Reducer Model Nomenclature

WP	C	—	35	—	50	—	CR	—	**
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 80 100		50 80 100 120 160		CR SR SRH SRJ		Input shaft diameter, etc.

* For code details, check Dimensions Table

Ratio Matrix Availability

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

Reducer Specifications

Frame	Ratio R*1	Nominal Output Torque *2 [Nm]	Maximum Output Torque *3 [Nm]	Emergency Stop Torque *4 [Nm]	Nominal Input Speed *5 [r/min]	Maximum Input Speed *6 [r/min]	Life *7 [hours]
35	50	7	23	46	3000	8500	10000
	80	10	30	61			
	100	10	36	70			
42	50	21	44	91	3000	7300	
	80	29	56	113			
	100	31	70	143			
	120	31	70	112			
50	50	33	73	127	3000	6500	
	80	44	96	165			
	100	52	107	191			
	120	52	113	191			
	160	52	120	191			
63	50	51	127	242	3000	5600	
	80	82	178	332			
	100	87	204	369			
	120	87	217	395			
	160	87	229	408			
80	50	99	281	497	3000	4800	
	80	153	395	738			
	100	178	433	841			
	120	178	459	892			
	160	178	484	892			
100*	50	178	523	892	3000	4000	
	80	268	675	1270			
	100	345	738	1400			
	120	382	802	1530			
	160	382	841	1530			

*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.

* 100 frame option is currently only available for open type

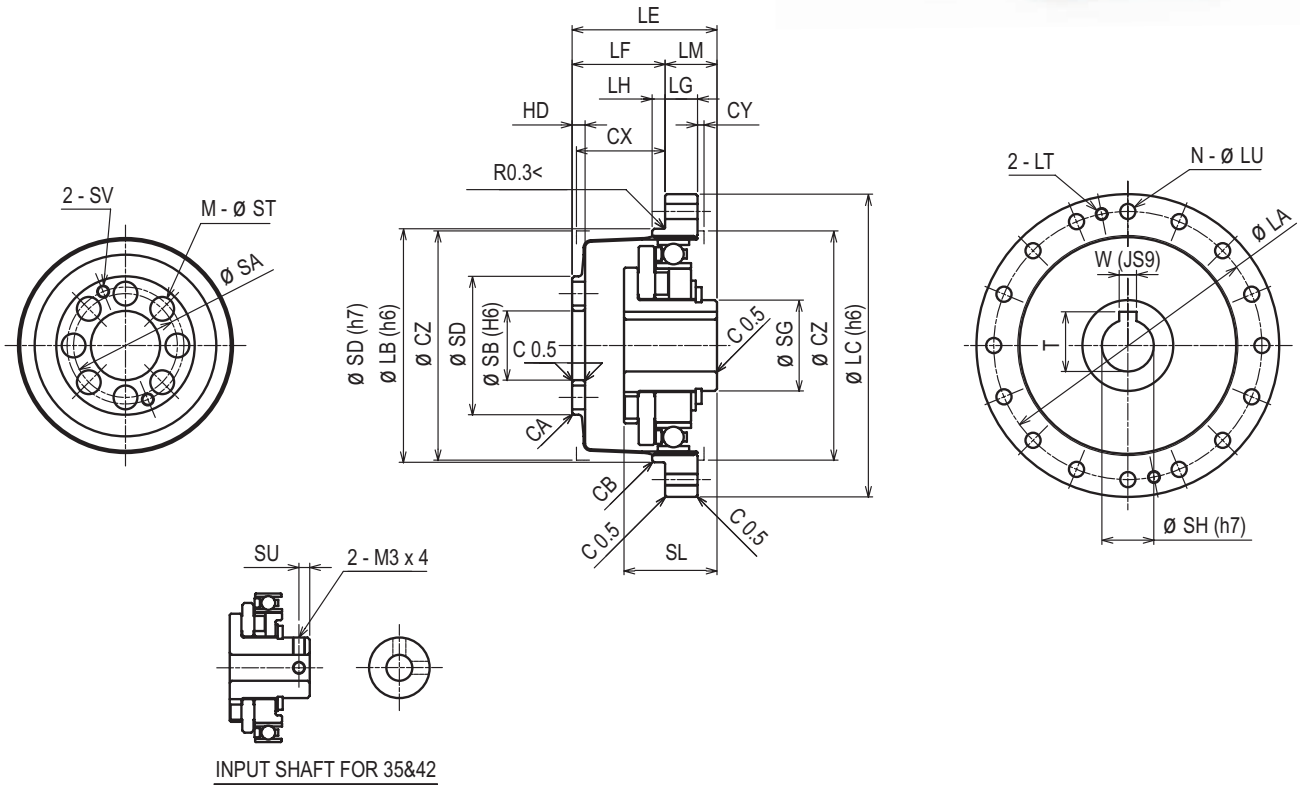
* 100 frame option is available for **S:** Simple unit type and **U:** Unit type (Input shaft unit) and (Hollow shaft)

