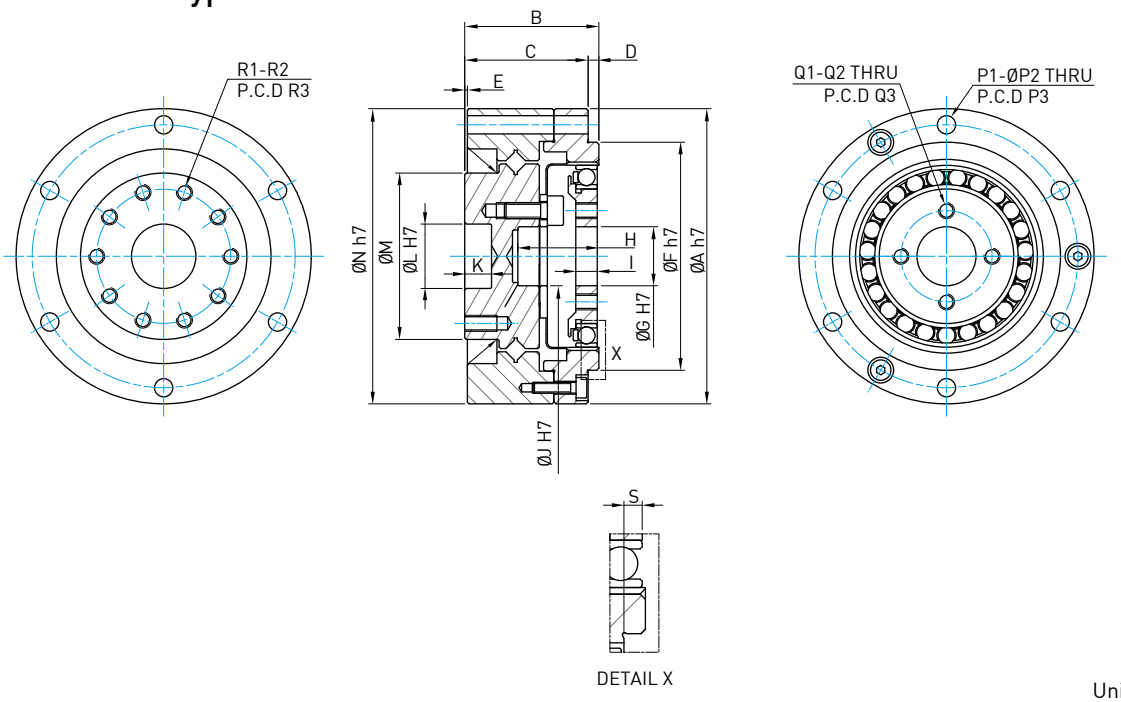


Unit : g

Instructions \ Model		14	17	20	25	32
Used vertical	Wave generator is facing down	0.4	0.8	1	2	5
	Wave generator is facing up	1.1	1.9	3	5	11

Note : Pre-filled with grease before shipment; no additional lubrication is required for horizontal installation.

5-18-8 DTC-PE type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h7	55	62	70	85	112
B	25	26.5	29.7	37.1	43
C	23	24.5	27.7	34.1	40
D	2	2	2	3	3
E	0.5	0.5	0.5	0.5	1
ØF h7	42.5	49.5	58	73	96
ØG H7	11	15	20	24	32
H	14.8	16.3	18.8	23.7	30.6
I	$4^{\ 0}_{-0.1}$	$5^{\ 0}_{-0.1}$	$5.2^{\ 0}_{-0.1}$	$6.3^{\ 0}_{-0.1}$	$8.6^{\ 0}_{-0.1}$
ØJ H7	11	11	16	20	30
K	5	5	5	5.5	5.5
ØL H7	12	14	18	24	32
ØM	31	38	45	58	78
ØN h7	55	62	70	85	112
P1	6	10	12	18	18
ØP2	3.4	3.4	3.4	3.4	4.5
P3 (P.C.D)	49	56	64	79	104
Q1	4	4	4	4	4
Q2	M3	M3	M3	M3	M4
Q3 (P.C.D)	17	21	26	30	40
R1	10	8	8	8	10
R2	M3 x 7 DP	M5 x 8 DP	M6 x 9 DP	M8 x 12 DP	M8 x 12 DP
R3 (P.C.D)	25	27	34	42	57
S	$1.7^{\ 0}_{-0.2}$	$1.7^{\ 0}_{-0.2}$	$1.7^{\ 0}_{-0.2}$	$2.6^{\ 0}_{-0.2}$	$2.5^{\ 0}_{-0.2}$
Moment of inertia ($\times 10^{-4}$ m^2)	0.021	0.054	0.090	0.282	1.09
Weight (Kg)	0.35	0.46	0.65	1.2	2.4

5-19 DTC-PE-M Type

5-19-1 Technical data

Table 5-19-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop※2		Permissible maximum value of average load torque※3		Instantaneous permissible max. torque※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	3.7	0.38	12	1.2	4.8	0.49	24	2.4	8500	3500
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6		
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6		
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500
	80	15	1.5	29	3.0	19	1.9	61	6.2		
	100	16	1.6	37	3.8	27	2.8	71	7.2		
	120	16	1.6	37	3.8	27	2.8	71	7.2		
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500
	80	24	2.4	51	5.2	33	3.4	89	9.1		
	100	28	2.9	57	5.8	34	3.5	95	9.7		
	120	28	2.9	60	6.1	34	3.5	95	9.7		
	160	28	2.9	64	6.5	34	3.5	95	9.7		
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500
	80	44	4.5	96	9.8	60	6.1	179	18		
	100	47	4.8	110	11	75	7.6	184	19		
	120	47	4.8	117	12	75	7.6	204	21		
	160	47	4.8	123	13	75	7.6	204	21		
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500
	80	83	8.5	213	22	117	12	398	41		
	100	96	9.8	233	24	151	15	420	43		
	120	96	9.8	247	25	151	15	445	45		
	160	96	9.8	261	27	151	15	445	45		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-19-2 Crossed roller bearing specifications

Item			Model	14	17	20	25	32
Pitch circle diameter of roller		Dpw	m	0.050	0.060	0.070	0.085	0.0111
Offset amount		R	m	0.0118	0.0123	0.0128	0.0140	0.0168
Basic load ratings	Dynamic load	C	kN	5.8	10.4	14.6	21.8	38.2
			kgf	590	1060	1490	2230	3900
	Static load	Co	kN	9.0	16.3	22.0	35.8	65.4
			kgf	920	1670	2250	3660	6680
Moment rigidity		K	$\times 10^4$ Nm/rad	12.8	15.4	25.2	39.2	100
			kgfm/arc min	3.8	4.6	7.5	11.6	29.6
Permissible dynamic tilting moment		M	Nm	91	124	187	258	580
Permissible static tilting moment		Mo	Nm	131	180	264	383	1000
Permissible axial load		Fa	kN	1.24	2.22	3.12	4.66	8.17
Permissible radial load		Fr	kN	0.828	1.49	2.09	3.12	5.47

Table 5-19-3 Angle transmission accuracy

Reduction ratio	Model	14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-19-4 Hysterisis loss

Reduction ratio	Model	14	17	20	25	32
50	$\times 10^{-4}$ rad	7.3	5.8	5.8	5.8	5.8
	arc min	2.5	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0

Table 5-19-5 Starting torque

Unit : cNm

Reduction ratio	Model	14	17	20	25	32
50		5.3	7.5	9.7	17	34
80		3.8	4.9	6.2	11	23
100		3.2	4.2	5.5	9.6	21
120		-	4.0	4.8	8.6	18
160		-	-	4.1	7.4	16

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

Table 5-19-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	3.3	4.7	5.6	10	20
80	3.3	4.5	6.1	10	22
100	3.9	5.0	6.4	11	24
120	-	5.6	6.8	12	25
160	-	-	7.8	14	31

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

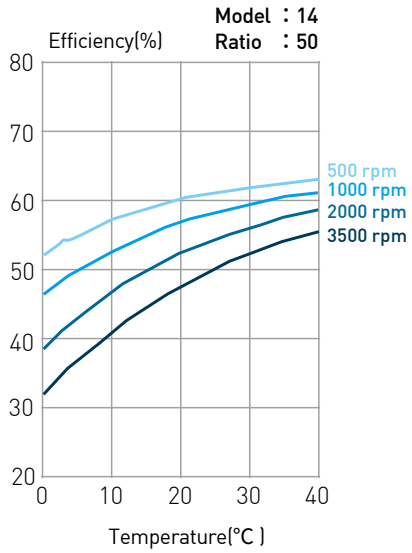
Table 5-19-7 Torsional rigidity

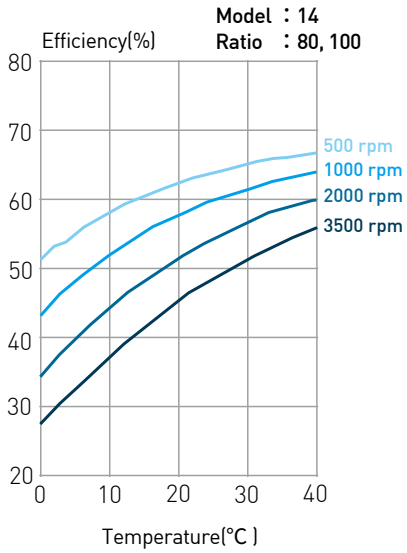
Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.29	0.67	1.1	2.0	4.7
		kgfm/arc min	0.085	0.2	0.32	0.6	1.4
	K_2	$\times 10^4$ Nm/rad	0.37	0.88	1.3	2.7	6.1
		kgfm/arc min	0.11	0.26	0.4	0.8	1.8
	K_3	$\times 10^4$ Nm/rad	0.47	1.2	2.0	3.7	8.4
		kgfm/arc min	0.14	0.34	0.6	1.1	2.5
	θ_1	$\times 10^{-4}$ rad	6.9	5.8	6.4	7.0	6.2
		arc min	2.4	2.0	2.2	2.4	2.1
	θ_2	$\times 10^{-4}$ rad	19	14	19	18	18
		arc min	6.4	4.6	6.6	6.1	6.1
80 up	K_1	$\times 10^4$ Nm/rad	0.4	0.84	1.3	2.7	6.1
		kgfm/arc min	0.12	0.25	0.4	0.8	1.8
	K_2	$\times 10^4$ Nm/rad	0.44	0.94	1.7	3.7	7.8
		kgfm/arc min	0.13	0.28	0.5	1.1	2.3
	K_3	$\times 10^4$ Nm/rad	0.61	1.3	2.5	4.7	11
		kgfm/arc min	0.18	0.39	0.75	1.4	3.3
	θ_1	$\times 10^{-4}$ rad	5.0	4.6	5.4	5.2	4.8
		arc min	1.7	1.6	1.8	1.8	1.7
	θ_2	$\times 10^{-4}$ rad	16	13	15	13	14
		arc min	5.4	4.3	5.0	4.5	4.8

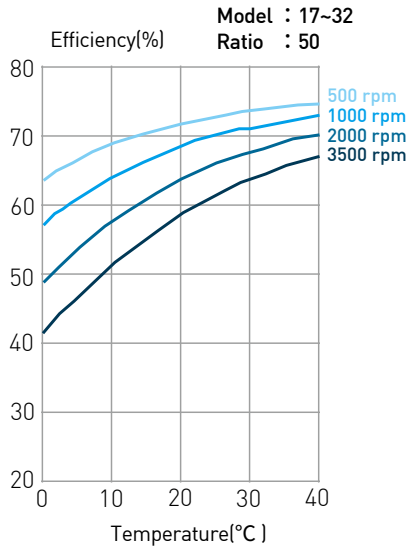
Note : The values are for reference only. The lower limit is 20% under the value in this table.

