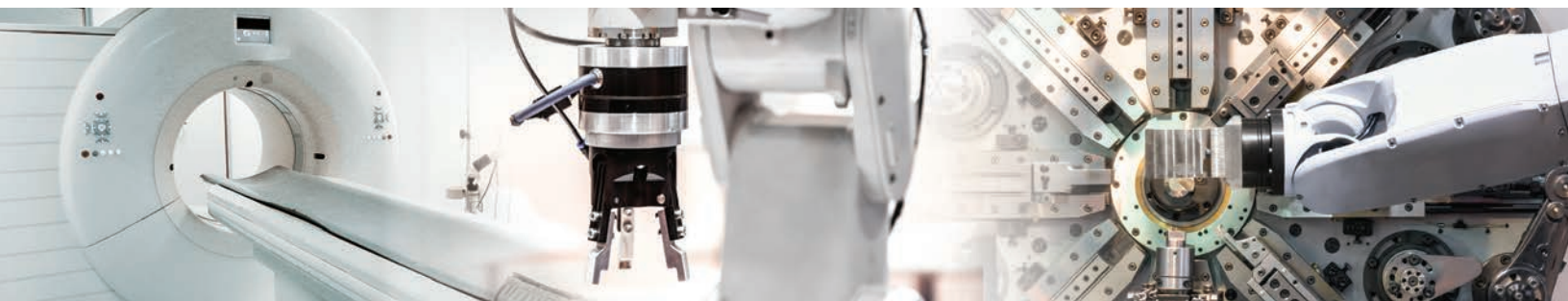


Nidec

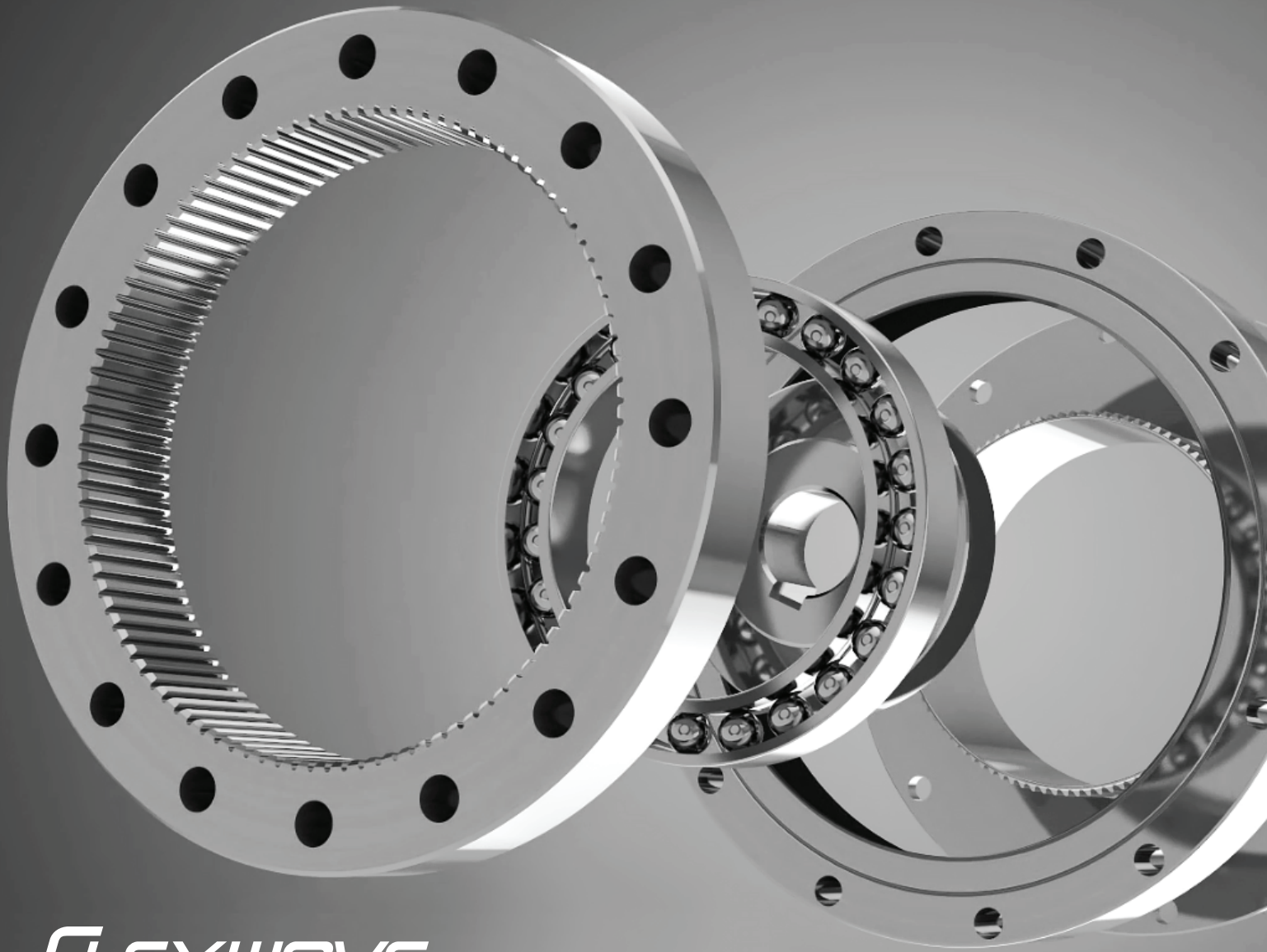
FLEXWAVE

The Next Generation



WP Series
The Highest Precision

NIDEC DRIVE TECHNOLOGY CORPORATION



FLEXWAVE

Relentless Refinement of Technology

The *Next Generation* Nidec FLEXWAVE high precision gear reducers offer machine designers virtually unlimited flexibility and adaptability when designing highly innovative drive mechanisms. Standard configurations include; component sets, self-contained assemblies, and complete gear units ready to mount to standard servomotors with pre-assembled innovative standard motor mounting kits.

The *Next Generation* Nidec FLEXWAVE optimized tooth profiles combined with the Nidec Corporation core competencies of manufacturing high precision components at scale offer the most robust solutions with the highest reliability rates available to meet the most demanding application requirements where performance is guaranteed.

The *Next Generation* Nidec FLEXWAVE Cup style and Top Hat style Flex gears combined with solid or hollow input shafts extend the possibilities for integrating into unique designs with Ultra Flat versions available for when space is tight and High Torque versions for the more demanding applications requiring high torque density.

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All *Next Generation* Nidec FLEXWAVE high precision gear reducers are fully interchangeable with industry standards allowing designers to upgrade performance to existing designs by simply changing part numbers on the bills of materials.

- Exceptional Repeatability and Positional Accuracy
- Zero Backlash
- High Torque Density
- High Efficiency Ratings
- Lightweight and Compact
- High Torsional Stiffness

The *Next Generation* Nidec FLEXWAVE - proving to be the superior choice for the next generation drive mechanisms in Robotics, Machine Tool, Medical Equipment, Semiconductor Manufacturing, Satellite Communications and Assembly Automation applications.

FLEXWAVE Lineup

Open type



Hollow unit

WPU-□-□-SNH
WPU-□-□-SDH
WPU-□-□-SRH



Input shaft unit

WPU-□-□-SNJ
WPU-□-□-SRJ



Simple unit

WPS-□-□-SN
WPS-□-□-SD
WPS-□-□-SR

Closed type



Component

WPC-□-□-CF
WPC-□-□-CN
WPC-□-□-CR
WPC-□-□-CD



Unit

WPU-□-□-CF
WPU-□-□-CN
WPU-□-□-CR
WPU-□-□-CD
WPU-□-□-CDH

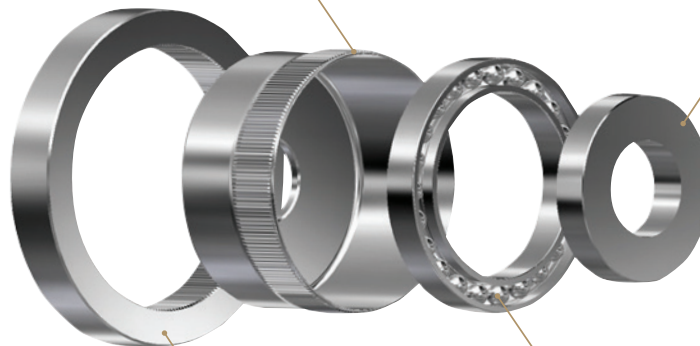


Gearhead

WPG-□-□-CR

Parts configuration

Flex gear (thin / flexible)



Cam (elliptic)

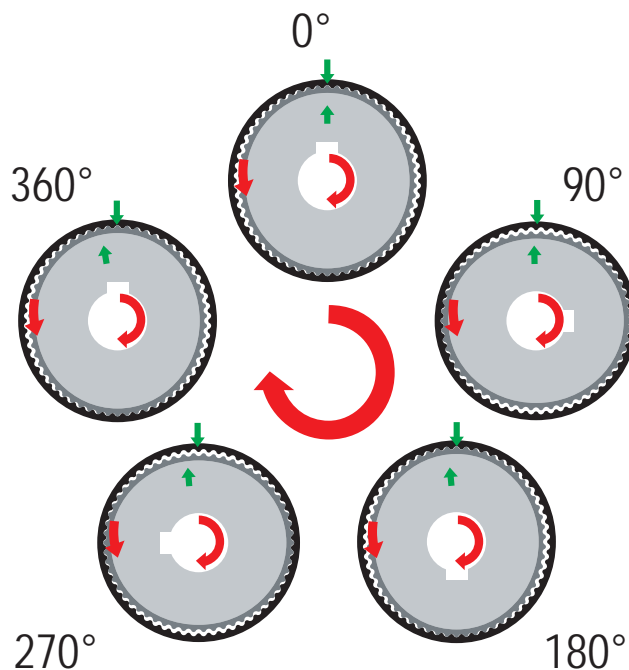
Elastic bearing (thin / flexible)

Internal gear

Strain Wave Technology

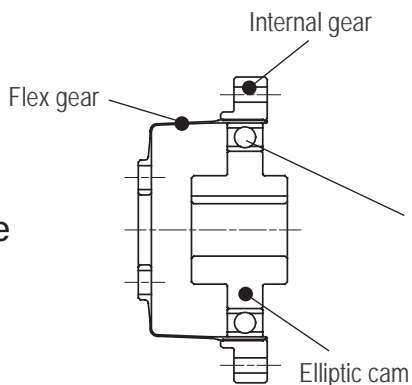
Reduction mechanism

- Flex gear and elastic bearing take elliptic shape with cam inserted.
- Elliptical cam input is inserted into Flex gear and then mounted into internal gear; the flex gear engages the internal gear in 2 locations 180° apart. This allows for high torque in a compact stable manner.
- With internal gear fixed and cam (input) rotated clockwise, the flex gear (output) rotates counter clockwise. Direction and speed of rotation is determined by tooth count of gears and mounting geometry.

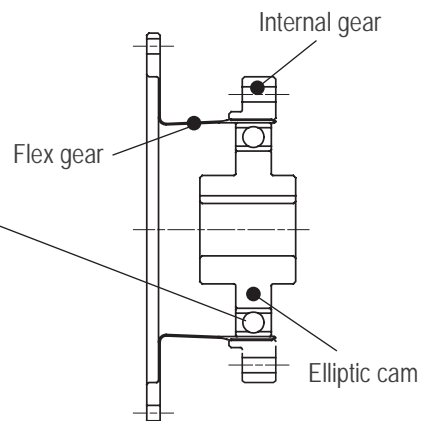


Closed type

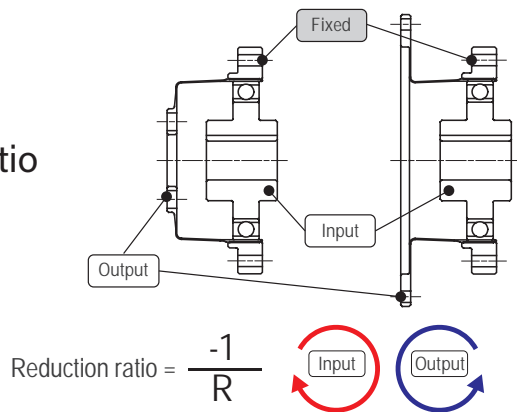
Parts name



Open type

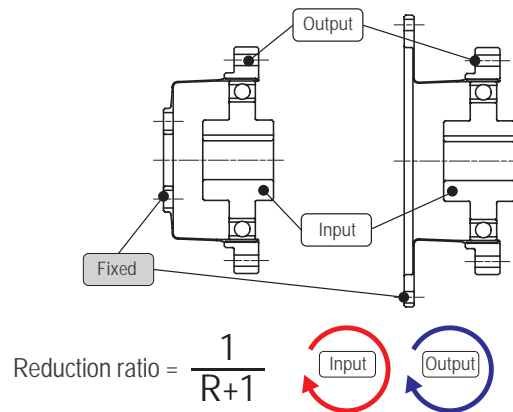


Reduction ratio



* The input and output rotation directions are opposite.

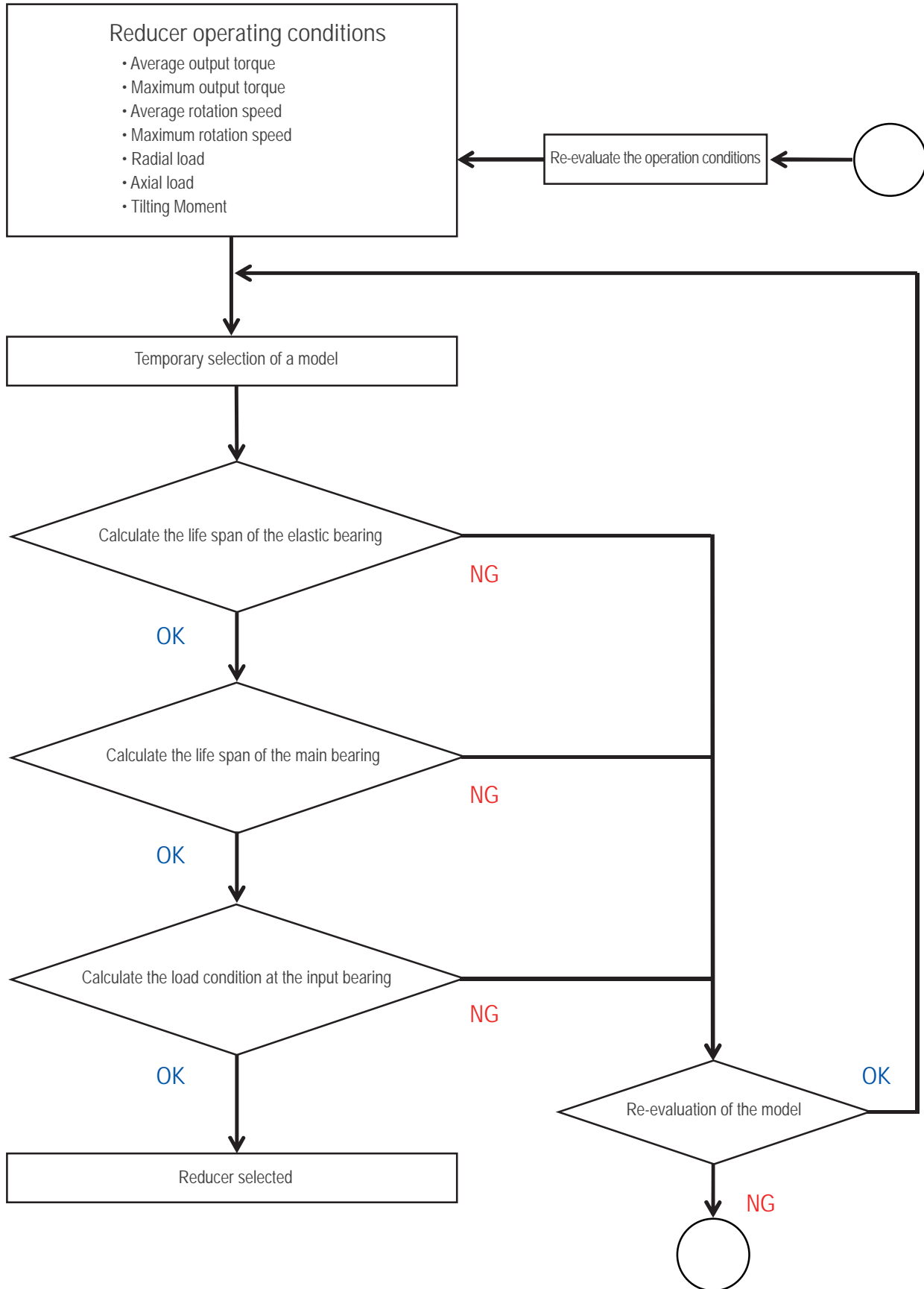
* "R" represents the "Ratio" figure in the specifications table on the next page.