Dimensions

Closed type: Component

WPC-□-□-CR

Size	Weight	Moment of Inertia
	kg	x10^{-4}kgm^2
35	0.10	0.0362
42	0.17	0.0831
50	0.26	0.190
63	0.43	0.414
80	0.91	1.54



INPUT SHAFT FOR 35&42

[mm]

Size	LA	LB	LC	N	LU	LT	LE	LF	LG	LH	LM	SG	SH	SL	W
35	44	38	50	8	3.5	M3	28.5	17.5	6	2	11	14	6	18.5	-
42	54	48	60	16	3.5	M3	32.5	20	6.5	2.5	12.5	18	8	20.7	-
50	62	54	70	16	3.5	M3	33.5	21.5	7.5	3	12	21	12	21.5	4
63	75	67	85	16	4.5	M4	37	24	10	3	13	26	14	21.6	5
80	100	90	110	16	5.5	M5	44	28	14	3	16	26	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	6	4.5	M3	2.4	C0.3	C0.3	17.1	1	38
42	-	3	19	10	27.2	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	C0.3	20.5	1.5	53
63	16.3	-	30	20	40	8	6.5	M4	3	C0.5	C0.3	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

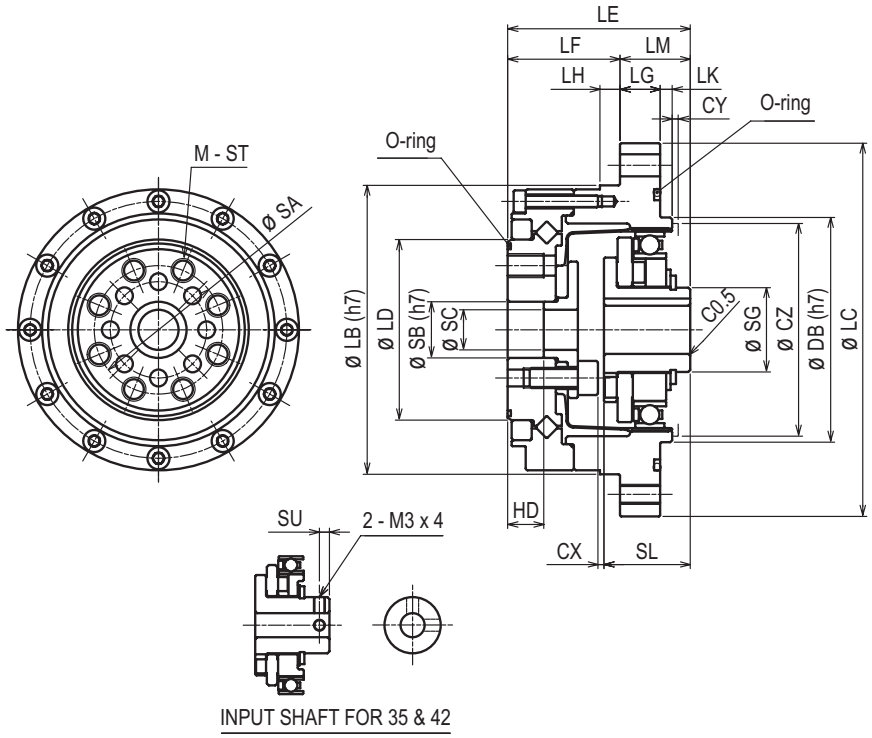
*1 For details in the input section, please check the drawings.
*2 Inner dimensions of CX, CY, CZ are recommended dimensions.