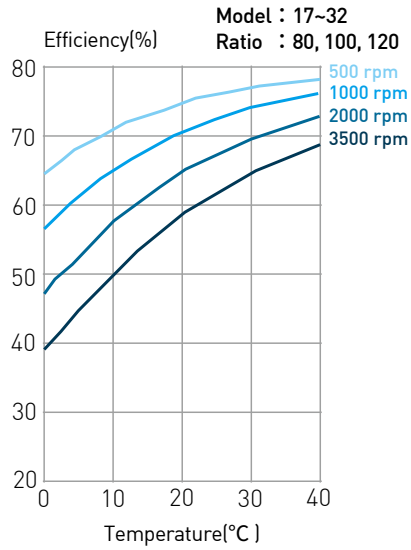
5-19-2 Efficiency E_R

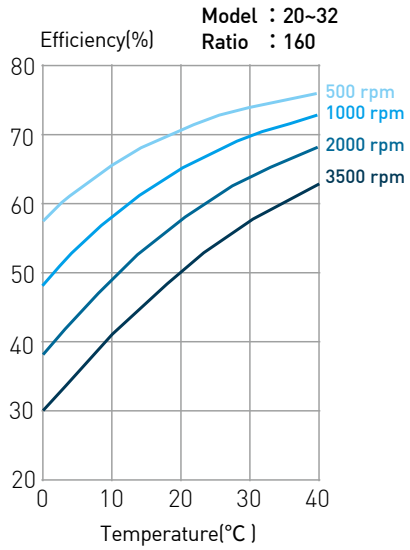
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .







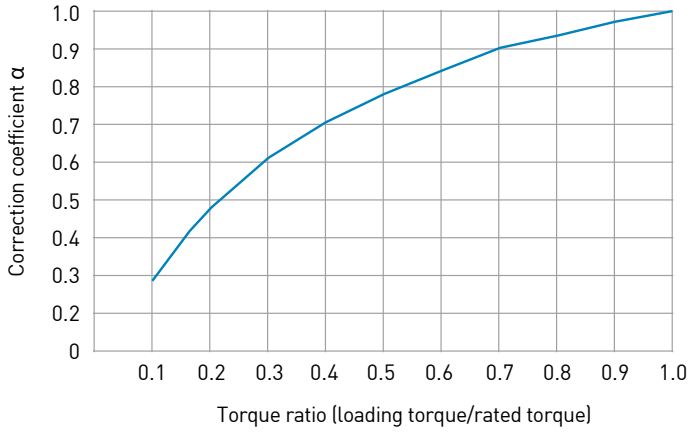




Correction coefficient β

Efficiency correction coefficient β by model

Efficiency = α x (E_R X β)



Unit : %

Reduction ratio \ Model	14	17	20	25	32
50	0.0	1.9	1.8	-0.1	-1.9
80	2.9	1.6	1.9	1.6	-0.3
100	0.0	-0.2	1.5	-0.3	-0.9
120	-	-2.8	-0.9	-2.8	-3.5
160	-	-	1.1	-0.8	-1.6

5-19-3 No-load operating torque

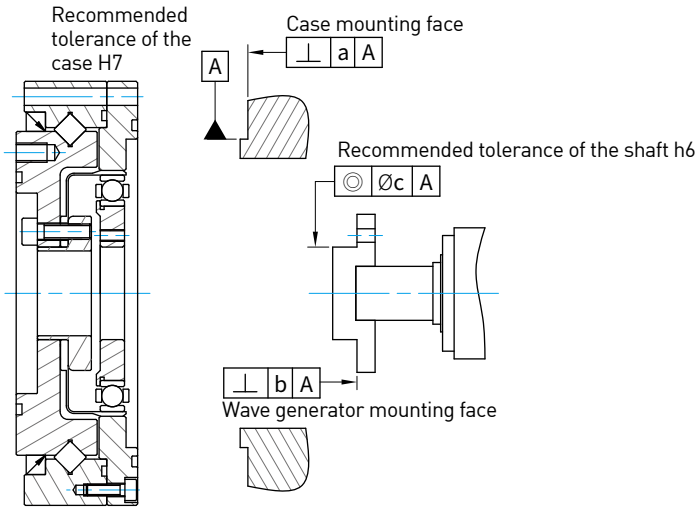
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	3.9	5.4	8.1	14.3	29.2
	1000 r/min	4.4	6.3	9.7	18.3	36.2
	2000 r/min	5.4	8	12.4	22.3	46.2
	3500 r/min	6.5	10	16.6	29.3	60.2
80	500 r/min	2.8	4	6	10.8	22.5
	1000 r/min	3.3	4.9	7.6	14.8	29.5
	2000 r/min	4.3	6.6	10.3	18.8	39.5
	3500 r/min	5.4	8.6	14.5	25.8	53.5
100	500 r/min	2.5	3.6	5.5	10	21
	1000 r/min	3	4.5	7.1	14	28
	2000 r/min	4	6.2	9.8	18	38
	3500 r/min	5.1	8.2	14	25	52
120	500 r/min	-	3.3	5.1	9.4	19.9
	1000 r/min	-	4.2	6.7	13.4	26.9
	2000 r/min	-	5.9	9.4	17.4	36.9
	3500 r/min	-	7.9	13.6	24.4	50.9
160	500 r/min	-	-	4.66	8.7	18.5
	1000 r/min	-	-	6.26	12.7	25.5
	2000 r/min	-	-	8.96	16.7	35.5
	3500 r/min	-	-	13.16	23.7	49.5

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

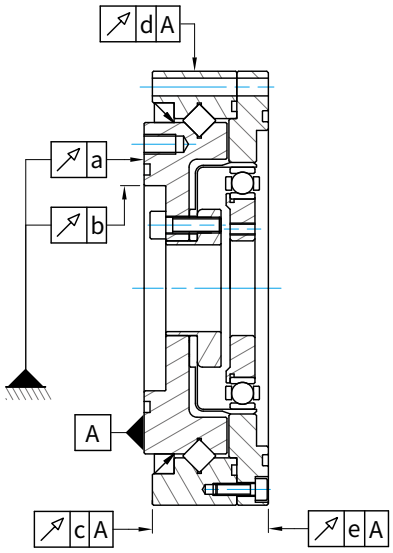
5-19-4 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32
a	0.011	0.015	0.017	0.024	0.026
b	0.008	0.010	0.012	0.012	0.012
Øc	0.016	0.018	0.019	0.022	0.022

5-19-5 Mechanical precision



Unit : mm

Mark \ Model	14	17	20	25	32
a	0.010	0.010	0.010	0.015	0.015
b	0.010	0.010	0.010	0.010	0.013
c	0.010	0.010	0.010	0.010	0.013
d	0.010	0.010	0.010	0.010	0.013
e	0.031	0.031	0.031	0.041	0.047

5-19-6 Installation bolt tightening torque

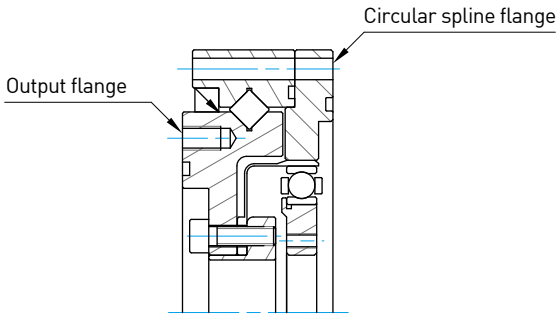


Table 5-19-8 Bolt tightening torque for Output flange

Item \ Model		14	17	20	25	32
Number of bolts		8	10	8	8	8
Bolts size		M3	M3	M4	M5	M6
Installation of bolts PCD	mm	42	50	60	73	96
Bolts tightening torque	Nm	2.0	2.0	4.5	9.0	15.3
	kgfm	0.20	0.20	0.46	0.9	1.56
Transmission torque	Nm	70	104	168	328	612
	kgfm	7.1	10.6	17.2	33.5	62.4

Table 5-19-9 Bolt tightening torque for Circular spline flange

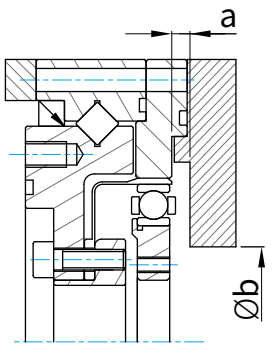
Item \ Model		14	17	20	25	32
Number of bolts		6	8	8	10	10
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	64	74	84	102	132
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0
	kgfm	0.20	0.20	0.20	0.46	0.9
Transmission torque	Nm	80	123	140	358	742
	kgfm	8.2	12.6	14.3	36.6	75.7

Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or higher.
2. The bolt depth should be at least twice the thread diameter.

5-19-7 Lubrication

1. Recommended dimensions for the inner wall of the case

Keep the space between the reducer and mounting flange as narrow as possible so that grease can be kept inside during operation.