* The input and output rotation directions are same.

Model Selection

Model selection flow



Reducer Model Nomenclature

WP	C	—	35	—	50	—	CN	—	**
Series Name	Type		Size		Ratio		Code *		Specifications
WP WP series	C: Component type S: Simple unit type U: Unit type • Input shaft unit • Hollow unit		35 42 50 63 80		50 80 100 120 160		CN CF SN SNH SHJ		Input shaft diameter, customer specified, etc.

* For code details, check Dimensions Table

Ratio Matrix Availability

Frame Size	Reduction Ratio				
	50	80	100	120	160
35					
42					
50					
63					
80					

Reducer Specifications

Frame	Ratio R*1	Nominal Output Torque *2	Maximum Output Torque *3	Emergency Stop Torque *4	Nominal Input Speed *5	Maximum Input Speed *6	Life *7
		[Nm]	[Nm]	[Nm]	[r/min]	[r/min]	[hours]
35	50	7	23	46	3000	8500	7000
	80	9	27	55			
	100	9	32	63			
42	50	21	44	91	3000	7300	
	80	26	50	102			
	100	28	63	129			
	120	28	63	129			
50	50	33	73	127	3000	6500	
	80	40	86	149			
	100	47	96	172			
	120	47	96	172			
	160	47	96	172			
63	50	51	127	242	3000	5600	
	80	66	142	266			
	100	70	163	295			
	120	70	163	295			
	160	70	163	295			
80	50	89	253	447	3000	4800	
	80	122	316	590			
	100	142	346	673			
	120	142	346	673			
	160	142	346	673			

*1 Reduction ratio is to be calculated by the formula in the previous page, using R value in this table.

*2 The maximum allowable value at the input rotation speed of 2000r/min

*3 The maximum torque when starting and stopping.

*4 The maximum torque when it receives shock.

*5 The maximum average input speed.

*6 The maximum input speed.

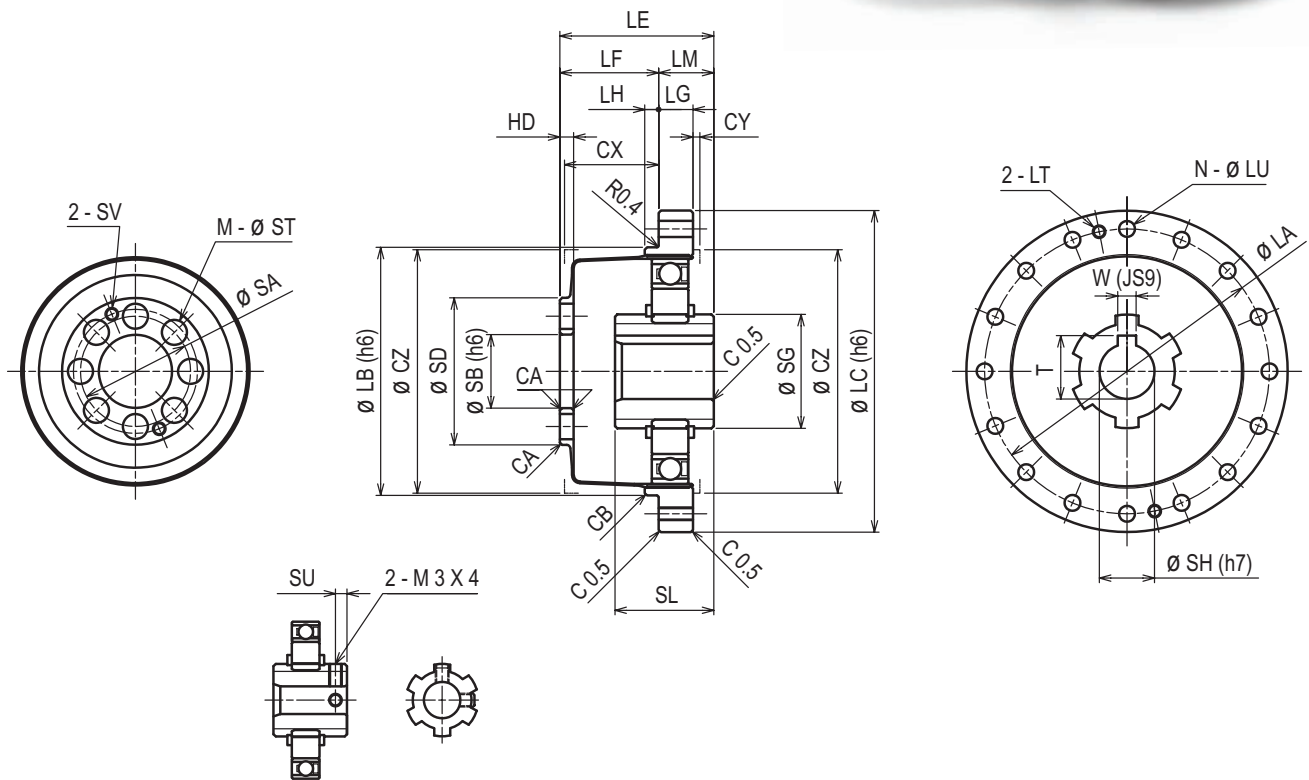
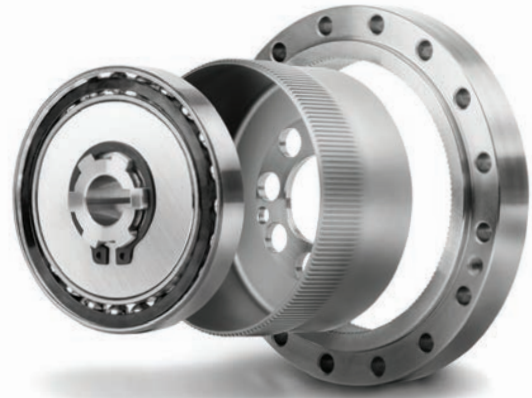
*7 The life time at the input rotation speed of 2000 r/min and nominal output torque.

Dimensions

Closed type: Component

WPC-□-□-CN, WPC-□-□-CF

Size	Weight	Moment of Inertia
	kg	$\times 10^{-4} \text{kgm}^2$
35	0.10	0.038
42	0.17	0.086
50	0.26	0.207
63	0.43	0.544
80	0.91	1.63



[mm]

Size	LA	LB	LC	N*1	LU	LT	LE	LF	LG	LH	LM	SG	SH	SL	W
35	44	38	50	8 (6)	3.5	M3	28.5	17.5	6	2	11	15.8	6	18.5	-
42	54	48	60	16 (12)	3.5	M3	32.5	20	6.5	2.5	12.5	15.8	8	20.7	-
50	62	54	70	16 (12)	3.5	M3	33.5	21.5	7.5	3	12	24.8	12	21.5	4
63	75	67	85	16 (12)	4.5	M4	37	24	10	3	13	27.8	14	21.6	5
80	100	90	110	16 (12)	5.5	M5	44	28	14	3	16	27.8	14	23.6	5

Size	T	SU	SA	SB	SD	M	ST	SV	HD	CA	CB	CX	CY	CZ
35	-	2.5	17	11	23.5	6	4.5	M3	2.4	C0.5	C0.3	17	1	38
42	-	3	19	10	27	6	5.5	M3	3	C0.5	C0.3	19	1	45
50	13.8	-	24	16	32	8	5.5	M3	3	C0.5	C0.5	20.5	1.5	53
63	16.3	-	30	20	40	8	6.5	M4	3	C0.5	C0.5	23	1.5	66
80	16.3	-	40	26	52	8	8.8	M5	3.2	C0.5	C0.5	26.8	1.5	86

*1 -CN and -CF are different in dimensions. The -CF value is shown in ().

*2 For details in the input section, please check the drawings.

*3 Inner dimensions of CX, CY, CZ are recommended dimensions.

Reducer Model/
Specifications

Dimensions

Life Estimation
(Elastic Bearing)

Life Estimation
(Main Bearing)

Maximum Load
at Input Shaft

Lubricant Information

Attachment Fixture
Requirement Info

Transmitting Torque

Input Section Structure/
Installation & Assembly

Motor Installation
Procedure Info

Characteristics Data

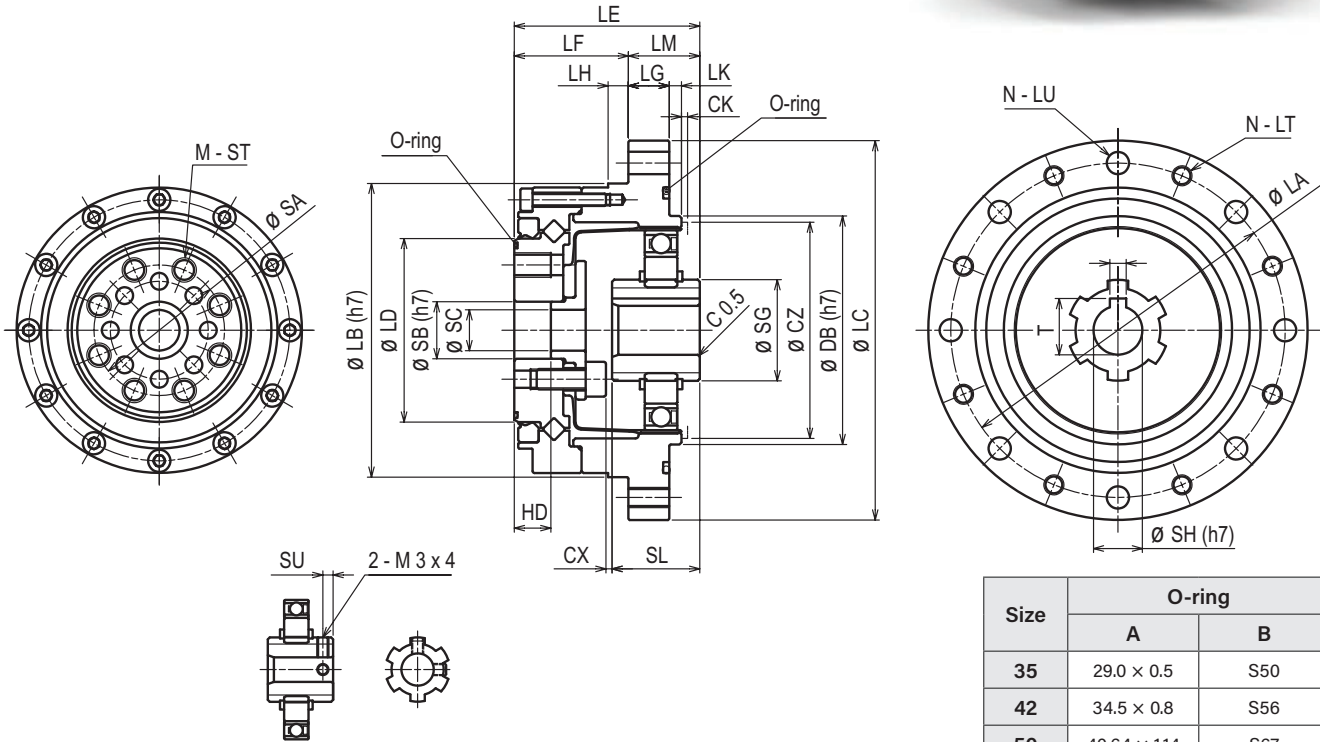
Dimensions

Closed type: Unit

WPU-□-□-CN, WPU-□-□-CF



Size	Weight	Moment of Inertia
	kg	$\times 10^{-4} \text{kgm}^2$
35	0.50	0.038
42	0.68	0.086
50	0.95	0.207
63	1.5	0.544
80	3.3	1.63



Size	O-ring	
	A	B
35	29.0 × 0.5	S50
42	34.5 × 0.8	S56
50	40.64 × 1.14	S67
63	53.29 × 0.99	S80
80	S71	S105

[mm]

Size	LA	LB	LC	LD	N *1	LT	LU	LE	LF	LG	LH	LK	LM	DB	SG
35	65	56	73	31	8 (6)	M4	4.5	41	27	7	3.5	2	14	38	15.8
42	71	63	79	38	8 (6)	M4	4.5	45	29	8	4	2	16	48	15.8
50	82	72	93	45	8 (6)	M5	5.5	45.5	28	10	5	3	17.5	56	24.8
63	96	86	107	58	10 (8)	M5	5.5	52	36	10	5	3	16	67	27.8
80	125	113	138	78	12	M6	6.5	62	45	12	5	3	17	90	27.8

Size	SH	SL	W	T	SU	SA	SB	SC	M	ST	HD	CX	CY	CZ
35	6	18.5	-	-	2.5	23	11	8	6	M4x8	9.5	1.6	1	38
42	8	20.7	-	-	3	27	10	7	6	M5x8	9.5	1.3	1	45
50	12	21.5	4	13.8	-	32	14	10	8	M6x9	9	1.5	1.5	53
63	14	21.6	5	16.3	-	42	20	15	8	M8x10	12	3.4	1.5	66
80	14	23.6	5	16.3	-	55	26	20	8	M10x12	15	5.2	1.5	86

*1 -CN and -CF are different in dimensions. The -CF value is shown in ().

*2 For details in the input section, please check the drawings.