Dimensions

Closed type: Unit

WPU-□-□-CR

Size	Weight	Moment of Inertia
	kg	x10⁻⁴kgm²
35	0.50	0.0362
42	0.68	0.0831
50	0.95	0.190
63	1.5	0.414
80	3.3	1.54



INPUT SHAFT FOR 35 & 42

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	LT	LU	LE	LF	LG	LH	LK	LM	DB	SG
35	65	56	73	31	8	M4	4.5	41	27	7	3.5	2	14	38	14
42	71	63	79	38	8	M4	4.5	45	29	8	4	2	16	48	18
50	82	72	93	45	8	M5	5.5	45.5	28	10	5	3	17.5	56	21
63	96	86	107	58	10	M5	5.5	52	36	10	5	3	16	67	26
80	125	113	138	78	12	M6	6.5	62	45	12	5	3	17	90	26

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	M4 × 8	9.5	1.6	1	38
42	8	20.7	-	-	3	27	10	7	6	M5 × 8	9.5	1.3	1	45
50	12	21.5	4	13.8	-	32	14	10	8	M6 × 9	9	1.5	1.5	53
63	14	21.6	5	16.3	-	42	20	15	8	M8 × 10	12	3.4	1.5	66
80	14	23.6	5	16.3	-	55	26	20	8	M10 × 12	15	5.2	1.5	86