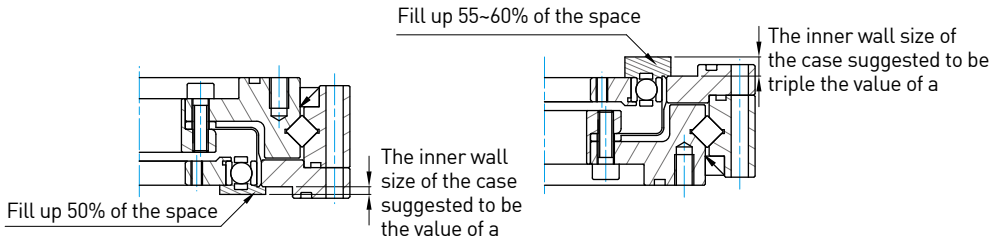


Unit : mm

Mark \ Model	14	17	20	25	32
a ※1	1	1	1.5	1.5	2
a ※2	3	3	4.5	4.5	6
Øb	16	26	30	37	37

※1 Center shaft horizontal or vertical: when the wave generator is facing downward
※2 Center shaft vertical: when the wave generator is facing upward

2. The key points of different application methods

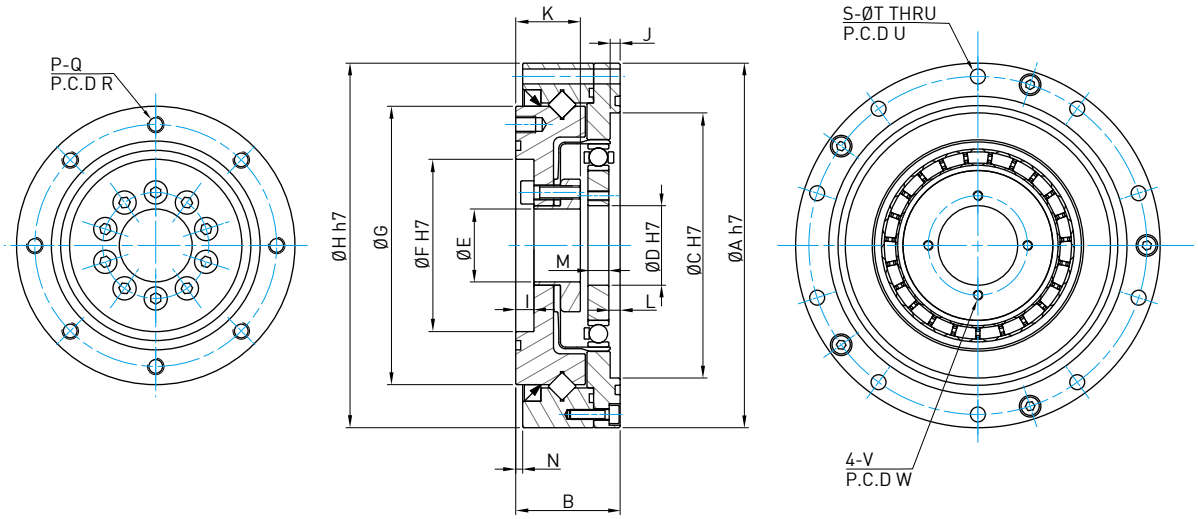


Unit : g

Instructions \ Model		14	17	20	25	32
Used vertical	Wave generator is facing down	0.4	0.8	1	2	5
	Wave generator is facing up	1.1	1.9	3	5	11

Note : Pre-filled with grease before shipment; no additional lubrication is required for horizontal installation.

5-19-8 DTC-PE-M type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h7	70	80	90	110	142
B	22	22.7	26.8	31.5	37
ØC H7	48	56	64	80	106
ØD H7	11	15	20	24	32
ØE	9	9	18	22	29
ØF H7	30	34	40	52	70
ØG	49	59	69	84	110
ØH h7	70	80	90	110	142
I	4.9	5.4	4.8	5.5	6
J	2.5	2.5	2.5	3	3
K	12.9	13.4	16.8	19.5	22
L	$2.8^{+0.2}_{0}$	$2.8^{+0.2}_{0}$	$2.8^{+0.2}_{0}$	$3.4^{+0.2}_{0}$	$3.5^{+0.2}_{0}$
M	$4^{0}_{-0.1}$	$5^{0}_{-0.1}$	$5.2^{0}_{-0.1}$	$6.3^{0}_{-0.1}$	$8.6^{0}_{-0.1}$
N	0.5	0.5	2.3	2.1	2.8
P	8	10	8	8	8
Q	M3 x 5 DP	M3 x 6 DP	M4 x 8 DP	M5 x 8 DP	M6 x 10 DP
R (P.C.D)	42	50	60	73	96
S	6	8	8	10	10
ØT	3.4	3.4	3.4	4.5	5.5
U (P.C.D)	64	74	84	102	132
V	M3	M3	M3	M3	M4
W (P.C.D)	17	21	26	30	40
Moment of inertia ($\times 10^{-4}$ m^2)	0.021	0.054	0.090	0.282	1.09
Weight (Kg)	0.5	0.66	0.94	1.7	3.3

5-20 DTH-PE Type

5-20-1 Technical data

Table 5-20-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	3.7	0.38	12	1.2	4.8	0.49	23	2.3	8500	3500
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6		
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6		
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500
	80	15	1.5	29	3.0	19	1.9	61	6.2		
	100	16	1.6	37	3.8	27	2.8	71	7.2		
	120	16	1.6	37	3.8	27	2.8	71	7.2		
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500
	80	24	2.4	51	5.2	33	3.4	89	9.1		
	100	28	2.9	57	5.8	34	3.5	95	9.7		
	120	28	2.9	60	6.1	34	3.5	95	9.7		
	160	28	2.9	64	6.5	34	3.5	95	9.7		
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500
	80	44	4.5	96	9.8	60	6.1	179	18		
	100	47	4.8	110	11	75	7.6	184	19		
	120	47	4.8	117	12	75	7.6	204	21		
	160	47	4.8	123	13	75	7.6	204	21		
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500
	80	83	8.5	213	22	117	12	398	41		
	100	96	9.8	233	24	151	15	420	43		
	120	96	9.8	247	25	151	15	445	45		
	160	96	9.8	261	27	151	15	445	45		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-20-2 Crossed roller bearing specifications

Item \ Model				14	17	20	25	32
Pitch circle diameter of roller		Dpw	m	0.0503	0.061	0.07	0.086	0.112
Offset amount		R	m	0.0111	0.0115	0.011	0.0121	0.0173
Basic load ratings	Dynamic load	C	kN	2.9	5.2	7.3	10.9	19.1
			kgf	296	530	744	1111	1948
	Static load	Co	kN	4.3	8.1	11	17.9	32.7
			kgf	438	826	1122	1825	3334
Moment rigidity		K	$\times 10^4$ Nm/rad	7.08	12.7	21	31	82.1
			kgfm/arc min	2.1	3.8	6.2	9.2	24.4
Permissible dynamic tilting moment		M	Nm	37	62	93	129	290
Permissible static tilting moment		Mo	Nm	55	101	161	210	503
Permissible axial load		Fa	kN	0.62	1.111	1.56	2.329	4.08
Permissible radial load		Fr	kN	0.415	0.744	1.045	1.56	2.734

Table 5-20-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-20-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32
50	$\times 10^{-4}$ rad	7.3	5.8	5.8	5.8	5.8
	arc min	2.5	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0

Table 5-20-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32
50	6.2	19	25	39	60
80	5.0	16	23	36	55
100	4.8	17	22	34	50
120	-	13	22	34	48
160	-	-	22	33	47

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

Table 5-20-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	3.7	11	15	24	36
80	4.3	15	21	32	46
100	5.8	21	27	41	60
120	-	28	33	51	68
160	-	-	42	64	91

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

Table 5-20-7 Torsional rigidity

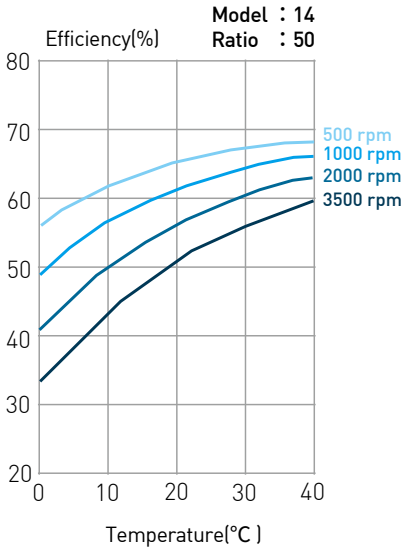
Reduction ratio		Model	14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.29	0.67	1.1	2.0	4.7
		kgfm/arc min	0.085	0.2	0.32	0.6	1.4
	K_2	$\times 10^4$ Nm/rad	0.37	0.88	1.3	2.7	6.1
		kgfm/arc min	0.11	0.26	0.4	0.8	1.8
	K_3	$\times 10^4$ Nm/rad	0.47	1.2	2.0	3.7	8.4
		kgfm/arc min	0.14	0.34	0.6	1.1	2.5
	θ_1	$\times 10^{-4}$ rad	6.9	5.8	6.4	7.0	6.2
		arc min	2.4	2.0	2.2	2.3	2.1
	θ_2	$\times 10^{-4}$ rad	19	14	19	18	18
		arc min	6.4	4.6	6.3	6.1	6.1
80 up	K_1	$\times 10^4$ Nm/rad	0.4	0.84	1.3	2.7	6.1
		kgfm/arc min	0.12	0.25	0.4	0.8	1.8
	K_2	$\times 10^4$ Nm/rad	0.44	0.94	1.7	3.7	7.8
		kgfm/arc min	0.13	0.28	0.5	1.1	2.3
	K_3	$\times 10^4$ Nm/rad	0.61	1.3	2.5	4.7	11
		kgfm/arc min	0.18	0.39	0.75	1.4	3.3
	θ_1	$\times 10^{-4}$ rad	5.0	4.6	5.4	5.2	4.8
		arc min	1.7	1.6	1.8	1.8	1.7
	θ_2	$\times 10^{-4}$ rad	16	13	15	13	14
		arc min	5.4	4.3	5.0	4.5	4.8

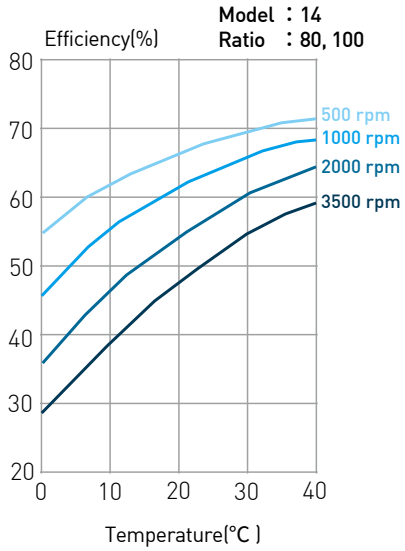
Note : The values are for reference only. The lower limit is 20% under the value in this table.

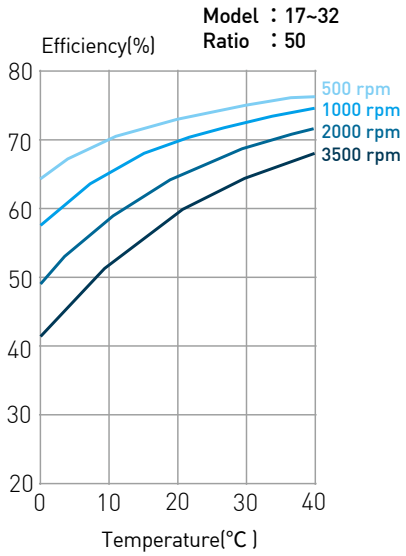
5-20-2 Efficiency

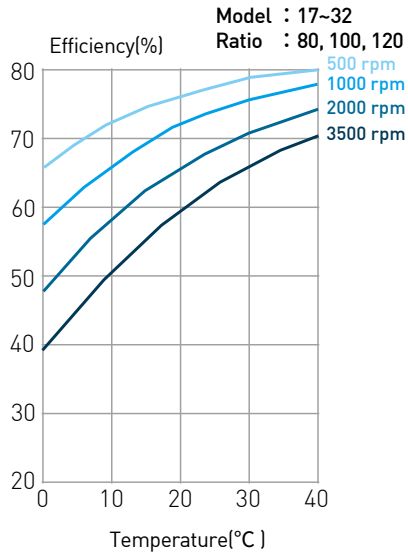
1. Rated torque E_R

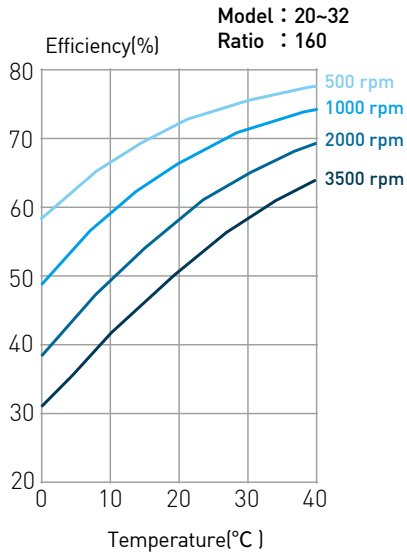
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .





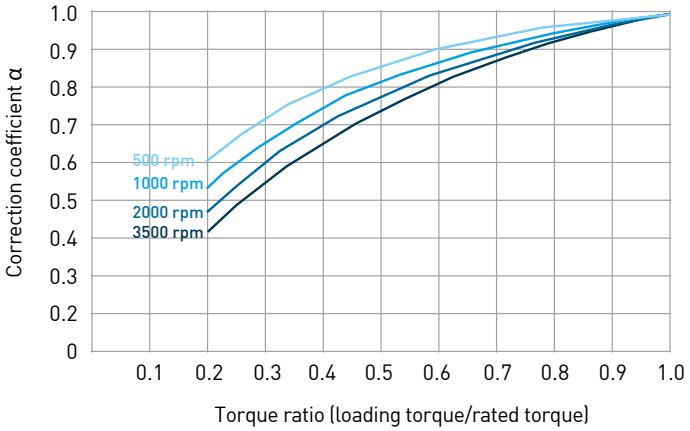






2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.

Unit : %

Reduction ratio \ Model	14	17	20	25	32
50	0.0	2.4	2.1	-0.7	-1.9
80	3.1	1.9	2.1	1.6	2.0
100	0.0	0.0	1.6	-0.3	-1.1
120	-	-2.6	-0.9	-2.9	-3.7
160	-	-	1.3	-0.8	-1.6

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

5-20-3 No-load operating torque

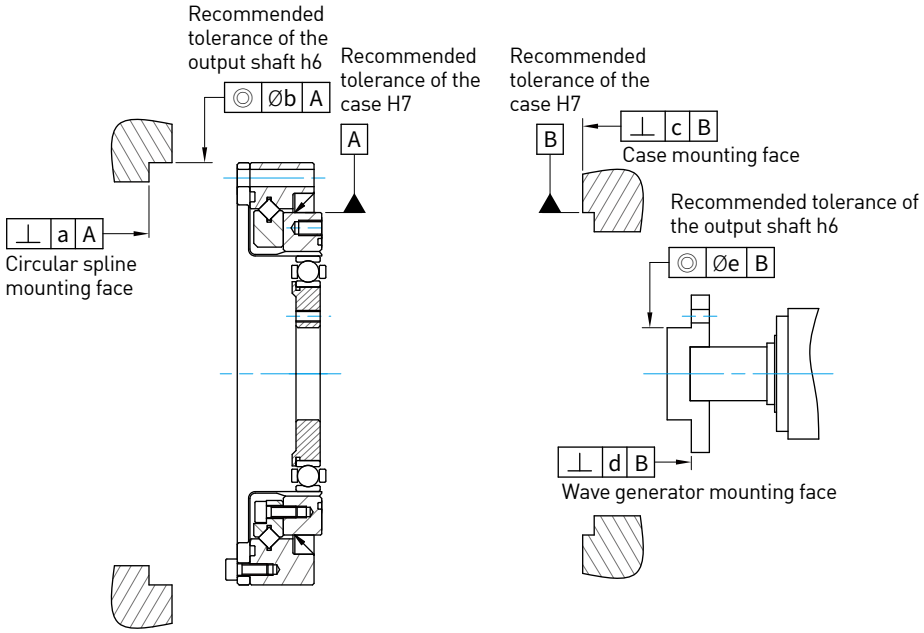
The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	3	4.9	7.4	13.5	27
	1000 r/min	3.7	5.8	9.1	17	33
	2000 r/min	4.7	7.6	11.8	21	45
	3500 r/min	5.8	9.5	15.4	28	59
80	500 r/min	2.2	3.6	5.5	10.3	21.4
	1000 r/min	2.9	4.5	7.2	13.8	27.4
	2000 r/min	3.9	6.3	9.9	17.8	39.4
	3500 r/min	5	8.2	13.5	24.8	53.4
100	500 r/min	2	3.3	5	9.5	20
	1000 r/min	2.7	4.2	6.7	13	26
	2000 r/min	3.7	6	9.4	17	38
	3500 r/min	4.8	7.9	13	24	52
120	500 r/min	-	3.1	4.7	9	19
	1000 r/min	-	4	6.4	12.5	25
	2000 r/min	-	5.8	9.1	16.5	37
	3500 r/min	-	7.7	12.7	23.5	51
160	500 r/min	-	-	4.3	8.3	17.6
	1000 r/min	-	-	6	11.8	23.6
	2000 r/min	-	-	8.7	15.8	35.6
	3500 r/min	-	-	12.3	22.8	49.6

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

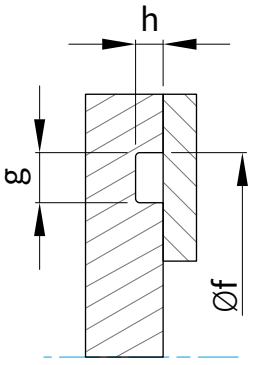
5-20-4 Installation accuracy



Unit : mm

Mark \ Model	14	17	20	25	32
a	0.016	0.021	0.027	0.035	0.042
Øb	0.015	0.018	0.019	0.022	0.022
c	0.011	0.012	0.013	0.014	0.016
d	0.008	0.010	0.012	0.012	0.012
Øe	0.016	0.018	0.019	0.022	0.022

5-20-5 Recommended dimensions for O-ring grooves



Unit : mm

Model	øf		g		h		O-ring (Included with the product)
14	57	$^{+0.1}_{0}$	2	$^{+0.25}_{0}$	1.1	$^{0}_{-0.1}$	54.1 x 1.2
17	68.1	$^{+0.1}_{0}$	2	$^{+0.25}_{0}$	1.1	$^{0}_{-0.1}$	64.0 x 1.5
20	78	$^{+0.1}_{0}$	2.7	$^{+0.25}_{0}$	1.5	$^{0}_{-0.1}$	72.0 x 2.0
25	94.8	$^{+0.1}_{0}$	2.4	$^{+0.25}_{0}$	1.35	$^{0}_{-0.1}$	88.62 x 1.78
32	123	$^{+0.1}_{0}$	2.7	$^{+0.25}_{0}$	1.5	$^{0}_{-0.1}$	118.0 x 2.0

5-20-6 Installation bolt tightening torque

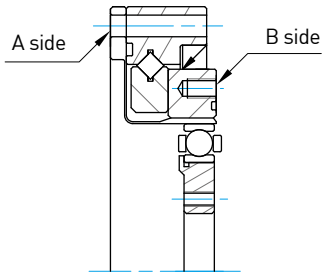


Table 5-20-8 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32
Number of bolts		8	12	12	12	12
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	64	74	84	102	132
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0
	kgfm	0.20	0.20	0.20	0.46	0.92
Transmission torque	Nm	108	186	210	431	892
	kgfm	11	19	21	44	91

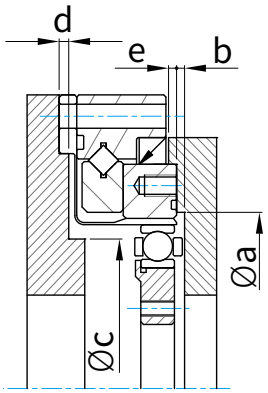
Table 5-20-9 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32
Number of bolts		8	12	12	12	12
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	43	52	61.4	76	99
Bolts tightening torque	Nm	2.0	2.0	2.0	6	9.0
	kgfm	0.20	0.20	0.20	0.46	0.92
Transmission torque	Nm	72	130	154	321	668
	kgfm	7.3	13.3	15.7	32.7	68.2

Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or nigher.
2. The bolt depth should be at least twice the thread diameter.

5-20-7 Lubrication

Other than the tooth space of DTH-PE type, all other parts are not packed with lubricant. Please follow the below points for applying the lubricant.

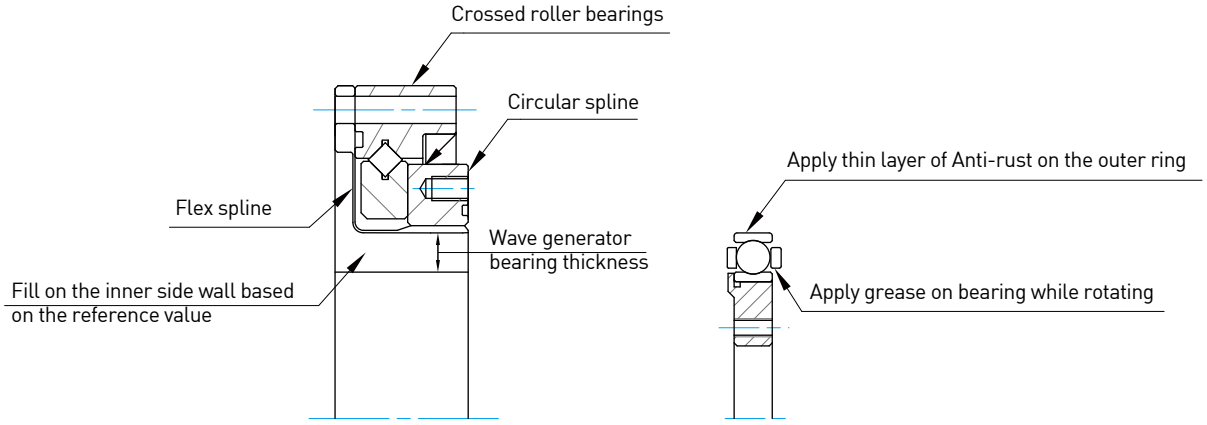


Unit : mm

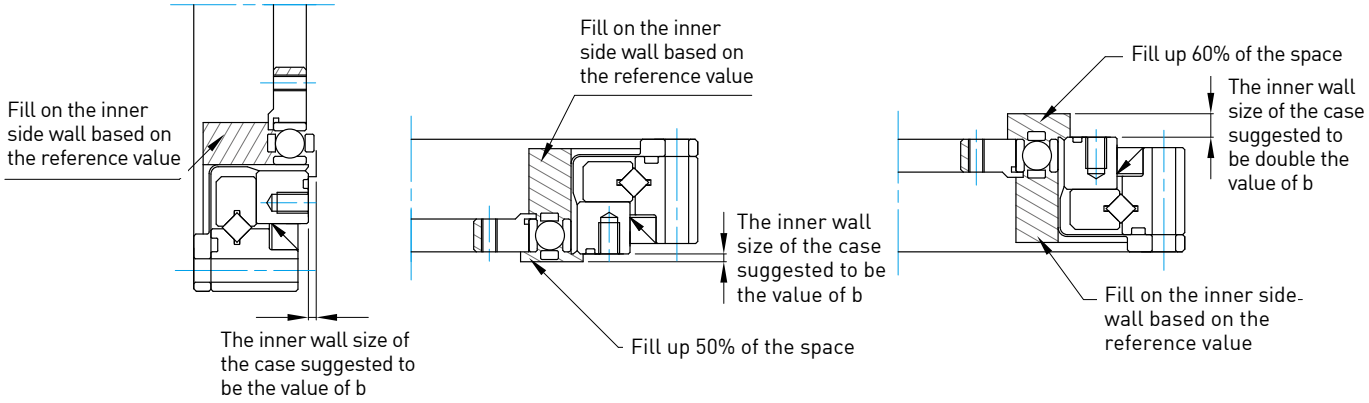
Mark \ Model	14	17	20	25	32
Øa	36.5	45	53	66	86
b	1(3)	1(3)	1.5(4.5)	1.5(4.5)	2(6)
Øc	31	38	45	56	73
d	1.4	1.8	1.7	1.8	1.8
e	1.5	1.5	1.5	3.3	4

Note: The value in ( ) is when the wave generator is facing upward.