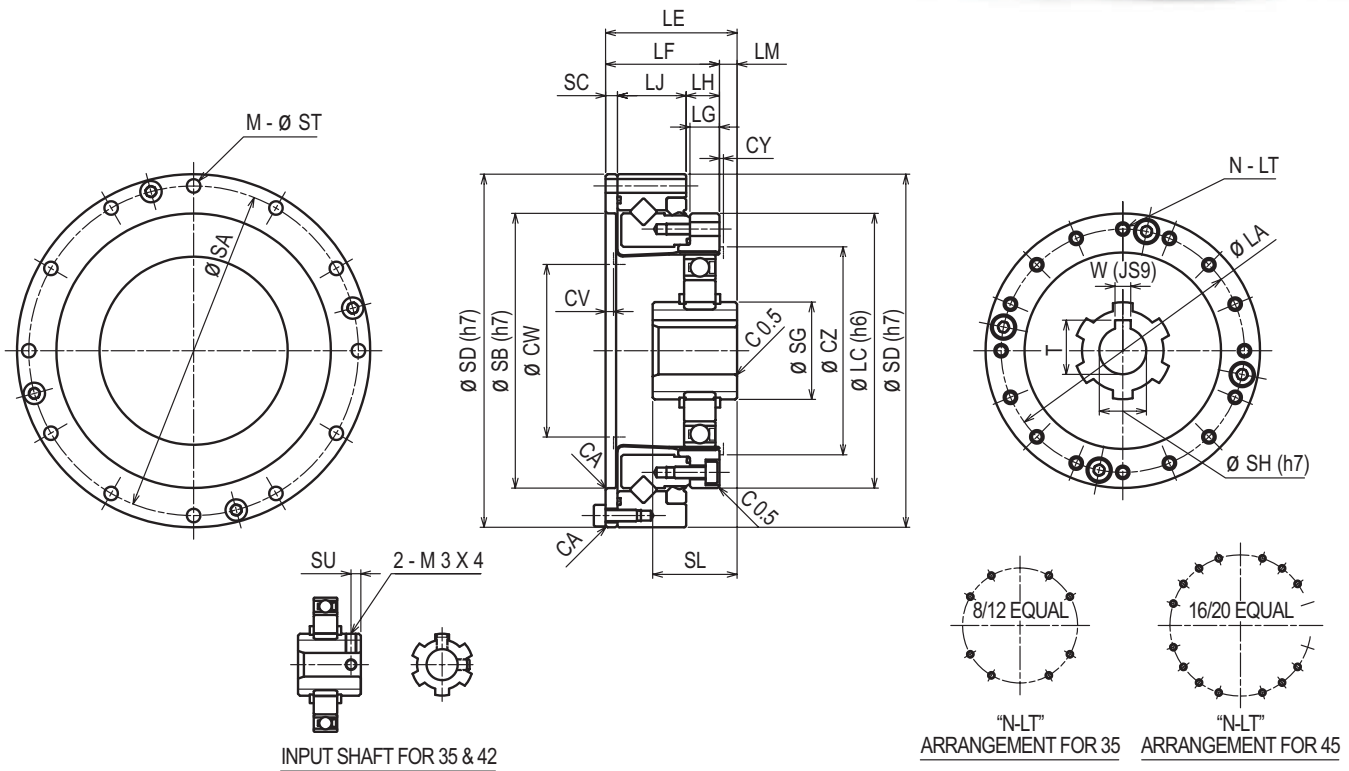
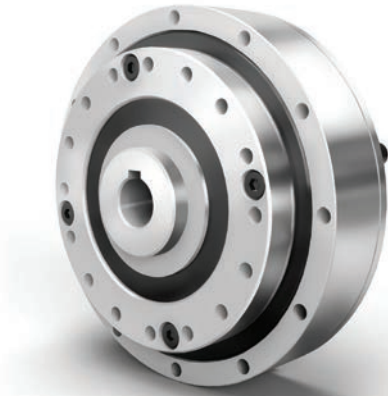
*3 Inner dimensions of CY, CZ are recommended dimensions.

Dimensions

Open type: Simple unit

WPS-□-□-SN

Size	Weight	Moment of Inertia
	kg	$\times 10^{-4} \text{kgm}^2$
35	0.39	0.039
42	0.55	0.087
50	0.79	0.209
63	1.3	0.549
80	2.7	1.65



[mm]

Size	LA	LC	LE	LF	LG	LH	LJ	LM	SG	SH	SL	W	T	SU	SA	SB
35	44	50	28.5	23.5	6	7	14.1	5	15.8	6	18.5	-	-	2.5	64	48
42	54	60	32.5	26.5	6.5	7.5	16	6	15.8	8	20.7	-	-	3	74	60
50	62	70	33.5	29	7.5	8.5	17.5	4.5	24.8	12	21.5	4	13.8	-	84	70
63	77	85	37	34	10	12	18.7	3	27.8	14	21.6	5	16.3	-	102	88
80	100	110	44	42	14	15	23.4	2	27.8	14	23.6	5	16.3	-	132	114

Size	SC	SD	M	ST	CA	CY	CZ	CV	CW	N	LT
35	2.4	70	8	3.5	C0.3	1	38	1.6	31	8	M3x5, $\varnothing 3.5 \times 6$
42	3	80	12	3.5	C0.3	1	45	2	37	16	M3x6, $\varnothing 3.5 \times 6.5$
50	3	90	12	3.5	C0.3	1.5	53	2	44	16	M3x6, $\varnothing 3.5 \times 7.5$
63	3.3	110	12	4.5	C0.3	1.5	66	2	56	16	M4x7, $\varnothing 4.5 \times 10$
80	3.6	142	12	5.5	C0.5	1.5	86	2	72	16	M5x8, $\varnothing 5.5 \times 14$

*1 For details in the input section, please check the drawings.

*2 Inner dimensions of CV, CW, CY, CZ are recommended dimensions.

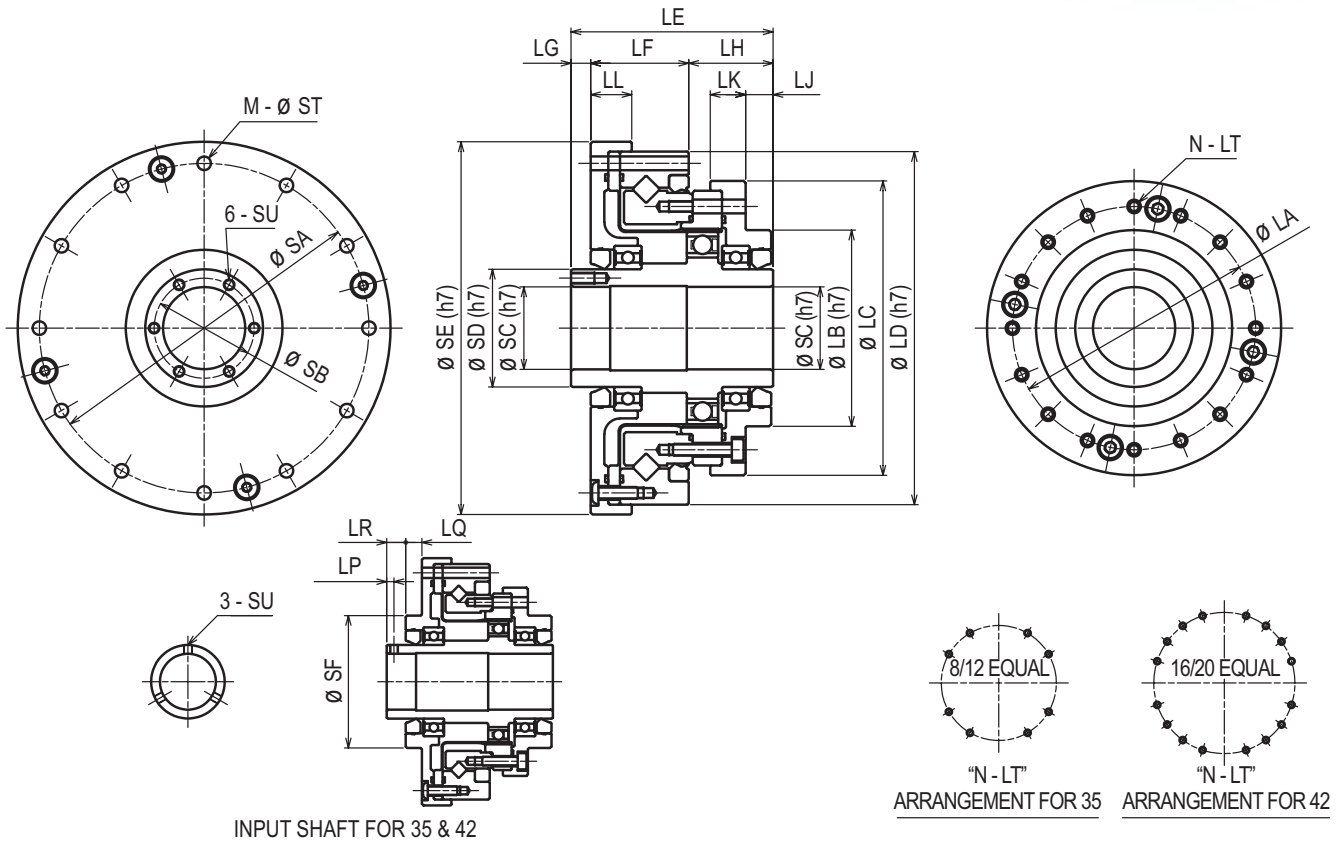
Reducer Model/ Specifications
 Dimensions
 Life Estimation (Elastic Bearing)
 Life Estimation (Main Bearing)
 Maximum Load at Input Shaft
 Lubricant Information
 Attachment Fixture Requirement Info
 Transmitting Torque
 Input Section Structure/ Installation & Assembly
 Motor Installation Procedure Info
 Characteristics Data

Dimensions

Open type: Unit (Hollow shaft)

WPU-□-□-SNH

Size	Weight	Moment of Inertia
	kg	$\times 10^{-4} \text{kgm}^2$
35	0.57	0.103
42	0.79	0.230
50	1.1	0.460
63	1.7	1.24
80	3.4	3.18



[mm]

Size	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LP	LQ	LR
35	44	36	54	70	52.5	20.5	12	20	7.5	8	9	2.5	5.5	6.5
42	54	45	64	80	56.5	23	12	21.5	8.5	8.5	10	2.5	5.5	6.5
50	62	50	75	90	51.5	25	5	21.5	7	9	10.5	-	-	-
63	77	60	90	110	55.5	26	6	23.5	6	8.5	10.5	-	-	-
80	100	85	115	142	65.5	32	7	26.5	5	9.5	12	-	-	-

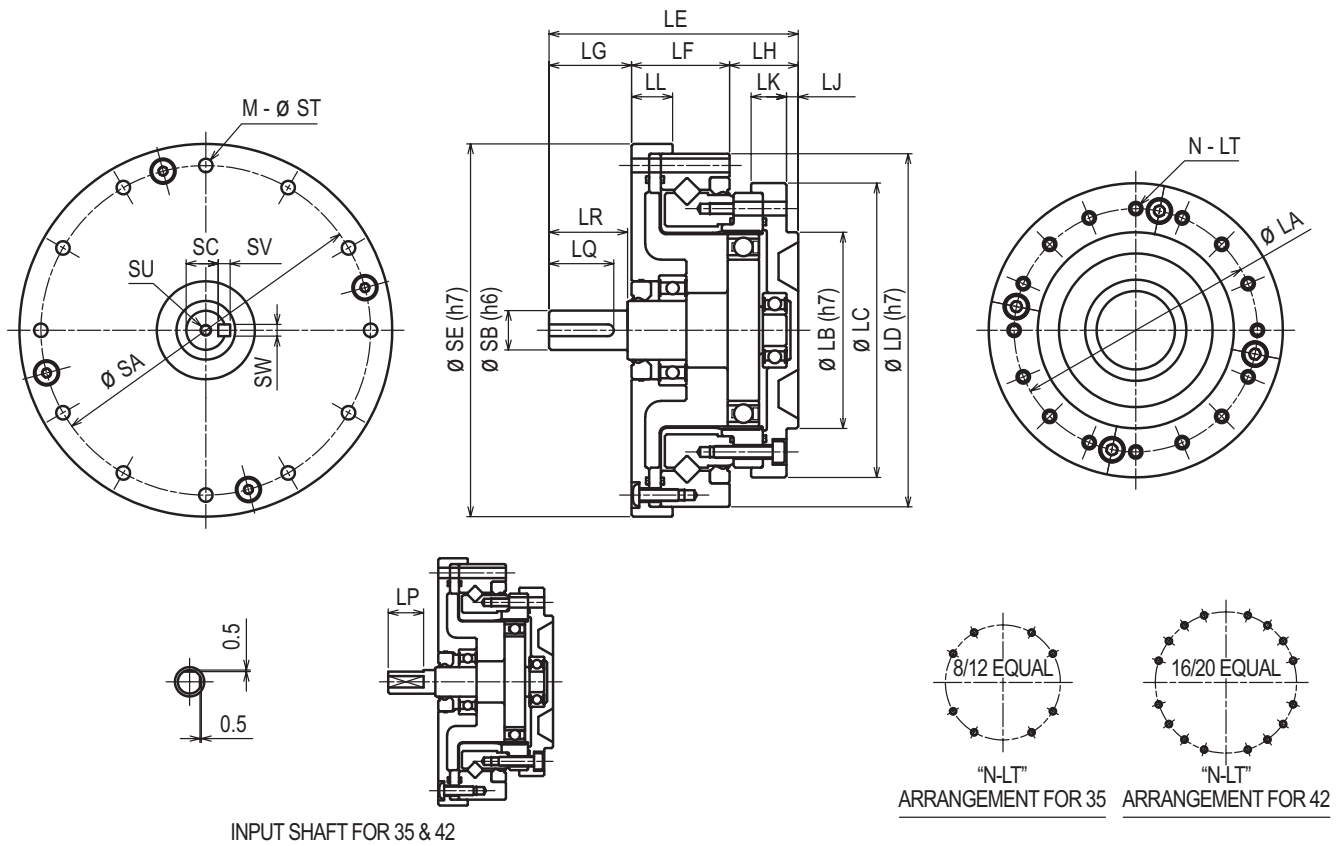
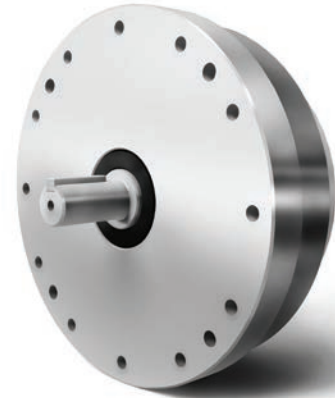
Size	SA	SB	SC	SD	SE	SF	M	ST	SU	N	LT
35	64	-	14	20	74	36	8	3.5	M3	8	M3x5, \varnothing 3.5x11.5
42	74	-	19	25	84	45	12	3.5	M3	16	M3x6, \varnothing 3.5x12
50	84	25.5	21	30	95	-	12	3.5	M3x6	16	M3x6, \varnothing 3.5x13.5
63	102	33.5	29	38	115	-	12	4.5	M3x6	16	M4x7, \varnothing 4.5x15.5
80	132	40.5	36	45	147	-	12	5.5	M3x6	16	M5x8, \varnothing 5.5x20.5

Dimensions

Open type: Unit (Input shaft)

WPU-□-□-SNJ

Size	Weight	Moment of Inertia
	kg	$\times 10^{-4} \text{kgm}^2$
35	0.48	0.038
42	0.69	0.090
50	1.0	0.208
63	1.6	0.554
80	3.2	1.74



[mm]

Size	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LP	LQ	LR
35	44	36	54	70	50.5	20.5	15	15	2.5	8	9	11	-	-
42	54	45	64	80	56	23	17	16	3	8.5	10	12	-	-
50	62	50	75	90	63.5	25	21	17.5	3	9	10.5	-	16.5	20
63	77	60	90	110	72.5	26	26	20.5	3	8.5	10.5	-	22.5	25
80	100	85	115	142	84.5	32	26	26.5	5	9.5	12	-	22.5	25

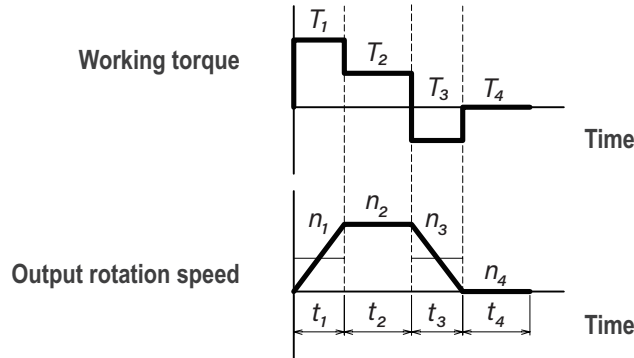
Size	SA	SB	SC	SE	SV	SW	M	ST	SU	N	LT
35	64	6	-	74	-	-	8	3.5	-	8	M3x5, \varnothing 3.5x11.5
42	74	8	-	84	-	-	12	3.5	-	16	M3x6, \varnothing 3.5x12
50	84	10	8.2	95	3	3	12	3.5	M3x6	16	M3x6, \varnothing 3.5x13.5
63	102	14	11	115	5	5	12	4.5	M5x10	16	M4x7, \varnothing 4.5x15.5
80	132	14	11	147	5	5	12	5.5	M5x10	16	M5x8, \varnothing 5.5x20.5

Reducer Model/ Specifications
 Dimensions
 Life Estimation (Elastic Bearing)
 Life Estimation (Main Bearing)
 Maximum Load at Input Shaft
 Lubricant Information
 Attachment Fixture Requirement Info
 Transmitting Torque
 Input Section Structure/ Installation & Assembly
 Motor Installation Procedure Info
 Characteristics Data

Life Estimation (Elastic Bearing)

Life span for the elastic bearing

Operation cycle example



Calculation formula for output torque

Average output torque	Tao	Nm	$T_{ao} = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot T_1 ^3 + n_2 \cdot t_2 \cdot T_2 ^3 + \dots + n_n \cdot t_n \cdot T_n ^3}{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}}$
Peak output torque value	Tmo	Nm	$T_{mo} = \text{maximum value of } T_1, T_2, \dots, T_n$

Please make sure the peak output torque is below the maximum output torque in the specification table.

Calculation formula for input speed

Average output rotation speed	nao	r/min	$n_{ao} = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}{t_1 + t_2 + \dots + t_n}$
Peak output rotation speed	nmo	r/min	$n_{mo} = \text{maximum value of } n_1, n_2, \dots, n_n$
Average input speed	nai	r/min	$n_{ai} = n_{ao} \times R \text{ (R = ratio)}$
Peak input speed value	nmi	r/min	$n_{mi} = n_{mo} \times R \text{ (R = ratio)}$

Please make sure the peak input speed value is below the maximum input speed in the specification table.

Calculation formula for life span

Part life span for the elastic bearing	Lhe	h	$L_{he} = 7000 \times \left(\frac{T_{ar}}{T_{ao}}\right)^3 \times \left(\frac{n_{ar}}{n_{ai}}\right)$
Rating torque	Tar	Nm	Nominal output torque in the specification table
Rating input rotation speed	nar	r/min	2000 r/min

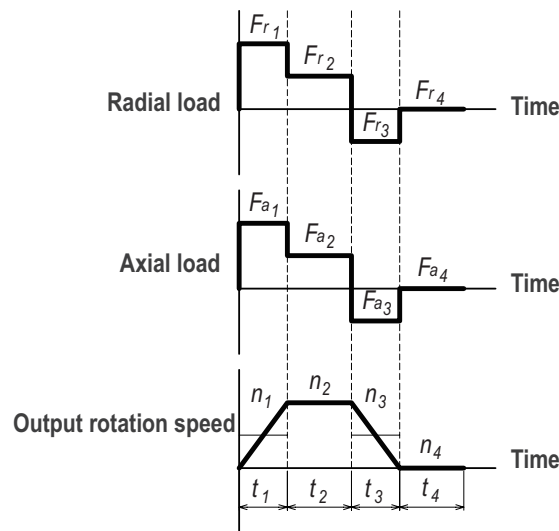
Life Estimation (Main Bearing)

Main bearing specification (Cross roller bearing)

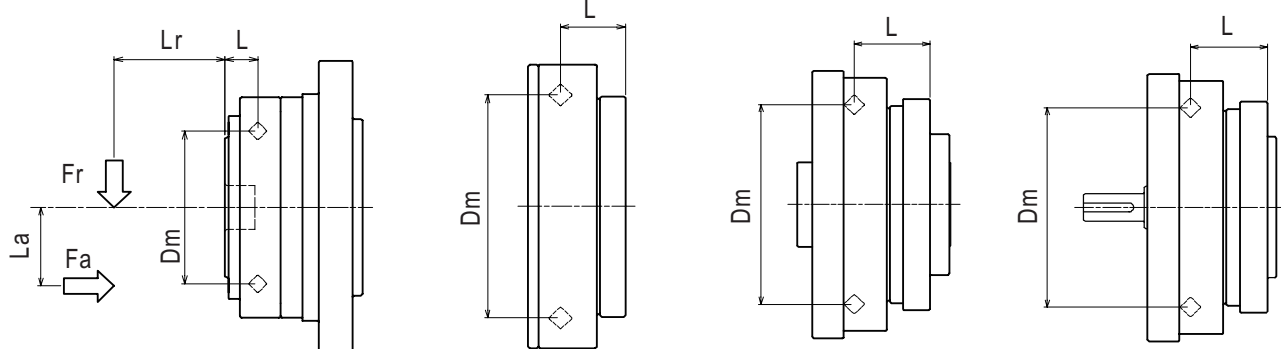
Series	Size	Pitch Circle Diameter of the Bearing Rollers	Offset	Basic Dynamic Load Rating	Basic Static Load Rating	Allowable Moment	Moment Rigidity
		Dm	L	C	Co	Mal	Km
		m	m	N	N	Nm	$\times 10^4$ Nm/rad
WPU-□-□-CF WPU-□-□-CN	35	0.0350	0.0095	4700	6070	41	4.38
	42	0.0425	0.0095	5290	7550	64	7.75
	50	0.0500	0.0095	5780	9000	91	12.8
	63	0.0620	0.0115	9600	15100	156	24.2
	80	0.0800	0.0130	15000	25000	313	53.9
WPS-□-□-SN	35	0.0500	0.0162	5800	8600	74	8.5
	42	0.0600	0.0184	10400	16300	124	15.4
	50	0.0700	0.0195	14600	22000	187	25.2
	63	0.0850	0.0241	21800	35800	258	39.2
	80	0.111	0.0299	38200	65400	580	100
WPU-□-□-SNH WPU-□-□-SNJ	35	0.0500	0.0217	5800	8600	74	8.5
	42	0.0600	0.0239	10400	16300	124	15.4
	50	0.0700	0.0255	14600	22000	187	25.2
	63	0.0850	0.0296	21800	35800	258	39.2
	80	0.111	0.0364	38200	65400	580	100

Life span for the main bearing

Operation cycle example



External load



Life Estimation (Main Bearing)

Calculation formula for the largest working moment

Peak working moment	Mm	Nm	$Mm = Frm \cdot (Lr + L) + Fam \cdot La$
Peak radial load	Frm	N	$Frm = \text{maximum value of } Fr_1, Fr_2, \dots Fr_n$
Peak axial load	Fam	N	$Fam = \text{maximum value of } Fa_1, Fa_2, \dots Fa_n$

Please make sure the peak working moment is below the maximum allowable moment.

Calculation formula for the Average radial load, Axial load, Average output rotation speed, Average working moment

Average radial load	Fra	N	$Fra = \sqrt[10]{\frac{n_1 \cdot t_1 \cdot Fr_1 ^{10/3} + n_2 \cdot t_2 \cdot Fr_2 ^{10/3} + \dots + n_n \cdot t_n \cdot Fr_n ^{10/3}}{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}}$
Axial load	Faa	N	$Faa = \sqrt[10]{\frac{n_1 \cdot t_1 \cdot Fa_1 ^{10/3} + n_2 \cdot t_2 \cdot Fa_2 ^{10/3} + \dots + n_n \cdot t_n \cdot Fa_n ^{10/3}}{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}}$
Average output rotation speed	nao	r/min	$nao = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}{t_1 + t_2 + \dots + t_n}$
Average working moment	Ma	Nm	$Ma = Fra \cdot (Lr + L) + Faa \cdot La$

Calculation formula for the Loading factor, Equivalent radial load

Loading factor	Xc, Yc	-	$\frac{Faa}{Fra + 2Ma / Dm} \leq 1.5$ in the case of, Xc = 1.0, Yc = 0.45
			$\frac{Faa}{Fra + 2Ma / Dm} > 1.5$ in the case of, Xc = 0.67, Yc = 0.67
Equivalent radial load	Pc	N	$Pc = Xc \cdot (Fra + 2Ma/Dm) + Yc \cdot Faa$

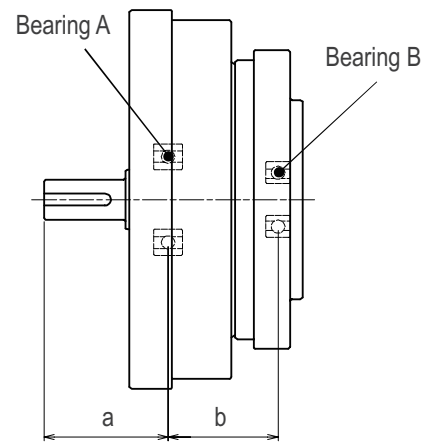
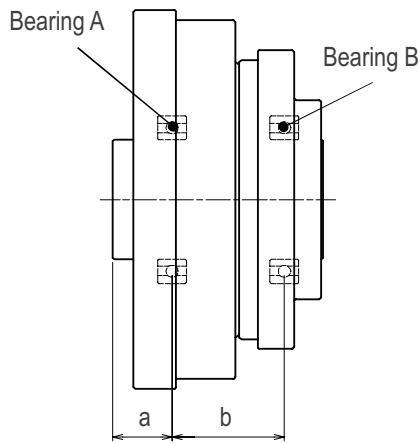
Life span for the main bearing

Life span for the main bearing	Lhc	h	$Lhc = \frac{10^6}{60 \cdot nao} \cdot \left(\frac{C}{fw \cdot Pc} \right)^{\frac{10}{3}}$
Impact factor	f w	-	1.0: no shock
			1.2: with some shock
			1.5: with shock and vibration

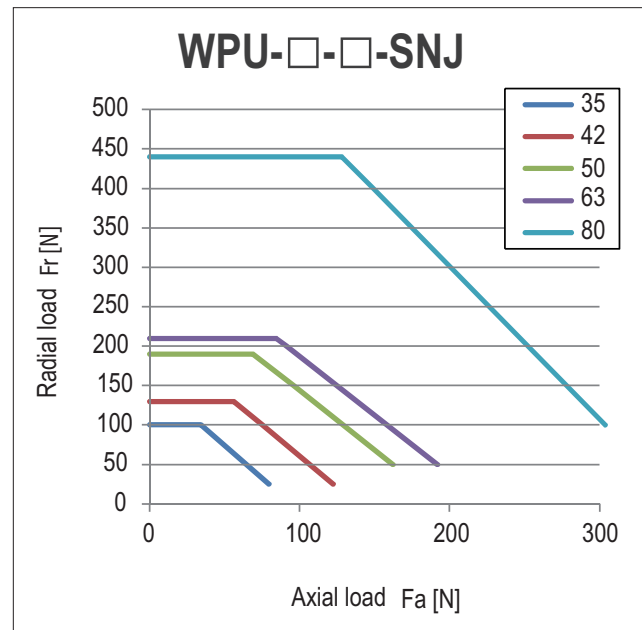
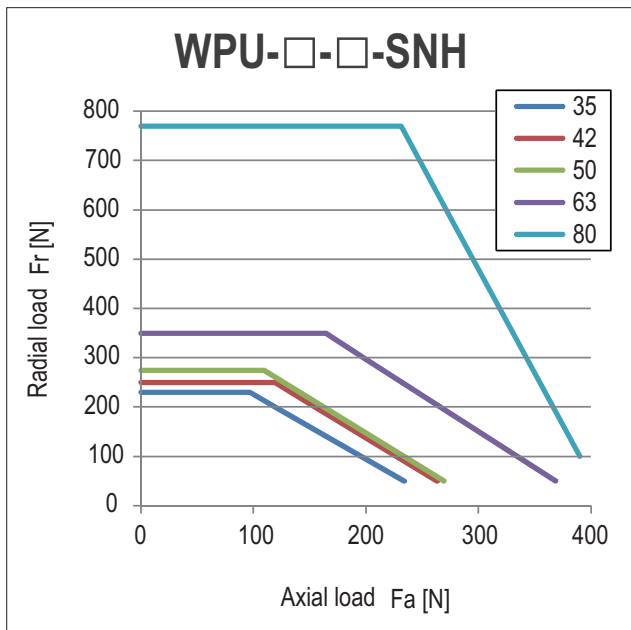
Maximum Load at Input Shaft

Bearing specification (Open type, Unit)

Series	Size	A Bearing A		B Bearing B		a	b
		Basic Dynamic Load Rating	Basic Static Load Rating	Basic Dynamic Load Rating	Basic Static Load Rating		
		C	Co	C	Co		
		N	N	N	N		
		mm	mm				
WPU-□-□-SNH	35	4000	2470	4000	2470	16	27
	42	4300	2950	4300	2950	16	31
	50	4500	3450	4500	3450	14.5	27.5
	63	4900	4350	4900	4350	15.5	30.8
	80	14100	10900	5350	5250	19	37
WPU-□-□-SNJ	35	2240	910	1080	430	24	21.5
	42	2700	1270	1610	710	27	23.5
	50	4350	2260	2240	910	31.5	26
	63	5600	2830	2700	1270	37.5	29
	80	9400	5000	4350	2260	39	38.5



Maximum load (Average input rotation speed : 2000r/min, Life span : 7000h)



Reducer Model/
Specifications

Dimensions

Life Estimation
(Elastic Bearing)

Life Estimation
(Main Bearing)

Maximum Load
at Input Shaft

Lubricant Information

Attachment Fixture
Requirement Info

Transmitting Torque

Input Section Structure/
Installation & Assembly

Motor Installation
Procedure Info

Characteristics Data

Lubricant Information

Grease

Sumiplex MP No.2 (SUMICO LUBRICANT CO., LTD.)