Lubricant application



The key points of different application methods



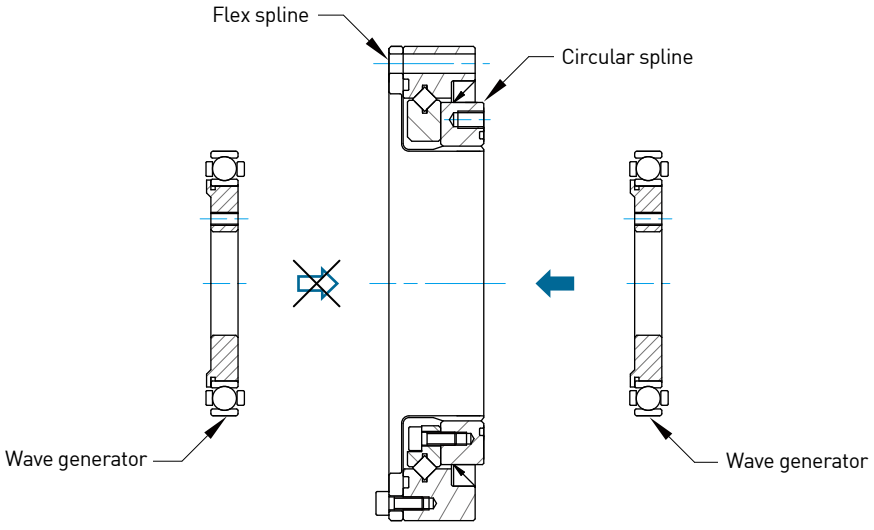
When used horizontally | Wave generator face downwards | Wave generator face upwards

Unit : g

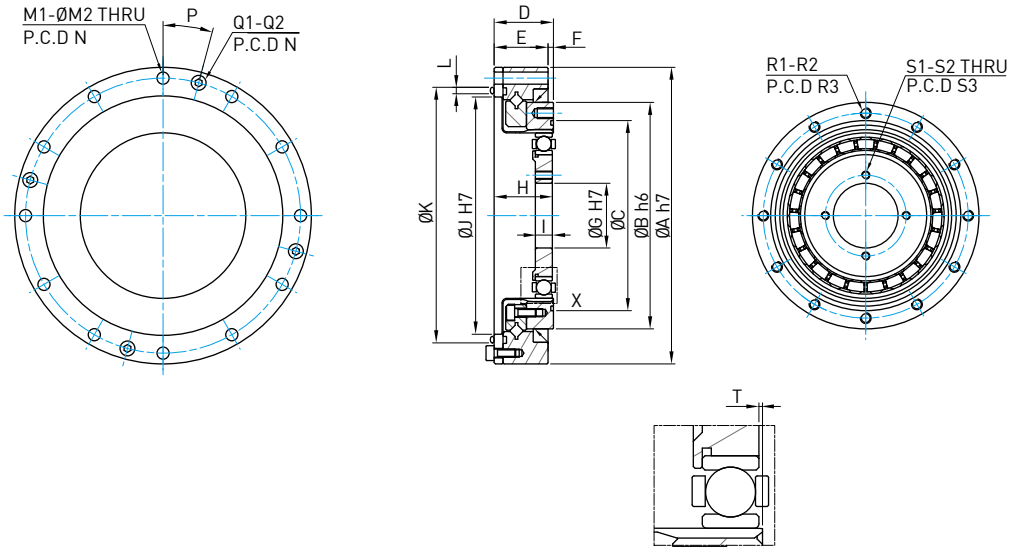
Instructions \ Model		14	17	20	25	32
Used horizontally		5	9	13	24	51
Used vertical	Wave generator is facing down	5.4	9.8	14	26	56
	Wave generator is facing up	6.1	11	16	29	62

5-20-8 Installation sequence

Install the circular spline and flex spline into the mechanism then install the wave generator.



5-20-9 DTH-PE type size chart



Unit : mm

Mark \ Model	14	17	20	25	32
ØA h7	70	80	90	110	142
ØB h6	49	59	69	84	110
ØC	39.1	48	56.8	70.5	92
D	17.5	18.5	19	22	27.9
E	15.5	16.5	17	20	23.6
F	2	2	2	2	4.3
ØG H7	11	15	20	24	32
H	$15.7^{\ 0}_{-0.2}$	$16.9^{\ 0}_{-0.2}$	$17.8^{\ 0}_{-0.2}$	$21.6^{\ 0}_{-0.2}$	$27.3^{\ 0}_{-0.2}$
I	$4^{\ 0}_{-0.1}$	$5^{\ 0}_{-0.1}$	$5.2^{\ 0}_{-0.1}$	$6.3^{\ 0}_{-0.1}$	$8.6^{\ 0}_{-0.1}$
ØJ H7	50	61	71	88	114
ØK	$57^{\ +0.1}_{\ 1}$	$68.1^{\ +0.1}_{\ 1}$	$78^{\ +0.1}_{\ 1}$	$94.8^{\ +0.1}_{\ 1}$	$123^{\ +0.1}_{\ 1}$
ØL	$2^{\ +0.25}_{\ 0}$	$2^{\ +0.25}_{\ 0}$	$2.7^{\ +0.25}_{\ 0}$	$2.4^{\ +0.25}_{\ 0}$	$2.7^{\ +0.25}_{\ 0}$
M1	8	12	12	12	12
M2	3.5	3.5	3.5	4.5	5.5
N (P.C.D)	64	74	84	102	132
P (Degree)	22.5°	15°	15°	15°	15°
Q1	2	2	2	4	4
Q2	M3	M3	M3	M3	M4
R1	8	12	12	12	12
R2	M3 x 4.5 DP	M3 x 4.5 DP	M3 x 4.5 DP	M4 x 6 DP	M5 x 8 DP
R3 (P.C.D)	43	52	61.4	76	99
S1	4	4	4	4	4
S2	M3	M3	M3	M3	M4
S3 (P.C.D)	17	21	26	30	40
Moment of inertia ($\times 10^{-4}$ m^2)	0.021	0.054	0.090	0.282	1.09
Weight (Kg)	0.33	0.41	0.52	0.91	1.87

5-21 DTH-AH Type

5-21-1 Technical data

Table 5-21-1 Rating table

Item / Model	Reduction ratio	Rated torque at input 2000r/min ※1		Peak torque at start/stop ※2		Permissible maximum value of average load torque ※3		Instantaneous permissible max. torque ※4		Permissible maximum input speed	Permissible average input speed
		Nm	kgfm	Nm	kgfm	Nm	kgfm	Nm	kgfm	r/min	r/min
14	50	3.7	0.38	12	1.2	4.8	0.49	23	2.3	8500	3500
	80	5.4	0.55	16	1.6	7.7	0.79	35	3.6		
	100	5.4	0.55	19	1.9	7.7	0.79	35	3.6		
17	50	11	1.1	23	2.3	18	1.8	48	4.9	7300	3500
	80	15	1.5	29	3.0	19	1.9	61	6.2		
	100	16	1.6	37	3.8	27	2.8	71	7.2		
	120	16	1.6	37	3.8	27	2.8	71	7.2		
20	50	17	1.7	39	4.0	24	2.4	69	7.0	6500	3500
	80	24	2.4	51	5.2	33	3.4	89	9.1		
	100	28	2.9	57	5.8	34	3.5	95	9.7		
	120	28	2.9	60	6.1	34	3.5	95	9.7		
	160	28	2.9	64	6.5	34	3.5	95	9.7		
25	50	27	2.8	69	7.0	38	3.9	127	13	5600	3500
	80	44	4.5	96	9.8	60	6.1	179	18		
	100	47	4.8	110	11	75	7.6	184	19		
	120	47	4.8	117	12	75	7.6	204	21		
	160	47	4.8	123	13	75	7.6	204	21		
32	50	53	5.4	151	15	75	7.6	268	27	4800	3500
	80	83	8.5	213	22	117	12	398	41		
	100	96	9.8	233	24	151	15	420	43		
	120	96	9.8	247	25	151	15	445	45		
	160	96	9.8	261	27	151	15	445	45		

※1 Permissible rated torque
※2 Permissible maximum torque
※3 Permissible average torque
※4 Permissible maximum value of impact

Table 5-21-2 Crossed roller bearing specifications

Item \ Model				14	17	20	25	32
Pitch circle diameter of roller		Dpw	m	0.0503	0.061	0.07	0.086	0.112
Offset amount		R	m	0.0111	0.0115	0.011	0.0121	0.0173
Basic load ratings	Dynamic load	C	kN	2.9	5.2	7.3	10.9	19.1
			kgf	296	530	744	1111	1948
	Static load	Co	kN	4.3	8.1	11	17.9	32.7
			kgf	438	826	1122	1825	3334
Moment rigidity		K	$\times 10^4$ Nm/rad	7.08	12.7	21	31	82.1
			kgfm/arc min	2.1	3.8	6.2	9.2	24.4
Permissible dynamic tilting moment		M	Nm	37	62	93	129	290
Permissible static tilting moment		Mo	Nm	55	101	161	210	503
Permissible axial load		Fa	kN	0.62	1.111	1.56	2.329	4.08
Permissible radial load		Fr	kN	0.415	0.744	1.045	1.56	2.734

Table 5-21-3 Angle transmission accuracy

Reduction ratio \ Model		14	17	20	25	32
50 up	$\times 10^{-4}$ rad	4.4	4.4	2.9	2.9	2.9
	arc min	1.5	1.5	1	1	1