Operating temperature range: 0~40°C (ambient temperature)

Grease application

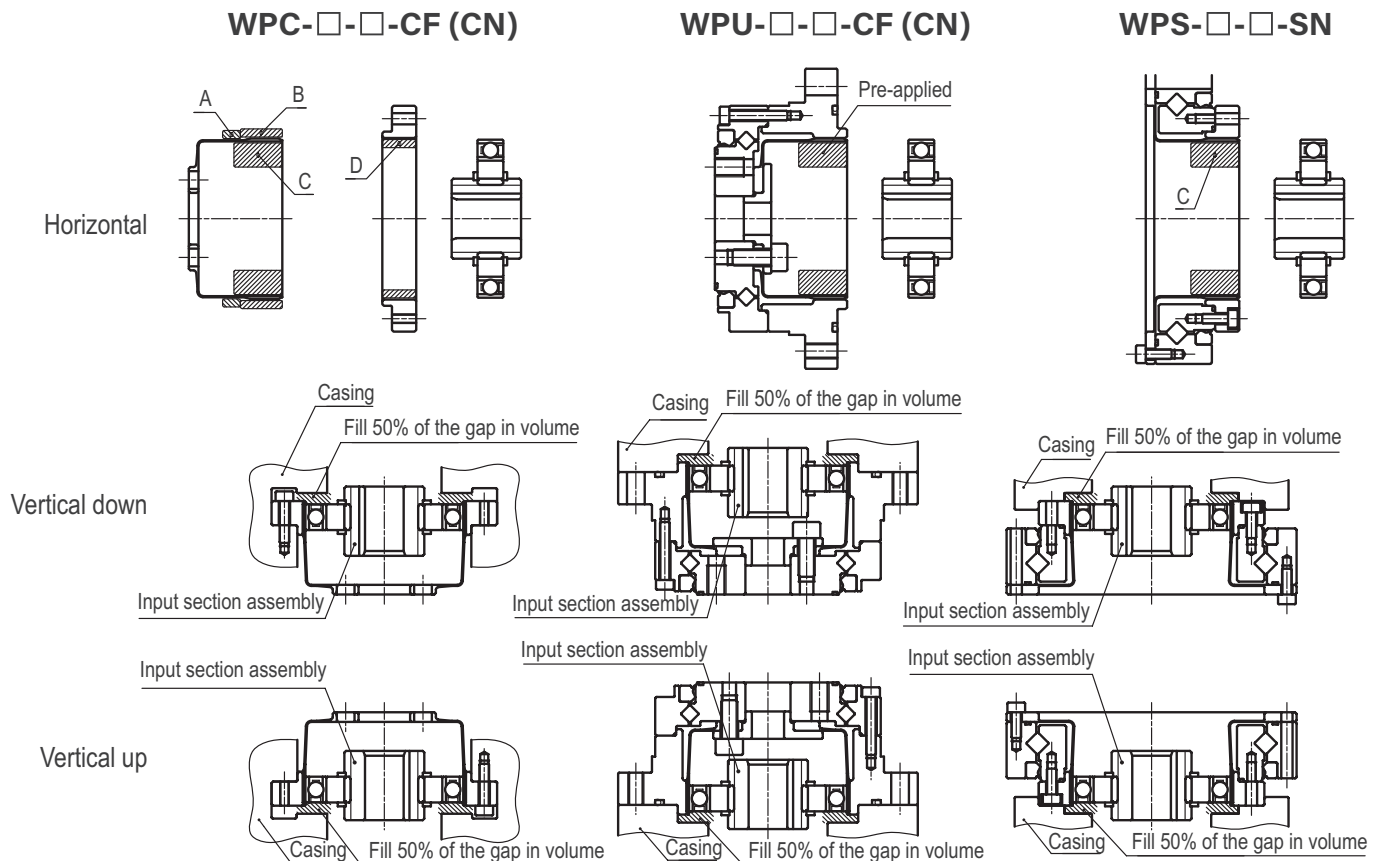
- The quantity of grease applied to C should be adjusted depending on the mounting direction. C of the unit type product is already filled with the same quantity of grease as horizontal mounting.
- For vertical up/down, 50% of the space between input assy and casing inner wall should be filled with grease.
- If the amount of grease is not sufficient due to case design, please contact us.

Please apply grease according to the table below.

[grams]

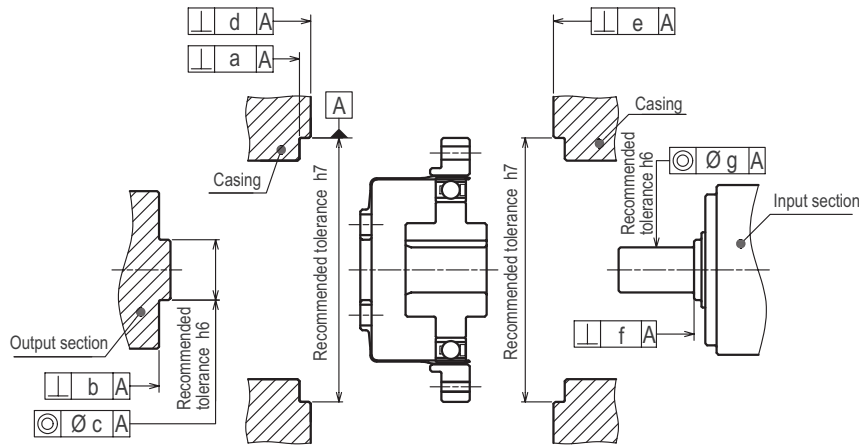
Size	Applied part					
	A	B	C Horizontal	C Vertical Up	C Vertical Down	D
35	0.3	0.3	6	8	9	0.3
42	0.5	0.5	10	12	14	0.5
50	0.8	0.8	16	18	21	0.8
63	1.5	1.5	30	35	40	1.5
80	3.0	3.0	60	70	80	3.0

Grease application location



Attachment Fixture Requirement

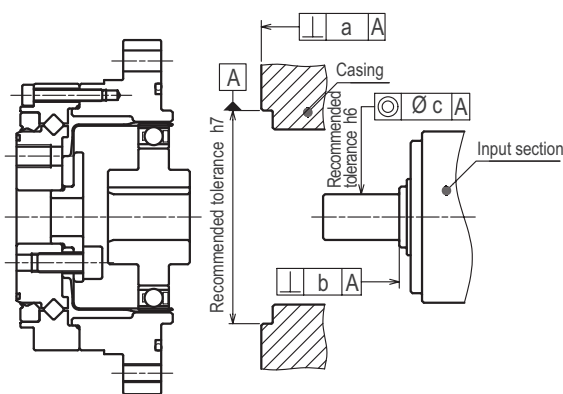
WPC-□-□-CF (CN)



Installation accuracy [mm]

Size	35	42	50	63	80
a	0.015	0.015	0.018	0.018	0.023
b	0.010	0.012	0.014	0.016	0.020
c	0.013	0.013	0.015	0.018	0.020
d	0.015	0.015	0.018	0.018	0.023
e	0.015	0.015	0.018	0.018	0.023
f	0.012	0.012	0.014	0.016	0.016
g	0.016	0.020	0.024	0.024	0.024

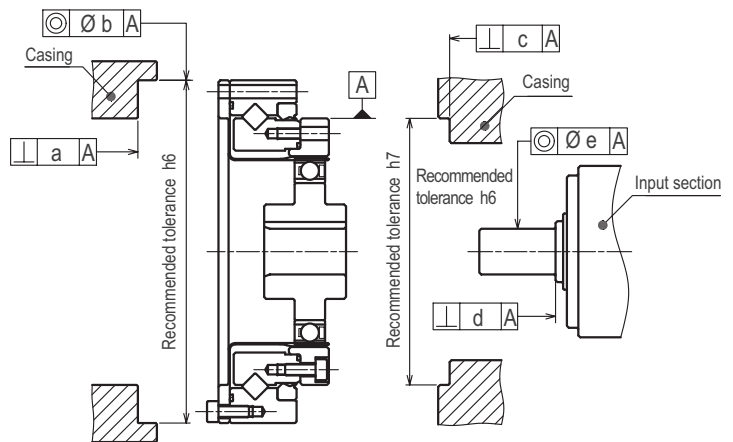
WPU-□-□-CF (CN)



Installation accuracy [mm]

Size	35	42	50	63	80
a	0.020	0.020	0.020	0.025	0.025
b	0.012	0.012	0.014	0.016	0.016
c	0.016	0.020	0.024	0.024	0.024

WPS-□-□-SN



Installation accuracy [mm]

Size	35	42	50	63	80
a	0.025	0.025	0.025	0.030	0.030
b	0.020	0.020	0.020	0.025	0.025
c	0.020	0.020	0.020	0.025	0.025
d	0.012	0.012	0.014	0.016	0.016
e	0.016	0.020	0.024	0.024	0.024

Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data
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Transmitting Torque

Bolting

Refer to the table below for the bolt tightening torque.

Note that the transmittable torque varies depending on the bolt count (different between CF and CN) and tightening torque.

Tightening torque for bolts

Bolt Size	M3	M4	M5	M6	M8	M10
Tightening Torque (Nm)	1.9	4.3	8.7	15	36	71

Recommended bolt: Strength rating 12.9

Bolt specifications and transmitting torque (Closed type, Unit)

Output flange attachment

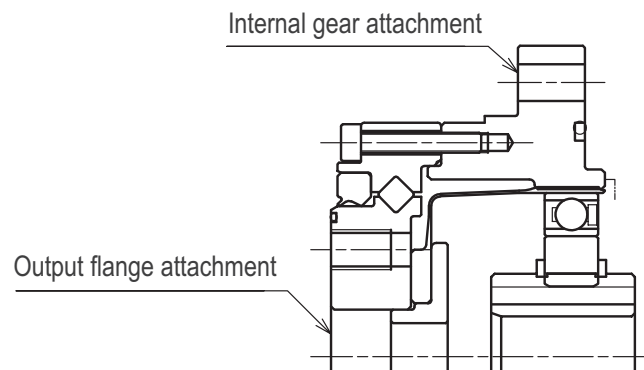
Size	35	42	50	63	80
Bolt Size	M4	M5	M6	M8	M10
Bolt Count	6	6	8	8	8
Bolt PCD [mm]	23	27	32	42	55
Tightening Torque [Nm]	4.3	8.7	15	36	71
Transmitting Torque [Nm]	56	106	238	566	1177

Internal gear attachment (CN)

Size	35	42	50	63	80
Bolt Size	M4	M4	M5	M5	M6
Bolt Count	8	8	8	10	12
Bolt PCD [mm]	65	71	82	96	125
Tightening Torque [Nm]	4.3	4.3	8.7	8.7	15
Transmitting Torque [Nm]	210	230	430	629	1392

Internal gear attachment (CF)

Size	35	42	50	63	80
Bolt Size	M4	M4	M5	M5	-
Bolt Count	6	6	6	8	-
Bolt PCD [mm]	65	71	82	96	-
Tightening Torque [Nm]	4.3	4.3	8.7	8.7	-
Transmitting Torque [Nm]	158	172	322	503	-



Transmitting Torque

Bolt specifications and transmitting torque (Closed type, Component)

Flex Gear Attachment

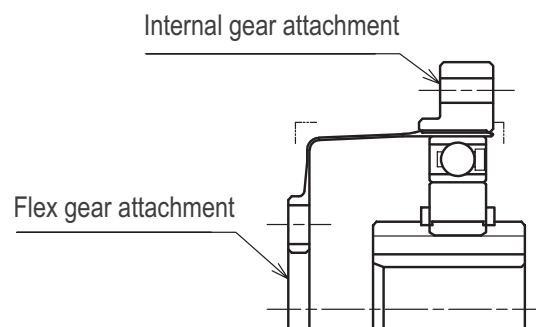
Size	35	42	50	63	80
Bolt Size	M4	M5	M5	M6	M8
Bolt Count	6	6	8	8	8
Bolt PCD	17	19	24	30	40
Tightening Torque	4.3	8.7	8.7	15	36
Transmitting Torque	41	75	126	223	539

Internal gear attachment (CN)

Size	35	42	50	63	80
Bolt Size	M3	M3	M3	M4	M5
Bolt Count	8	16	16	16	16
Bolt PCD	44	54	62	75	100
Tightening Torque	1.9	1.9	1.9	4.3	8.7
Transmitting Torque	82	200	230	485	1048

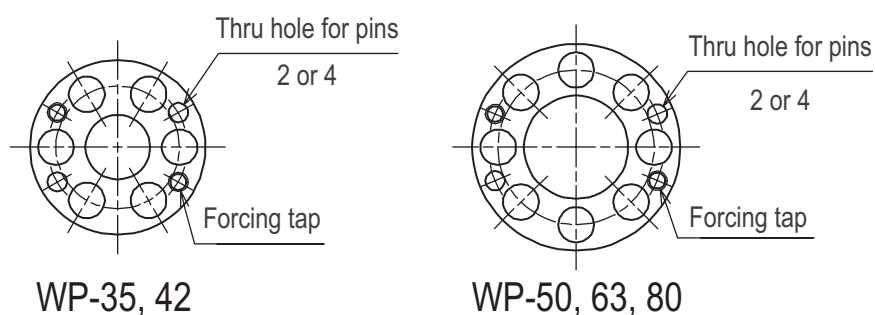
Internal gear attachment (CF)

Size	35	42	50	63	80
Bolt Size	M3	M3	M3	M4	M5
Bolt Count	6	12	12	12	12
Bolt PCD	44	54	62	75	100
Tightening Torque	1.9	1.9	1.9	4.3	8.7
Transmitting Torque	61	150	172	364	786



Reinforcement

Pins can be added if the transmittable torque at the flex gear interface is not sufficient. As an option, holes can be added.