Table 5-21-4 Hysterisis loss

Reduction ratio \ Model		14	17	20	25	32
50	$\times 10^{-4}$ rad	7.3	5.8	5.8	5.8	5.8
	arc min	2.5	2.0	2.0	2.0	2.0
80 up	$\times 10^{-4}$ rad	5.8	2.9	2.9	2.9	2.9
	arc min	2.0	1.0	1.0	1.0	1.0

Table 5-21-5 Starting torque

Unit : cNm

Reduction ratio \ Model	14	17	20	25	32
50	11	39	53	79	114
80	9.0	34	44	66	108
100	8.7	37	49	73	101
120	-	34	49	73	99
160	-	-	48	72	97

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

Table 5-21-6 Reversed starting torque

Unit : Nm

Reduction ratio \ Model	14	17	20	25	32
50	6	21	29	44	63
80	7.1	28	41	60	84
100	9.7	41	54	80	111
120	-	51	65	99	126
160	-	-	84	126	171

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

Table 5-21-7 Torsional rigidity

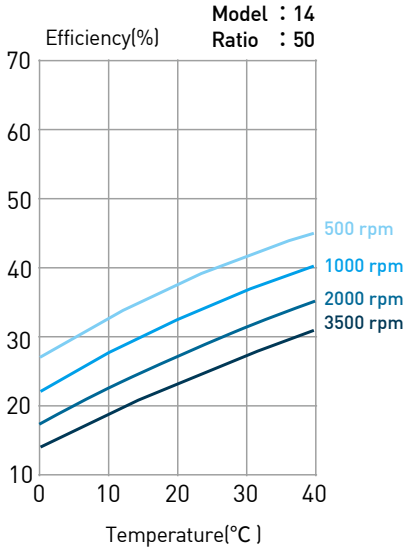
Reduction ratio \ Model			14	17	20	25	32
T_1		Nm	2.0	3.9	7.0	14	29
		kgfm	0.2	0.4	0.7	1.4	3.0
T_2		Nm	6.9	12	25	48	108
		kgfm	0.7	1.2	2.5	4.9	11
50	K_1	$\times 10^4$ Nm/rad	0.29	0.67	1.1	2.0	4.7
		kgfm/arc min	0.085	0.2	0.32	0.6	1.4
	K_2	$\times 10^4$ Nm/rad	0.37	0.88	1.3	2.7	6.1
		kgfm/arc min	0.11	0.26	0.4	0.8	1.8
	K_3	$\times 10^4$ Nm/rad	0.47	1.2	2.0	3.7	8.4
		kgfm/arc min	0.14	0.34	0.6	1.1	2.5
	θ_1	$\times 10^{-4}$ rad	6.9	5.8	6.4	7.0	6.2
		arc min	2.4	2.0	2.2	2.3	2.1
	θ_2	$\times 10^{-4}$ rad	19	14	19	18	18
		arc min	6.4	4.6	6.3	6.1	6.1
80 up	K_1	$\times 10^4$ Nm/rad	0.4	0.84	1.3	2.7	6.1
		kgfm/arc min	0.12	0.25	0.4	0.8	1.8
	K_2	$\times 10^4$ Nm/rad	0.44	0.94	1.7	3.7	7.8
		kgfm/arc min	0.13	0.28	0.5	1.1	2.3
	K_3	$\times 10^4$ Nm/rad	0.61	1.3	2.5	4.7	11
		kgfm/arc min	0.18	0.39	0.75	1.4	3.3
	θ_1	$\times 10^{-4}$ rad	5.0	4.6	5.4	5.2	4.8
		arc min	1.7	1.6	1.8	1.8	1.7
	θ_2	$\times 10^{-4}$ rad	16	13	15	13	14
		arc min	5.4	4.3	5.0	4.5	4.8

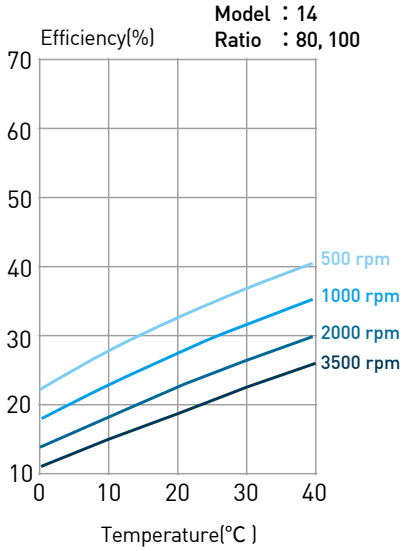
Note : The values are for reference only. The lower limit is 20% under the value in this table.

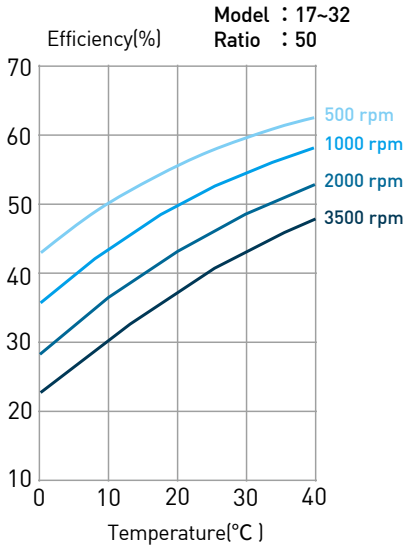
5-21-2 Efficiency

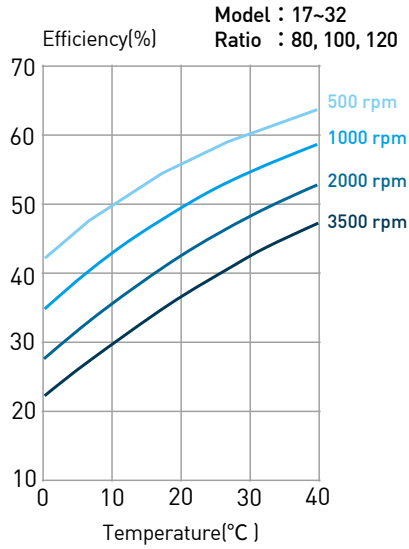
1. Rated torque E_R

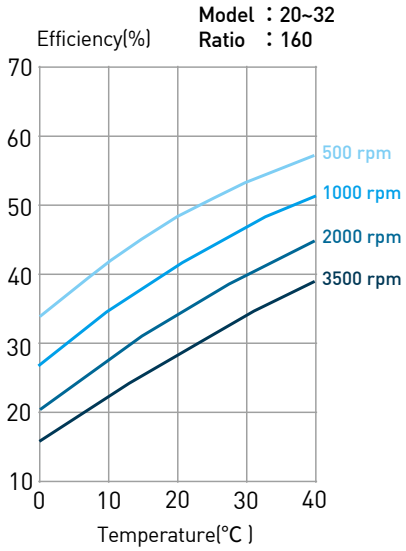
DATORKER® efficiency would change by model, ratio, operating conditions (speed/loading) and lubrication (lubricant type/quantity) .





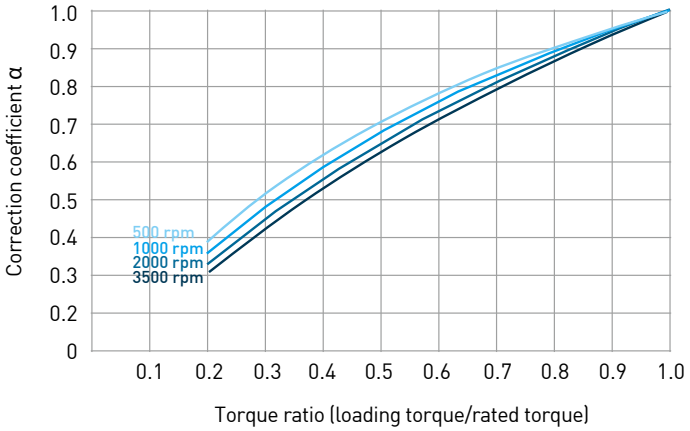






2. Correction coefficient α

Efficiency correction coefficient α by loading torque



3. Correction coefficient β

Efficiency correction coefficient β by model.

Unit : %

Reduction ratio \ Model	14	17	20	25	32
50	0.0	-1.0	1.2	-0.2	-0.1
80	3.1	-1.5	1.4	2.7	2.0
100	0.0	-3.9	0.4	0.1	0.9
120	-	-6.8	-2.5	-2.9	-2.0
160	-	-	-1.2	-1.3	-0.4

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

5-21-3 No-load operating torque

The torque required to drive the DATORKER® input (high-speed end) after running in at an input speed of 2000 r/min under an average ambient temperature of 25° C without load for more than 2 hours.

Unit : cNm

Reduction ratio	Input rotational speed	Model				
		14	17	20	25	32
50	500 r/min	10.5	15.6	20.4	33	62
	1000 r/min	14	18.6	26.4	43	82
	2000 r/min	17	23.6	33.4	54	107
	3500 r/min	21	29.6	42.4	70	147
80	500 r/min	9.7	14.3	18.5	29.8	56.4
	1000 r/min	13.2	17.3	24.5	39.8	76.4
	2000 r/min	16.2	22.3	31.5	50.8	101.4
	3500 r/min	20.2	28.3	40.5	66.8	141.4
100	500 r/min	9.5	14	18	29	55
	1000 r/min	13	17	24	39	75
	2000 r/min	16	22	31	50	100
	3500 r/min	20	28	40	66	140
120	500 r/min	-	13.8	17.7	28.5	54
	1000 r/min	-	16.8	23.7	38.5	74
	2000 r/min	-	21.8	30.7	49.5	99
	3500 r/min	-	27.8	39.7	65.5	139
160	500 r/min	-	-	17.3	27.8	52.6
	1000 r/min	-	-	23.3	37.8	72.6
	2000 r/min	-	-	30.3	48.8	97.6
	3500 r/min	-	-	39.3	64.8	137.6

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

5-21-4 Installation bolt tightening torque

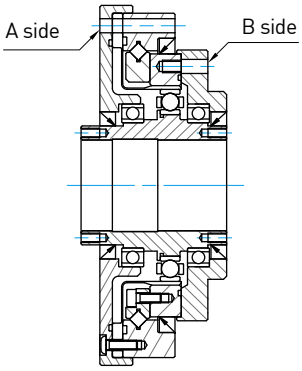


Table 5-21-8 Bolt tightening torque for A side

Item \ Model		14	17	20	25	32
Number of bolts		8	12	12	12	12
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	64	74	84	102	132
Bolts tightening torque	Nm	2.0	2.0	2.0	4.5	9.0
	kgfm	0.20	0.20	0.20	0.46	0.92
Transmission torque	Nm	108	186	210	431	892
	kgfm	11	19	21	44	91