Reducer Model/
Specifications

Dimensions

Life Estimation
(Elastic Bearing)

Life Estimation
(Main Bearing)

Maximum Load
at Input Shaft

Lubricant Information

Attachment Fixture
Requirement Info

Transmitting Torque

Input Section Structure/
Installation & Assembly

Motor Installation
Procedure Info

Characteristics Data

Transmitting Torque

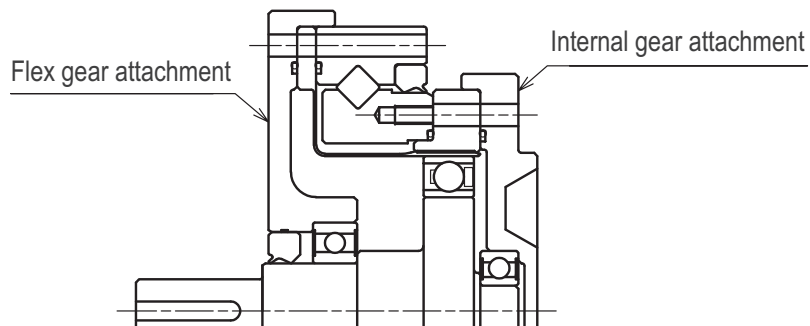
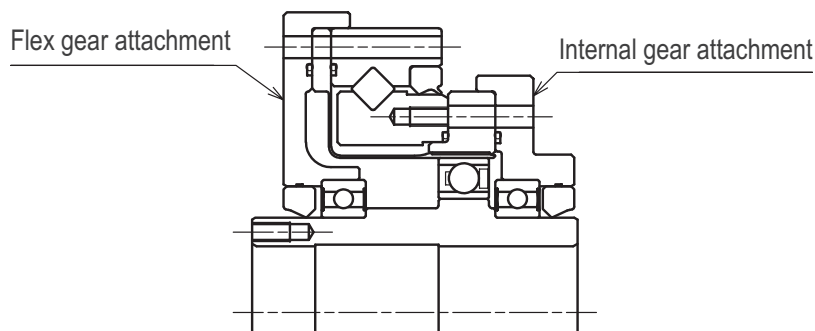
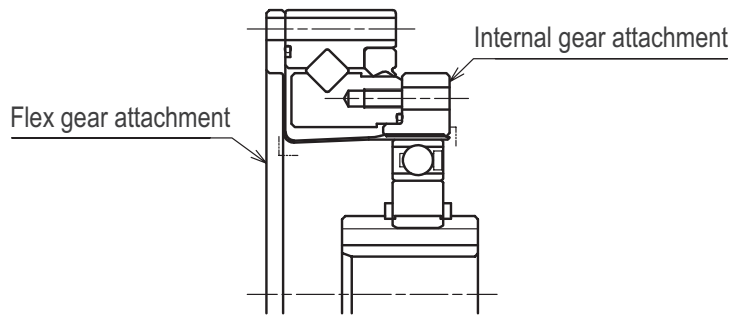
Bolt specifications and transmitting torque (Open type)

Flex gear attachment

Size	35	42	50	63	80
Bolt Size	M3	M3	M3	M4	M5
Bolt Count	8	12	12	12	12
Bolt PCD	64	74	84	102	132
Tightening Torque	1.9	1.9	1.9	4.3	8.7
Transmitting Torque	119	206	234	495	1037

Internal gear attachment

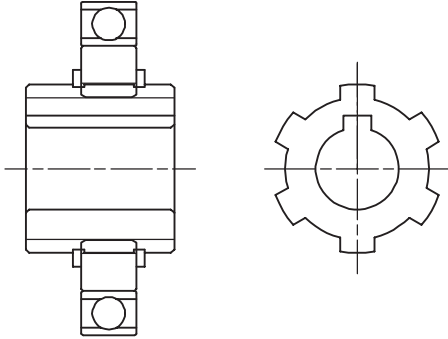
Size	35	42	50	63	80
Bolt Size	M3	M3	M3	M4	M5
Bolt Count	8	16	16	16	16
Bolt PCD	44	54	62	77	100
Tightening Torque	1.9	1.9	1.9	4.3	8.7
Transmitting Torque	82	200	230	498	1048



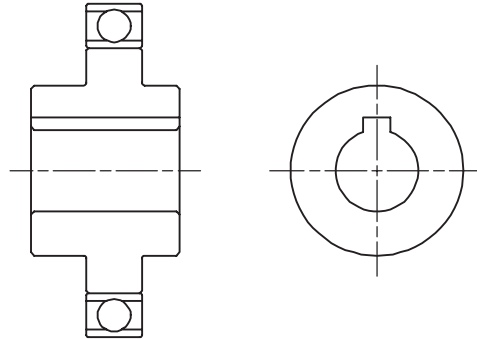
Input Section Structure

There are two types of input section structure, spline type (self-centering feature) and rigid type.

Spline type (Self-centering)

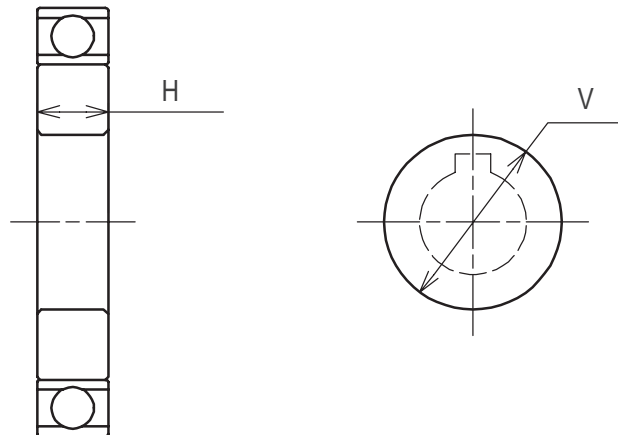


Rigid type



Cam hole diameter

The diameter of the cam opening is customizable. Holes smaller than the 'standard hole size' in the table will be built in the spline type. Holes equal to or larger than the 'standard hole size' and smaller than the 'maximum hole size' will be built in the rigid type. Please contact us if you need sizes outside the specification in the table.



Cam dimension

[mm]

Size	35	42	50	63	80
Standard Bore Size	6	8	12	14	14
V Maximum Bore Size	17	20	23	28	36
H Minimum Thickness	6	7	8	9	11

Reducer Model/
Specifications

Dimensions

Life Estimation
(Elastic Bearing)

Life Estimation
(Main Bearing)

Maximum Load
at Input Shaft

Lubricant Information

Attachment Fixture
Requirement Info

Transmitting Torque

Input Section Structure/
Installation & Assembly

Motor Installation
Procedure Info

Characteristics Data

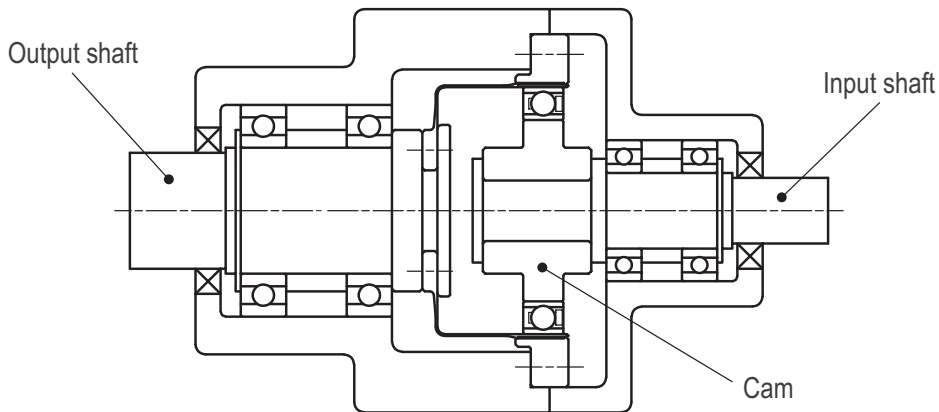
Installation and Assembly Instructions

WPC-□-□-C □

Shaft installation instruction

Please design the support structure for input shaft and output shaft so that both radial and axial loads are supported. (Diagram below shows an example)

Inside thrust load has an effect on the cam. Secure cam from possible axial movement.

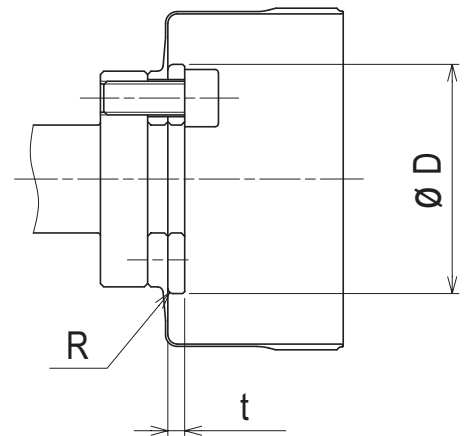


WPC-□-□-C □

Attachment flange requirement

For an attachment flange that comes in contact with flex gear, please build the corner radius according to the table below, in order to prevent damage.

	[mm]				
Item	35	42	50	63	80
D	24.5	29	34	42	55
R	1.2	1.2	1.4	1.5	2
t	2	2.5	2.5	5	7



Warm-up run

After assembly, "Warm-up run" is necessary before run with load / torque. The purpose is to coat the Flex gear and Internal gear surface evenly with enough grease in order to meet the load / torque performance.

Condition example

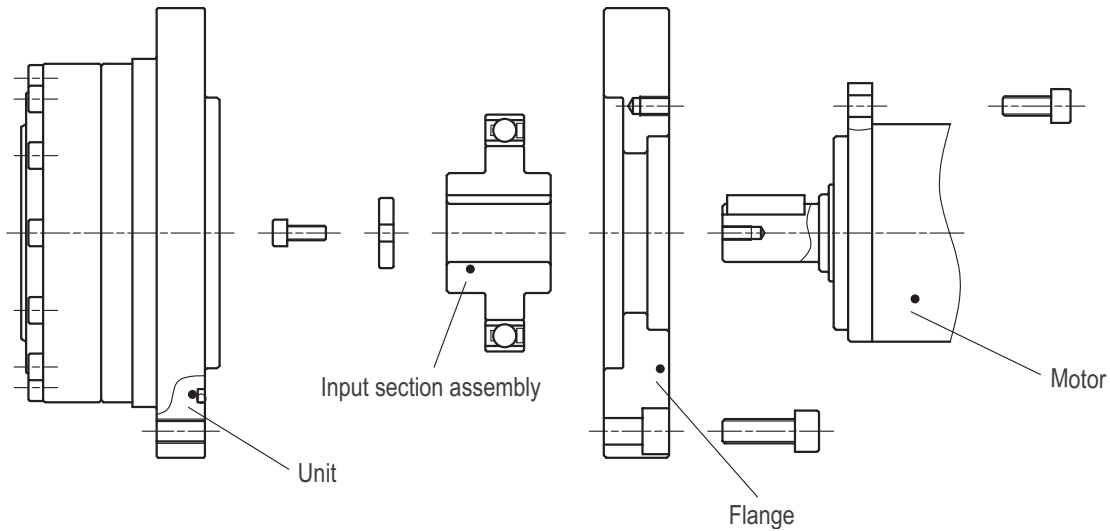
- Load - No load
- Input rotation speed - Start slowly from 1,000r/min or less, then accelerate up to 3,000r/min
- Test time - About 1 hour
- Output rotation angle - As large as possible

Motor Installation Procedure

WPU-□-□-C□

Procedure 1

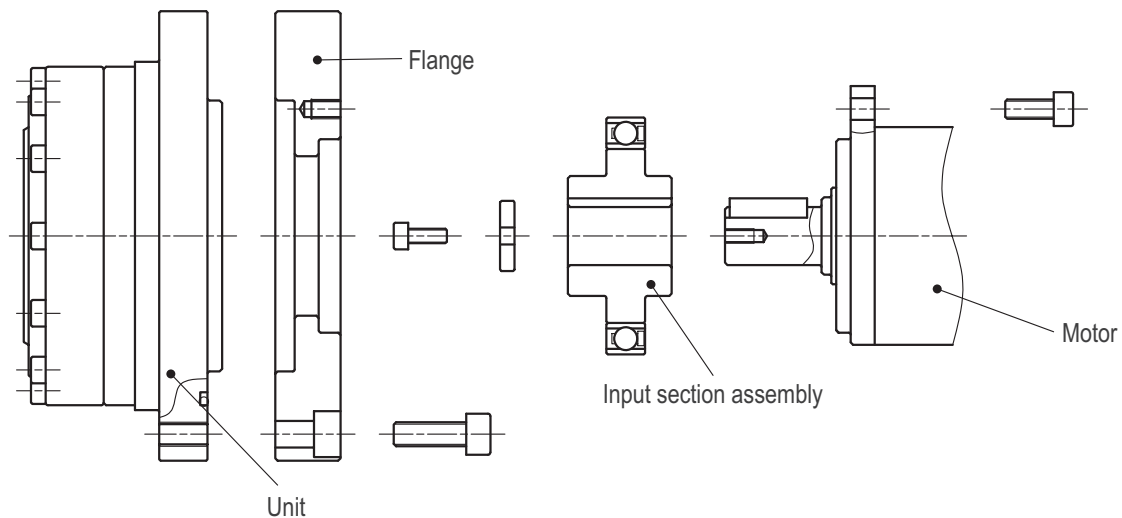
- Attach the flange on to the motor
- Attach the input section assembly with elastic bearings to the motor shaft
- Attach the unit



* This model is not directly attached to a motor. Necessary fixtures are to be prepared at the customer side.

Procedure 2

- Attach the input section assembly with elastic bearings to the motor shaft
- Attach the flange on to the motor
- Attach the unit



* This model is not directly attached to a motor. Necessary fixtures are to be prepared at the customer side.



Caution During Installation

- Do not use excessive force while mating parts
- Please watch for tilting during input section assembly and motor

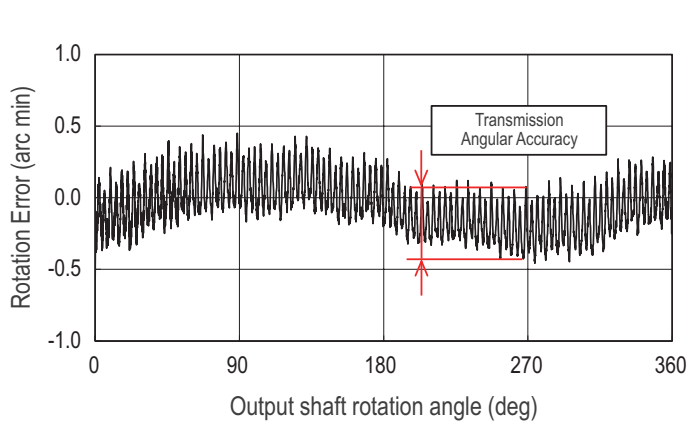
Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data
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Characteristics Data

Transmission angular accuracy

What is Transmission Angular Accuracy?

It is the difference between the measured output rotation angle and the theoretical angle, while input shaft is rotated with no load.



[arc min]

Ratio	Size				
	35	42	50	63	80
50	2.0	2.0	1.5	1.0	1.0
80	1.5	1.5	1.0	1.0	1.0
100	1.5	1.5	1.0	1.0	1.0
120	-	1.5	1.0	1.0	1.0
160	-	-	1.0	1.0	1.0

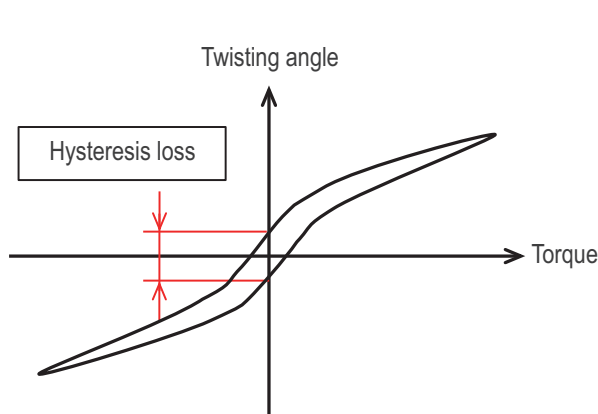
Table values are reference values.

Hysteresis loss

What is Hysteresis Loss?

When torque load is applied at the output shaft in alternate direction repeatedly with input shaft fixed, there is residual twisting angle when torque is back to zero.

In this context, hysteresis loss is the difference in the forward and backward twisting angle



[arc min]

Ratio	Size				
	35	42	50	63	80
50	2.0	2.0	2.0	2.0	2.0
80	1.5	1.5	1.0	1.0	1.0
100	1.5	1.5	1.0	1.0	1.0
120	-	1.5	1.0	1.0	1.0
160	-	-	1.0	1.0	1.0

Table values are reference values.

Characteristics Data

Maximum backlash

What is Maximum Backlash?

In this context, maximum backlash is the output backlash for spline type input shaft.

(Backlash is zero for rigid type input, because gear engagement backlash is zero)

[arc min]

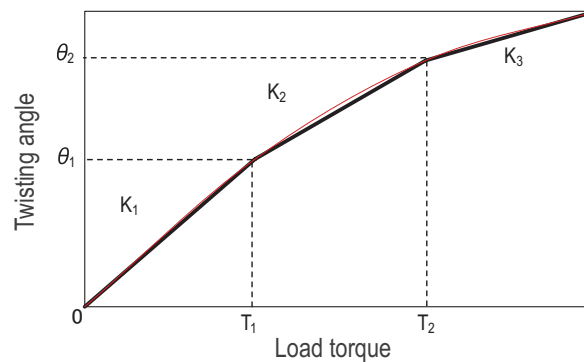
Ratio	Size				
	35	42	50	63	80
50	27	27	18	16	16
80	17	17	11	10	10
100	13	13	9	8	8
120	-	11	7	7	7
160	-	-	6	5	5

Maximum backlash

What is Maximum Backlash?

In this context, maximum backlash is the output backlash for spline type input shaft.

(Backlash is zero for rigid type input, because gear engagement backlash is zero)



K1... Spring coefficient at $0 \sim T_1$ torque
 K2... Spring coefficient at $T_1 \sim T_2$ torque
 K3... Spring coefficient at $T_2 \sim$ torque

Ratio	Item	Unit	Size				
			35	42	50	63	80
-	T_1	Nm	2	3.9	7	14	29
-	T_2	Nm	6.9	12	25	48	108
50	K_1	$\times 10^4 \text{Nm/rad}$	0.28	0.69	1.1	2.7	5.6
	K_2	$\times 10^4 \text{Nm/rad}$	0.45	0.85	1.7	3.3	7.1
	K_3	$\times 10^4 \text{Nm/rad}$	0.55	1.1	2.5	4.0	8.3
	θ_1	arcmin	2.3	2.2	2.0	1.8	2.0
	θ_2	arcmin	5.7	4.5	5.3	5.5	6.5
80 100 120 160	K_1	$\times 10^4 \text{Nm/rad}$	0.45	0.92	1.2	3.3	6.9
	K_2	$\times 10^4 \text{Nm/rad}$	0.63	1.1	1.8	3.7	8.1
	K_3	$\times 10^4 \text{Nm/rad}$	0.70	1.3	2.2	4.5	10
	θ_1	arcmin	1.8	1.3	1.8	1.6	1.7
	θ_2	arcmin	4.7	3.5	4.8	4.4	4.9

Average value shown in the table.

Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data
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Characteristics Data

Starting torque (Closed type, Unit)

What is Starting Torque?

Input torque needed for input side to start rotating (no load, ambient temperature: 25°C)

[cNm]

Ratio	Size				
	35	42	50	63	80
50	1.7	3.9	5.5	8.7	19
80	1.9	4.2	6.0	9.5	21
100	1.6	3.5	5.0	7.9	18
120	-	2.8	4.0	6.3	14
160	-	-	3.6	5.8	13

*1 For reference only. Torque value may vary depending on the condition.

*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Output starting torque (Closed type, Unit)

What is Output Starting Torque?

Output torque needed for output side to start rotating (no load, ambient temperature : 25°C)

[Nm]

Ratio	Size				
	35	42	50	63	80
50	1.3	2.6	4.5	5.7	12
80	1.9	4.0	6.8	8.6	19
100	2.1	4.4	7.5	9.5	21
120	-	5.3	9.0	11	25
160	-	-	9.9	13	29

*1 For reference only. Torque value may vary depending on the condition.

*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

No-load running torque (Closed type, Unit)

What is No-load Running Torque?

Input torque needed to keep it running with no load (average value, ambient temperature: 25°C)

[cNm]

Ratio	Input Rotation Speed	Size				
		35	42	50	63	80
50	500r/min	3.1	5.1	11.2	13.7	26.1
	1000r/min	3.4	5.4	12.4	15.2	28.6
	2000r/min	3.6	5.9	13.6	16.9	31.3
	3500r/min	3.9	6.3	14.9	18.8	34.2
80	500r/min	4.3	7.7	8.4	15.6	28.6
	1000r/min	4.6	8.3	9.2	17.3	31.2
	2000r/min	5.0	8.9	10.1	19.2	34.2
	3500r/min	5.4	9.6	11.1	21.4	37.4
100	500r/min	2.9	7.4	9.5	14.2	22.5
	1000r/min	3.1	8.0	10.5	15.7	24.6
	2000r/min	3.3	8.6	11.5	17.5	26.9
	3500r/min	3.6	9.2	12.6	19.4	29.4
120	500r/min	-	6.1	9.2	12.4	26.3
	1000r/min	-	6.5	10.1	13.8	28.8
	2000r/min	-	7.0	11.1	15.3	31.5
	3500r/min	-	7.5	12.2	17.0	34.5
160	500r/min	-	-	8.0	13.9	29.1
	1000r/min	-	-	9.1	14.8	30.8
	2000r/min	-	-	10.3	16.2	33.1
	3500r/min	-	-	11.6	17.7	35.7

*1 For reference only. Torque value may vary depending on the condition.

*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Reducer Model/
Specifications

Dimensions

Life Estimation
(Elastic Bearing)Life Estimation
(Main Bearing)Maximum Load
at Input Shaft

Lubricant Information

Attachment Fixture
Requirement Info

Transmitting Torque

Input Section Structure/
Installation & AssemblyMotor Installation
Procedure Info

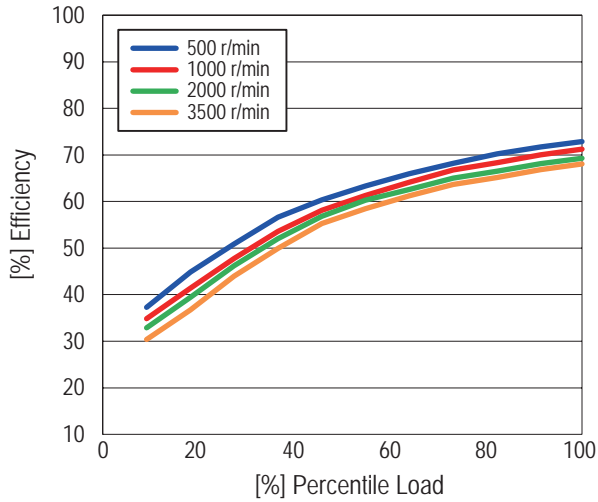
Characteristics Data

Characteristics Data

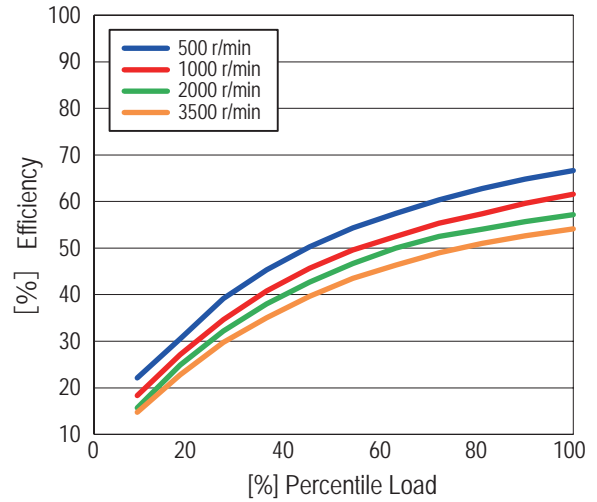
Efficiency (Closed type, Unit)

- Percentile load (%) is equal to load torque divided by allowable average torque.
- Ambient temperature: 25°C

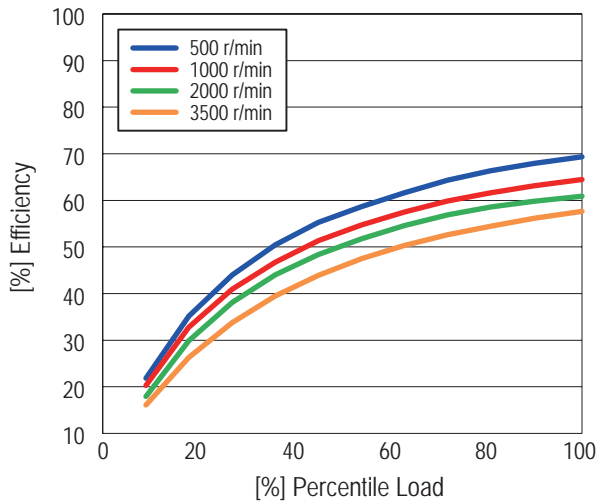
WPU-35-50



WPU-35-80



WPU-35-100



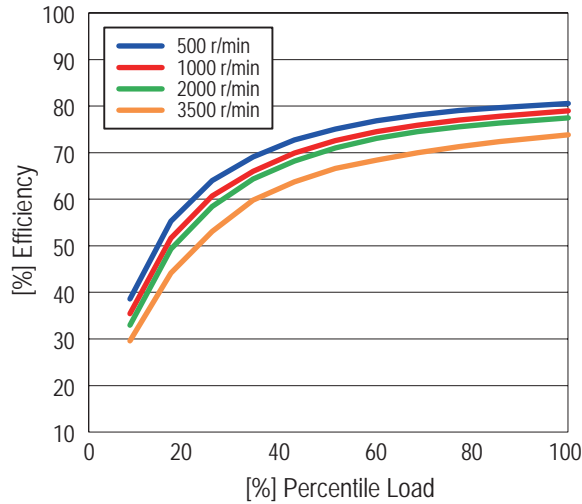
*1 These diagrams represent the average value of the actual measurement.
 *2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

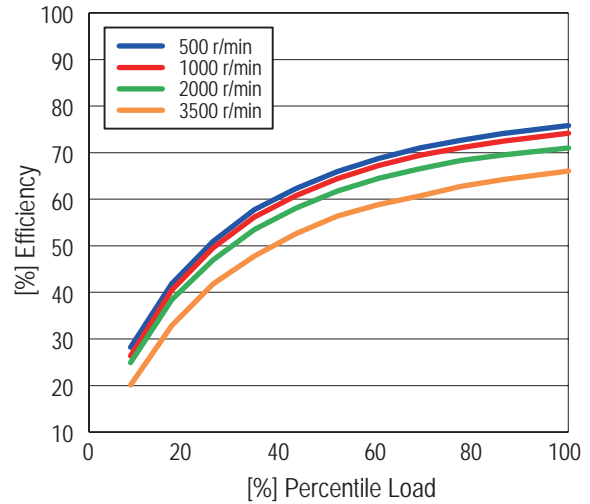
Efficiency (Closed type, Unit)

- Percentile load (%) is equal to load torque divided by allowable average torque.
- Ambient temperature: 25°C

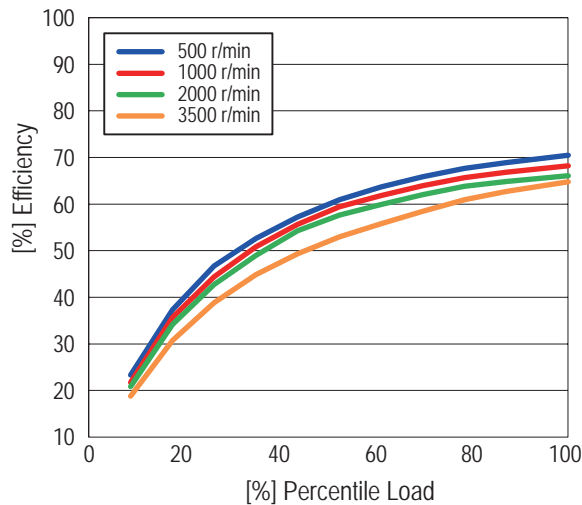
WPU-42-50



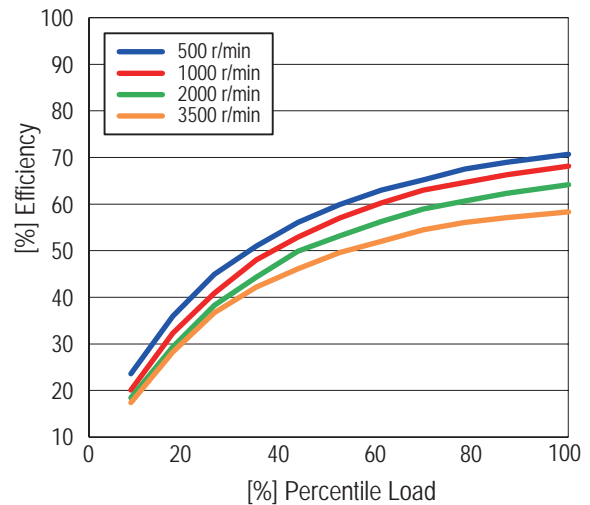
WPU-42-80



WPU-42-100



WPU-42-120



*1 These diagrams represent the average value of the actual measurement.
 *2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

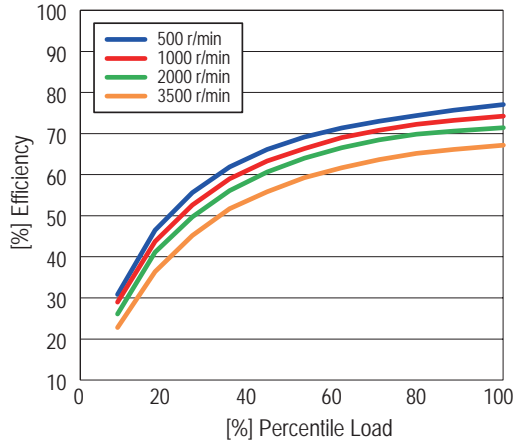
Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data
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Characteristics Data

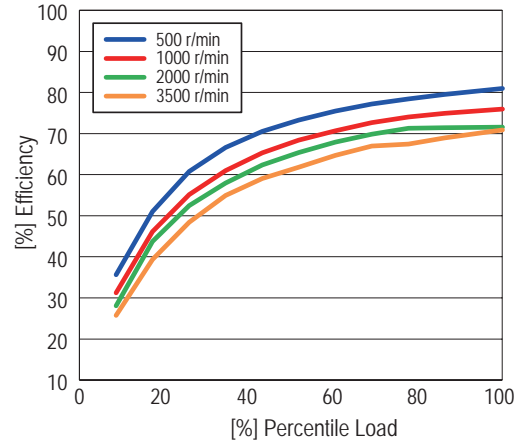
Efficiency (Closed type, Unit)

- Percentile load (%) is equal to load torque divided by allowable average torque.
- Ambient temperature: 25°C

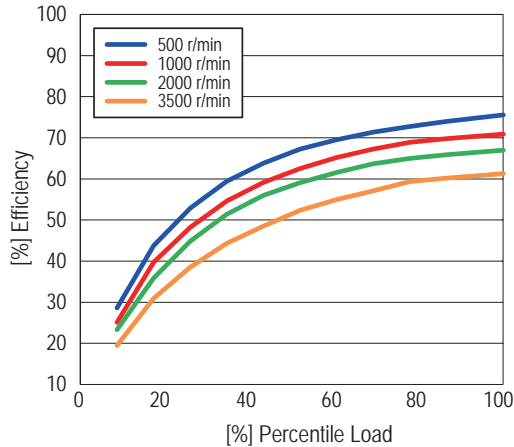
WPU-50-50



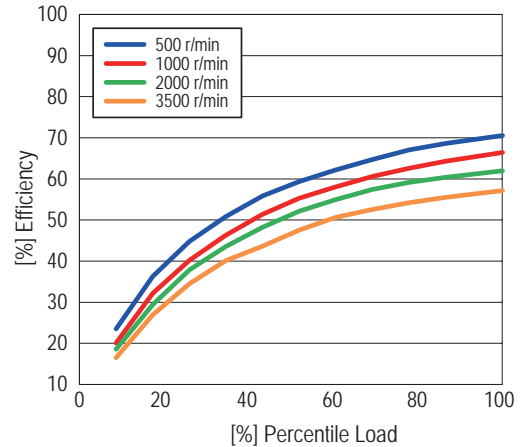
WPU-50-80



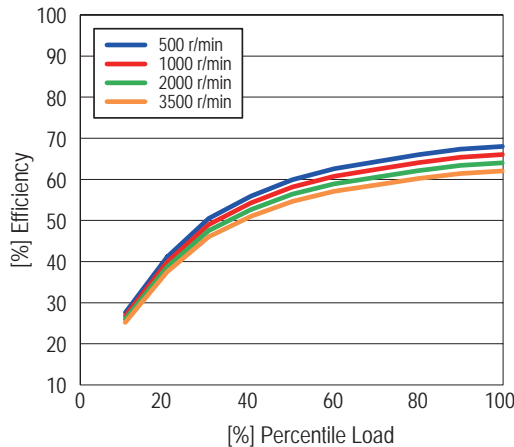
WPU-50-100



WPU-50-120



WPU-50-160



*1 These diagrams represent the average value of the actual measurement.