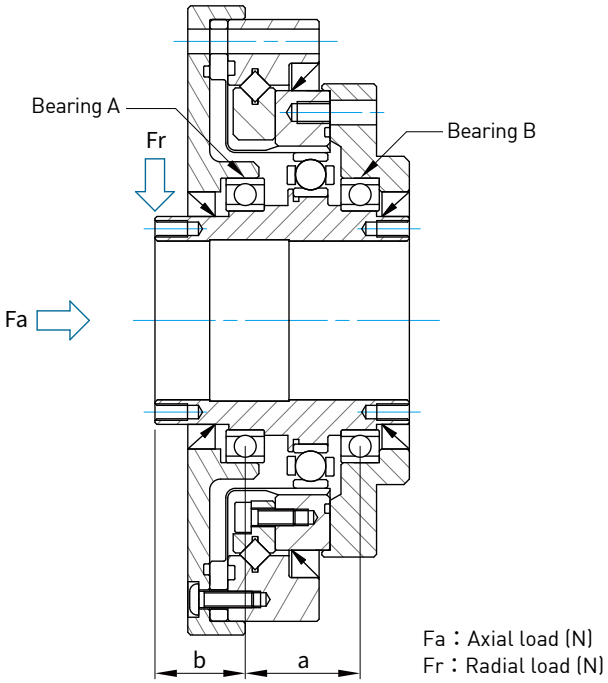
Table 5-21-9 Bolt tightening torque for B side

Item \ Model		14	17	20	25	32
Number of bolts		8	12	12	12	12
Bolts size		M3	M3	M3	M4	M5
Installation of bolts PCD	mm	43	52	61.4	76	99
Bolts tightening torque	Nm	2.0	2.0	2.0	6	9.0
	kgfm	0.20	0.20	0.20	0.46	0.92
Transmission torque	Nm	72	130	154	321	668
	kgfm	7.3	13.3	15.7	32.7	68.2

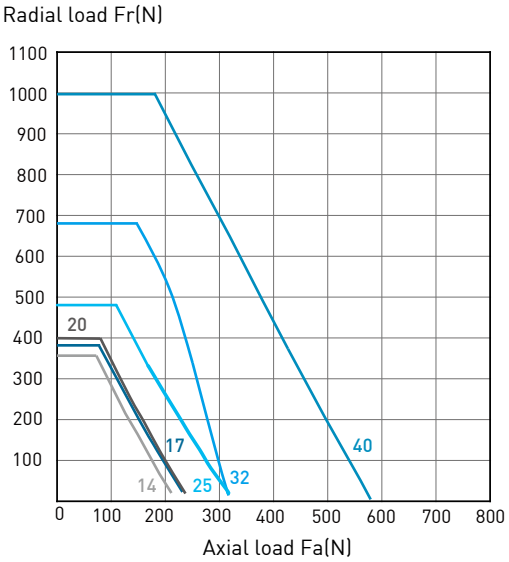
Note : 1. It is recommended to use ISO 4762 bolt with a strength grade of 12.9 or nigher.
2. The bolt depth should be at least twice the thread diameter.

5-21-5 Permissible input load

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

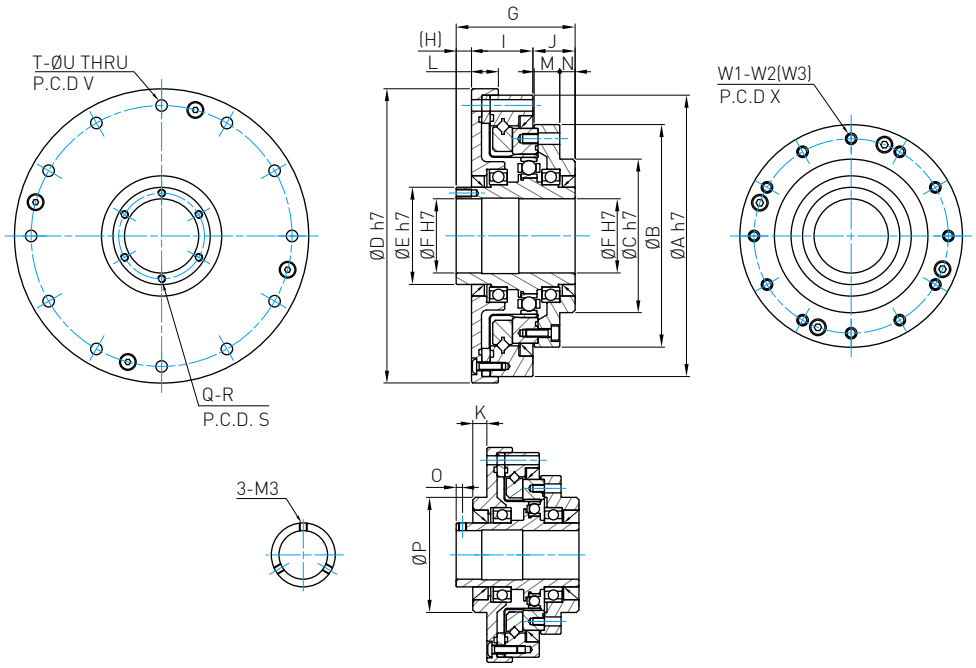


The figure below shows the average input speed of 2000rpm and the basic rated life L_{10} = 10000hour.



Item / Model	Bearing A		Bearing B		a (mm)	b (mm)	Maximum radial load Fr (N)
	Dynamic load C (kN)	Static load Co (kN)	Dynamic load C (kN)	Static load Co (kN)			
14	4.0	2.47	4.0	2.47	16.5	20.0	179
17	4.5	3.15	4.5	3.15	18.0	19.5	191
20	4.7	3.65	4.7	3.65	15.5	17.5	199
25	6.35	5.55	6.35	5.55	16.5	21.0	290
32	8.8	8.5	6.4	6.2	19.5	26.0	410

5-21-6 DTH-AH type size chart



Model14、17

Unit : mm

Mark \ Model	14	17	20	25	32
ØA h7	70	80	90	110	142
ØB	52	62	73	87	114
ØC h7	36	45	50	60	75
ØD h7	74	84	95	115	147
ØE h7	20	25	30	38	54
ØF H7	14	19	21	29	41
G	45.5	48	42	46.5	55
H	12	12	5	6	7
I	19.5	20.5	21.5	24	28.6
J	14	15.5	15.5	16.5	19.4
K	5.5	5.5	-	-	-
L	9	10	10.5	10.5	12
M	7	8	8	10	11
N	6.5	7	7	6	7.5
O	2.5	2.5	-	-	-
ØP	36	45	-	-	-
Q	3	3	6	6	6
R	M3	M3	M3 x 6 DP	M3 x 6 DP	M3 x 6 DP
S (P.C.D)	-	-	25.5	33.5	48
T	8	12	12	12	12
ØU	3.5	3.5	3.5	4.5	5.5
V (P.C.D)	64	74	84	102	132
W1	8	12	12	12	12
W2	Ø3.5 x 5.5 DP	Ø3.5 x 6.5 DP	Ø 3.5 x 6.5 DP	Ø 4.5 x 8.5 DP	Ø 5.5 x 7.6 DP
W3	M3 x 4.5 DP	M3 x 4.5 DP	M3 x 4.5 DP	M4 x 6 DP	M5 x 8 DP
X	43	52	61.4	76	99
Moment of inertia ($\times 10^{-4}$ m^2)	0.064	0.141	0.271	0.793	2.900
Weight (Kg)	0.49	0.66	0.84	1.4	2.7

6. Installation Notes

6-1 Precautions for Installation of Reducer Body

- Check the flatness of the installation plane and ensure it is not inclined.
- Check case mounting part and ensure it does not interfere with the body.
- When locking the bolt, temporarily tighten to half the value of the specified torque in the diagonal order before reaching the specified torque. Do not tighten the bolts to the specified torque directly.
- The surface of the product is not treated with anti-rust. If anti-rust is required, please apply on the surface.

6-2 Precautions for Installation of Wave Generator

- To avoid excessive force on the wave generator bearing during installation, please rotate the wave generator and insert it smoothly.
- If you choose a wave generator without the Oldham mechanism, kindly ensure to keep the concentricity and perpendicularity within the recommended range. (Refer to "Assembly accuracy" of each series)

6-3 Others

- Do not change the combination of product accessories to avoid affecting the overall performance and accuracy.
- Please do not use it for applications that may fall. Though there is no scar on the surface after falling, the change in internal stress may also reduce the fatigue strength. Please do not use it.
- It is strictly forbidden for dust to fall into the product to avoid abnormal sound, wear and vibration during operation.
- Ensure to use the specified grease in the product. (Please refer to Chapter 6. "Lubricant" of this manual)
- Avoid overload operation.
- Note that the input speed should be within the specified range.
- Please use a thread locker in the threaded hole. We recommend using Loctite 242 to prevent leakage.

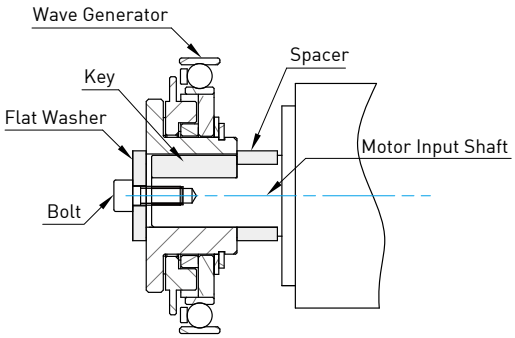
6-4 The Following Conditions May Cause Problems, Please Pay Attention

- Overrun
- Insufficient lubricant
- Bearing/gear components damaged.
- Poor connection with other interface components.

6-5 If the Following Problems Occur, Please Stop Immediately and Check the Reducer

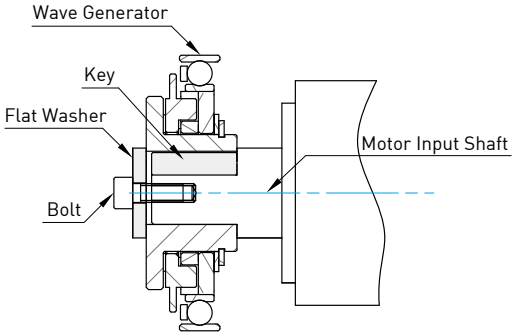
- The internal temperature rises over 80 degrees or the ambient temperature rises over 40 degrees.
- Abnormal noise or vibration.

6-6 Wave Generator and Input Shaft Connection Options

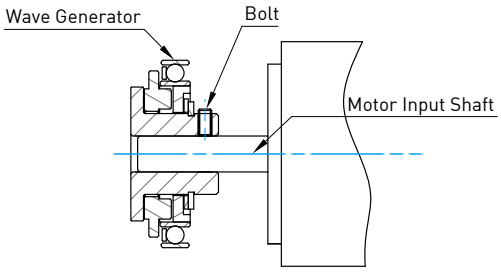


The motor input shaft has a shoulder that is not long enough, so it is necessary to install a spacer between the wave generator and the shaft, and fix it with washers and bolts.