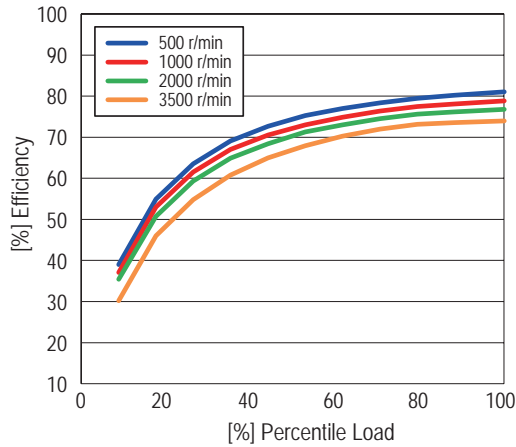
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

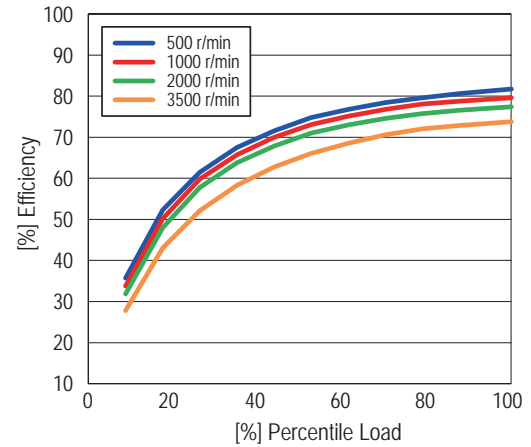
Efficiency (Closed type, Unit)

- Percentile load (%) is equal to load torque divided by allowable average torque.
- Ambient temperature: 25°C

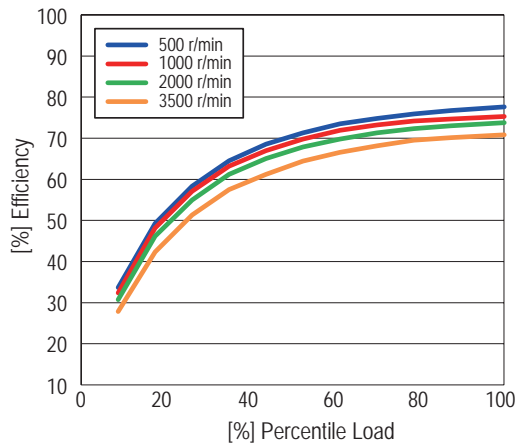
WPU-63-50



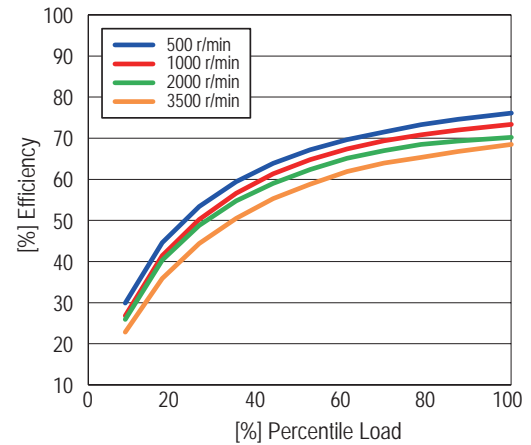
WPU-63-80



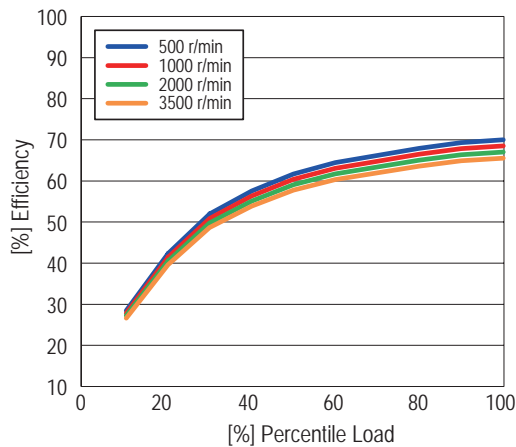
WPU-63-100



WPU-63-120



WPU-63-160



*1 These diagrams represent the average value of the actual measurement.

*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

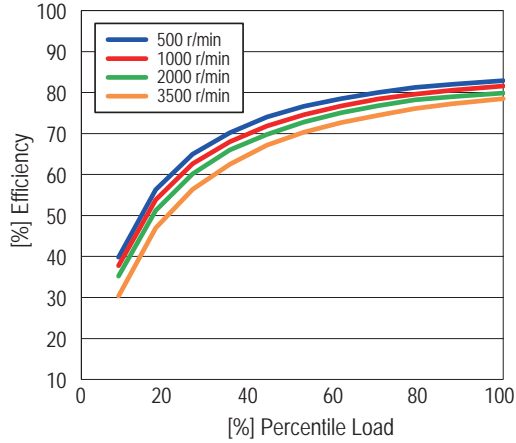
Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data
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Characteristics Data

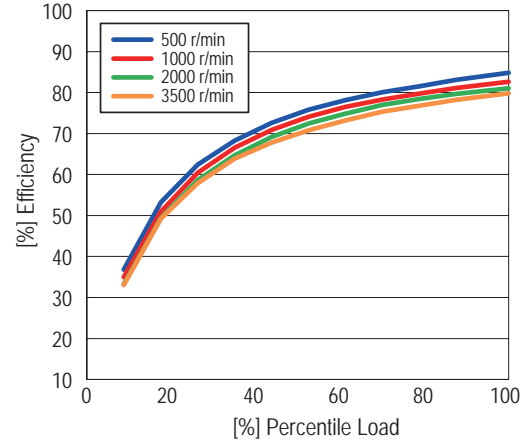
Efficiency (Closed type, Unit)

- Percentile load (%) is equal to load torque divided by allowable average torque.
- Ambient temperature: 25°C

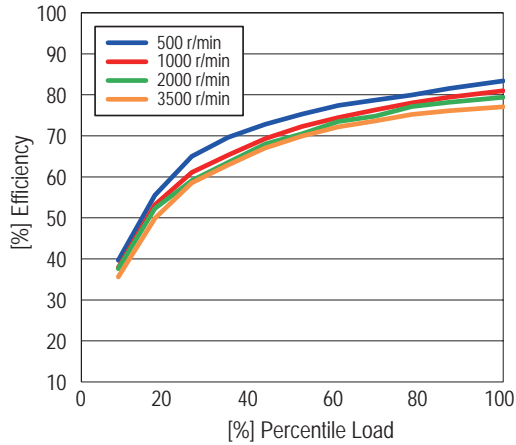
WPU-80-50



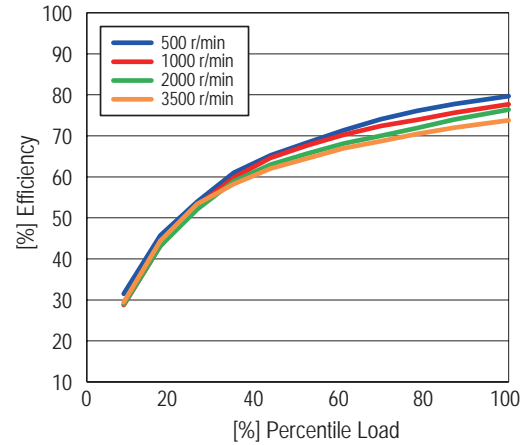
WPU-80-80



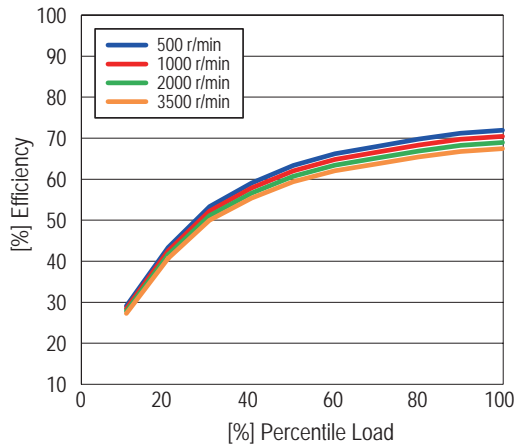
WPU-80-100



WPU-80-120



WPU-80-160



*1 These diagrams represent the average value of the actual measurement.

*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Reducer Model/ Specifications	Dimensions	Life Estimation (Elastic Bearing)	Life Estimation (Main Bearing)	Maximum Load at Input Shaft	Lubricant Information	Attachment Fixture Requirement Info	Transmitting Torque	Input Section Structure/ Installation & Assembly	Motor Installation Procedure Info	Characteristics Data

Customer Service and Support

Distinction in Service and Support

Nidec Drive Technology Corporation has invested heavily in building a global customer service and application support network that will meet the evolving needs of our customers. By leveraging our global infrastructure, our OEM customers maintain their competitiveness and profitability at home while able to expand into emerging markets abroad without any drop-off of service and support.

Nidec DTC pledges that we will continue to expand our service and support network footprint globally, and continuously strive for perfection as a dependable partner to our customers. In this section you will learn about our service and support capabilities that we will leverage in order to provide you peace of mind.

Online and Phone Support

Resolve your technical issues quickly and accurately, without disrupting your business. When you do business with Nidec Drive Technology, your company and your customers have immediate access to our global network of support centers and resources. Whether you need help designing, installing, and maintaining equipment or diagnosing an operating issue, Nidec DTC will deliver the tools and information that you need in order to insure that your equipment is running to perfection.

Contact your local sales office for immediate support either over the phone or in the field. All customer accounts in North America have a dedicated Technical Support Engineer, knowledgeable about your business, on-standby ready to support you and your customers. If you do not know who to contact, please call our 1-800 number in order to get properly directed to the right person for help.

For online support, please visit our website in order to download any drawings, instruction manuals, or technical performance specifications that you require. All catalogs and brochures are easily downloadable on the website. If you prefer to inquire about an issue or for more information, please do not hesitate to submit your request online or email us at the address listed below.

Training Services

Investing our time in you, so together we build better, more competitive product for your customer. As the industrial world becomes increasingly competitive, new technologies are introduced every year requiring manufacturers to constantly rationalize and update existing designs. As a result, successful manufacturers realize the absolute need for product training.

Nidec DTC has a network of engineers that are factory trained and authorized to provide your workforce solid training on our products and basic power transmission concepts. The main objective of our standard program and materials is to better empower your workforce to size and select gearboxes for any motion control applications. We provide this service at no cost to our customers, because we see the value in building a more knowledgeable customer and helping them more quickly react to equipment design revisions when needed.

Other manufacturers are not as forthcoming with sharing information with their customers, an attempt to hide their higher manufacturing costs or to use unreleased performance data as a "product differentiator." Nidec DTC views their customers as long term partners and trains and shares information freely based on that vision.

Training classes can be conducted online, at any of our sales branches or offices, or at key distributor branches when requested. Nidec DTC can also bring the training session to your facility in order to make better use of your time and costs. A thorough hands-on training seminar can be provided at our North American headquarters in Glendale Heights, where customers can get the opportunity to completely assemble and test our products.

The Nidec DTC training program options provide support for any budget. Our training programs improve your employees' skill and knowledge competencies in the areas of power transmission and motion control while addressing any location, time, travel and productivity constraints. Contact your local sales office today in order to get a product refresher on your calendar.



Nidec Drive Technology Hotline:

Toll-free: (800) 842-1479

Email: info@nidec-dtc.com

Selection Tool Configurator

Nidec Drive Technology's Online Product Configurator makes it easier than ever for engineers to incorporate our products into their drive system design. Our configurator allows our customers to select from wide range of servo motor manufacturer models to ensure flawless fitment with our products. With over 75 motor manufacturers included, there is a good possibility we have a solution ready to go.

In addition to motor sizing, our configurator also allows our customers to select gearheads based on application. These applications include rotary tables, belt conveyors, rack and pinion drives, lifting and lowering devices, ball screws, drive gears, drive carriages and robot joints. After selecting the application template, customers can then input the application load parameters and motion profile. The proper frame size and reduction ratio are then determined, with motor selection as the final last step.

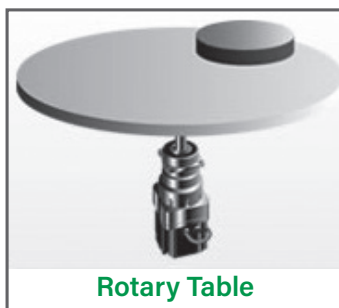
Once sizing is complete, our configurator will then display the full part number, along with gearbox and motor technical specifications. This part number includes the motor mounting adapter, which can be sent directly to our sales support team for pricing & delivery.



Drawings and models are also available in PDF, DXF, IGS and STEP formats, making it simple for machine designers to quickly drop them into machine schematics to check for proper fitment. We have seasoned application engineers standing by to assist with any sizing or selection questions.

<https://www.nidec-drivetechnology.co.jp/selection/all/>

Application Selection



Rotary Table



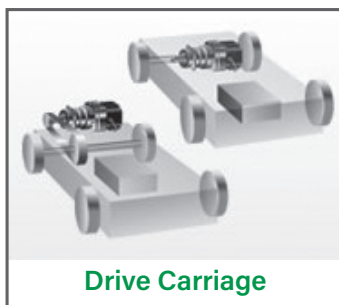
Belt Conveyor



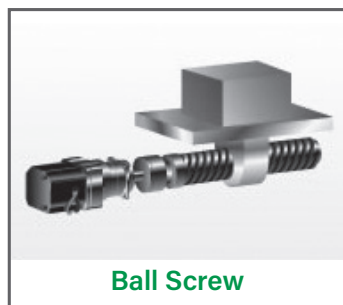
Rack and Pinion



Lifting & Lowering Device



Drive Carriage



Ball Screw



Drive Gears



Robot Joints

www.nidec-dtc.com

Nidec

NIDEC DRIVE TECHNOLOGY CORPORATION
175 Wall Street, Glendale Heights, IL 60139 USA
Phone: (800) 842-1479 • info@nidec-dtc.com