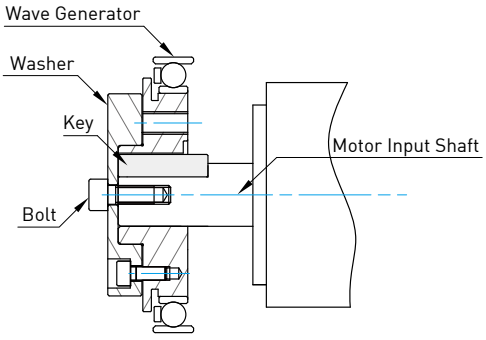
* The parallelism of both ends of the spacer should be less than 0.01mm.



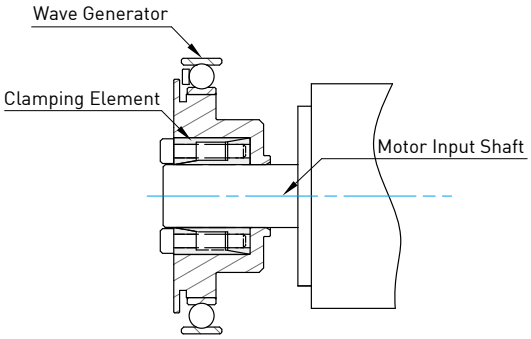
The motor input shaft has a shoulder, install the wave generator and fix it with washers and bolts.



The input shaft of the motor is a round shaft (without keyway). Install the wave generator and fix it with bolts.



Install the washer on the wave generator, then install it into the motor input shaft, and then fix it with bolts.



The wave generator is inserted into the motor input shaft, and then fixed with clamping element.

6-7 Warranty

- **Warranty Period**

  This product must be installed and operated in accordance with the correct installation methods and normal operating conditions described in the technical information. Under this premise, the company provides a warranty for the product body for one year from the date of delivery, or a total operating time of 2,000 hours (whichever occurs first).

- **Exclusions from Warranty**

  The warranty does not apply to any failure or damage caused by any of the following conditions:

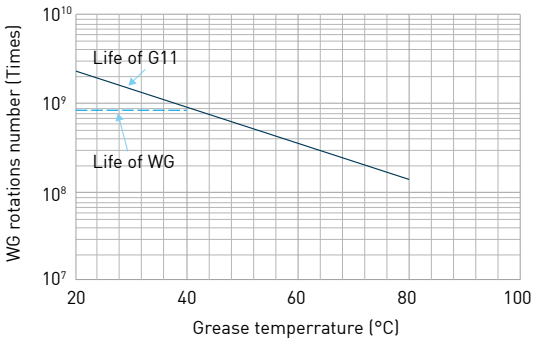
  1. Failure resulting from improper operation or failure to follow the technical information or related operating specifications.
  2. Any disassembly, modification, repair, or alteration performed by the buyer or a third party without the HIWIN's authorization.
  3. Damage caused by external equipment, peripheral systems, or factors not related to the product itself.
  4. Damage caused by natural disasters, accidents, environmental factors, or other force majeure events.

7. Lubricant

7-1 Grease Replacement

When the average load torque is lower than the rated torque, set the grease replacement time as shown in the table below.

- **When the average load torque is lower than the rated torque(L_{GTn})**



When the average load torque is higher than the rated torque, the grease replacement period can be calculated according to the following formula.

- **When the average load torque is higher than the rated torque(L_{GT})**

$$L_{GT} = L_{GTn} \times \left(\frac{T_r}{T_{av}}\right)^3$$

L_{GT} is the replacement time when the torque is higher than the rated torque(times)
L_{GTn} is the replacement time when the torque is lower than the rated torque(times)
T_r is the rated torque (Nm) refer to the rating table of Chapter 4. Product Series
T_{av} is the average load torque (Nm) refer to 2-2-1

- **Others**

1. Do not mix with other greases.
2. When used for fixed load and continuous operation in a fixed direction, it may cause poor lubrication.
3. Please strengthen the sealing mechanism according to the use environment.

7-2 HIWIN G11 Special Lubricant Oil for Reducer

- **Conditions and characteristics of use**
  1. Load resistance
  2. Wear resistance
  3. Excellent shear stability
  4. Suitable for robots, automation equipment, semiconductor equipment, machine tools, etc.

- **Basic properties**

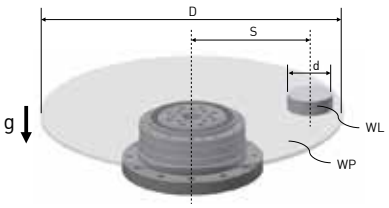
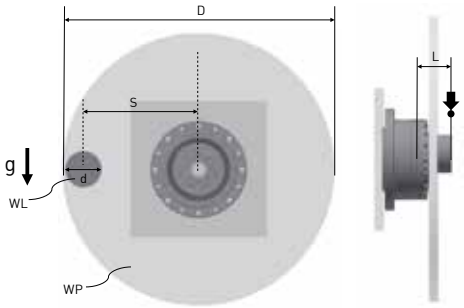
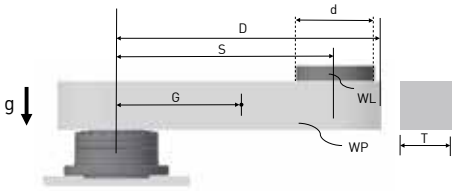
Colour	Yellow
Base oil	Mineral oil
Consistency enhancer	Lithium soap
Service temp. (°C)	-20~130
Ambient working temperature (°C)	0~40
NLGI-grade (0.1mm)	265~295
Drop point (°C)	196

- **Packaging specifications:** 400g hard tube packed

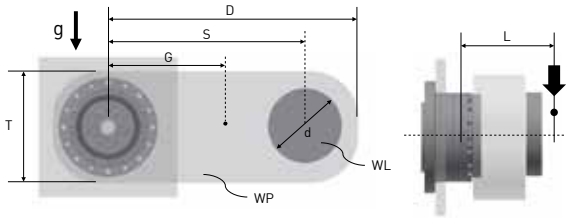
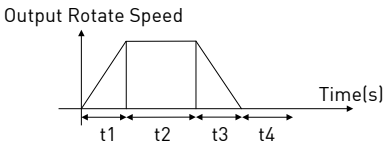
- **Others**
  1. HIWIN DATORKER® is prepacked with HIWIN G11 grease can be installed directly. Except for DSC-CO, DGC-CO, DGC-CE-L type, high speed and high torque conditions, it is recommended to apply additional grease to each part as per the Lubrication instructions in this technical manual.
  2. Do not mix and use with different types of Lubricants.
  3. For use in special conditions with high vibration, in clean room, vacuum, high temperature or low temperature, please contact us for more detailed evaluation.

8. Inquiry Form

8-1 DATORKER® Inquiry Form

Customer Name		Date	/ /
Application	☐ Robot _____ ☐ Semi-conductor equipment _____ ☐ Machine tool _____ ☐ Automation equipment _____ ☐ Inspection equipment _____ ☐ Medical related equipment _____ ☐ Others _____		
Type of Reducer Currently Used	☐ Harmonic reducer, Maker_____; Spec_____ ☐ Others, Maker_____; Spec_____		
Environments	☐ Normal working conditions (ambient temperature 0°C - 40°C , humidity under 80% RH) ☐ Special ambient temperature: _____ °C ☐ Harsh environment (Dusty, Cutting fluid, Dirty, etc) ☐ Other special conditions: _____		
Special Requirements	☐ Sealed and Dustproof ☐ Anti-rust Treatment ☐ Custom Dimensions ☐ High/Low Temperature Lubricant ☐ Output Support Bearing ☐ Other _____ ※If you have special requirements, please contact HIWIN.		
Selection	Load Condition*	• Mounting type I：Plate (Horizontal) Table diameter (D):_____(mm) Table weight (WP):_____(kg) Load diameter (d):_____(mm) Load weight (WL):_____(kg) Distance between load center of rotation axis (S):_____(mm) Ratio (R):_____ 	
		• Mounting type II：Plate (Perpendicular) Table diameter (D):_____(mm) Table weight (WP):_____(kg) Load diameter (d):_____(mm) Load weight (WL):_____(kg) Distance between load center of rotation axis (S):_____(mm) Distance between outputface and loading gravity center (L):_____(mm) Ratio (R):_____ 	
		• Mounting type III：Square (Horizontal) Arm length (D):_____(mm) Load diameter (d):_____(mm) Arm width (T):_____(mm) Load weight (WL):_____(kg) Arm weight (WP):_____(kg) Ratio (R):_____ Distance of arm's gravity center (G):_____(mm) Distance between load center of rotation axis (S):_____(mm) 	
HIWIN Support			

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

Selection	Load Condition	• Mounting type IV：Square (Perpendicular) Arm length (D):_____(mm) Load diameter (d):_____(mm) Arm width (T):_____(mm) Load weight (WL):_____(kg) Arm weight (WP):_____(kg) Ratio (R):_____ Distance of arm's gravity center (G):_____(mm) Distance between outputface and loading gravity center (L):_____(mm) Distance between load center of rotation axis (S):_____(mm) 
HIWIN Support	Operation Condition	Acceleration time (t1):_____(s) Steady operating time (t2):_____(s) Decelerating time (t3):_____(s) Stop time (t4):_____(s) Equipment operation time (Tr):_____(hour) Equipment operation day (Ty):_____(day) Rotate angle (θ):_____(degree) Reciprocating rotate angle (θ):_____(degree) 

8-2 DATORKER® Strain Wave Gear System Inquiry Form (Optional)

Brake	☐ No ☐ Yes
Input Voltage(V)	☐ 220V Single Phase ☐ 220V Three Phase ☐ Others
Encoder	☐ 17bit (Absolute) ☐ 23bit (Absolute)
Control Interface	☐ Voltage command and Pulse (Standard) ☐ EtherCAT (CoE) ☐ Others
Cable	Power Extension Cable (Flexure Resistance) Cable Length：☐ 3M (Standard) ☐ 5M ☐ 7M ☐ 10M Encoder Extension Cable (Flexure Resistance) Cable Length：☐ 3M (Standard) ☐ 5M ☐ 7M ☐ 10M
Optional Accessories	☐ Control Cable (Including Pulse + I/O Pins) ☐ USB Transfer Cable ☐ Single Phase Filters ☐ Three Phase Filters
Host	☐ None ☐ PLC/Brand: Model: ☐ Motion control card/Brand: Model:
Other Requirements	
Below to be filled in by HIWIN or Distributor Suggested Model & Specification:	

DATORKER® Strain Wave Gear Technical Information

Publication Date：November 2020, first edition
April 2026, 9th edition

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2. Actual products may differ from specifications and photos provided in this catalog. These differences may be the result of various factors including product improvements.
3. HIWIN website for patented product directory: http://www.hiwin.tw/Products/Products_patents.aspx
4. HIWIN will not sell or export products or processes restricted under the "Foreign Trade Act" or related regulations. Export of restricted products should be approved by proper authorities in accordance with relevant laws and shall not be used to manufacture or develop nuclear, biochemical, missiles or other weapons.

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