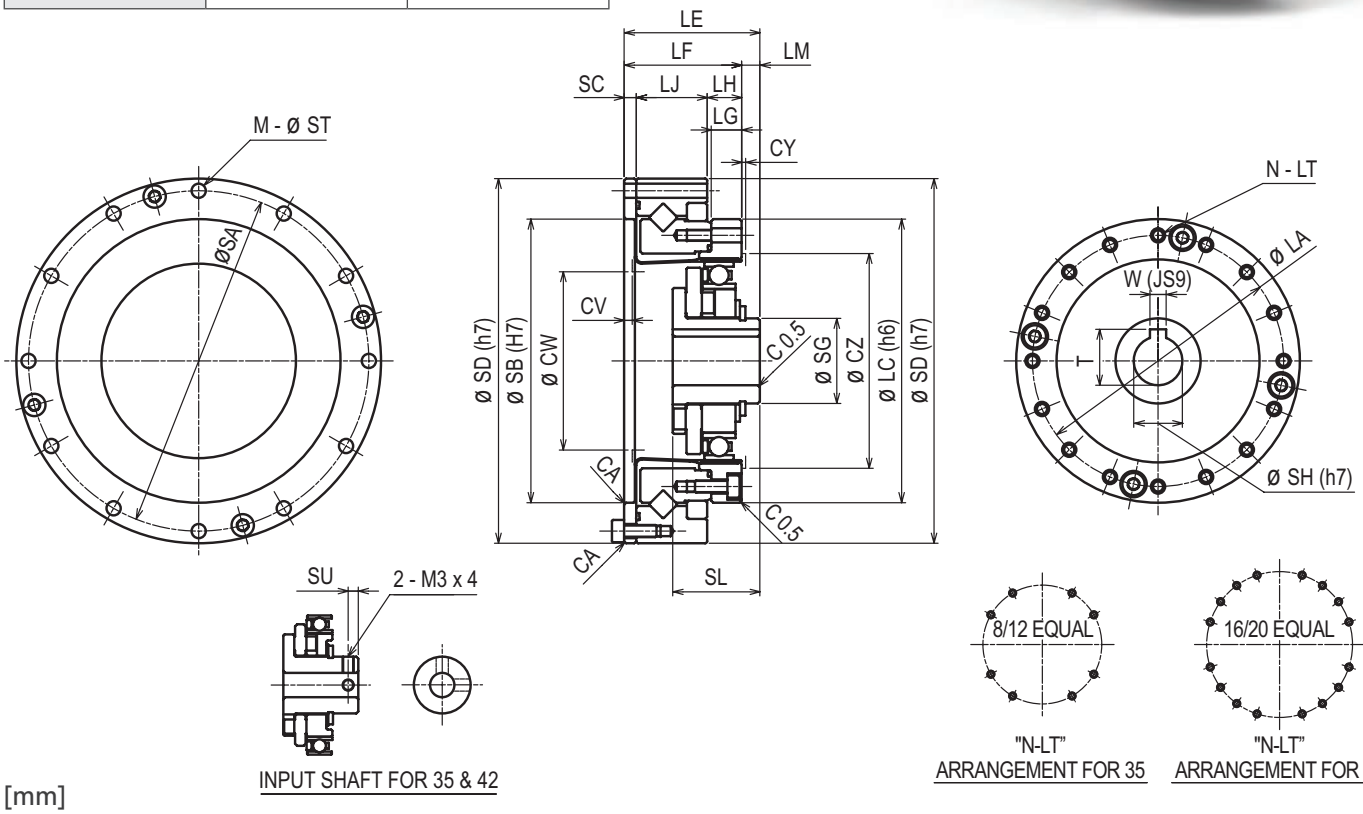
*1 For details in the input section, please check the drawings.
*2 Inner dimensions of CY, CZ are recommended dimensions.

Dimensions

Open type: Simple unit

WPS-□-□-SR

Size	Weight	Moment of Inertia
	kg	x10^{-4}kgm^2
35	0.39	0.0362
42	0.55	0.0831
50	0.79	0.190
63	1.3	0.414
80	2.7	1.54
100	4.5	3.11



INPUT SHAFT FOR 35 & 42

"N-LT" ARRANGEMENT FOR 35

"N-LT" ARRANGEMENT FOR 42

[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	14	6	18.5	-	-	2.5	64	48
42	54	60	32.5	26.5	6.5	7.5	16	6	18	8	20.7	-	-	3	74	60
50	62	70	33.5	29	7.5	8.5	17.5	4.5	21	12	21.5	4	13.8	-	84	70
63	77	85	37	34	10	12	18.7	3	26	14	21.6	5	16.3	-	102	88
80	100	110	44	42	14	15	23.4	2	26	14	23.6	5	16.3	-	132	114
100	122	135	53.6	51	17	18	29	2	32	16	29.7	5	18.3	-	158	140

Size	SC	SD	M	ST	CA	CY	CZ	CV	CW	N	LT
35	2.4	70	8	3.5	C0.4	1	38	1.7	31	8	M3 × 5, Ø 3.5 × 6
42	3	80	12	3.5	C0.4	1	45	2.1	38	16	M3 × 6, Ø 3.5 × 6.5
50	3	90	12	3.5	C0.4	1.5	53	2	45	16	M3 × 6, Ø 3.5 × 7.5
63	3.3	110	12	4.5	C0.4	1.5	66	2	56	16	M4 × 7, Ø 4.5 × 10
80	3.6	142	12	5.5	C0.4	1.5	86	2	73	16	M5 × 8, Ø 5.5 × 14
100	4	170	12	6.6	C0.4	2	106	2	90	16	M6 × 10, Ø 6.6 × 17

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

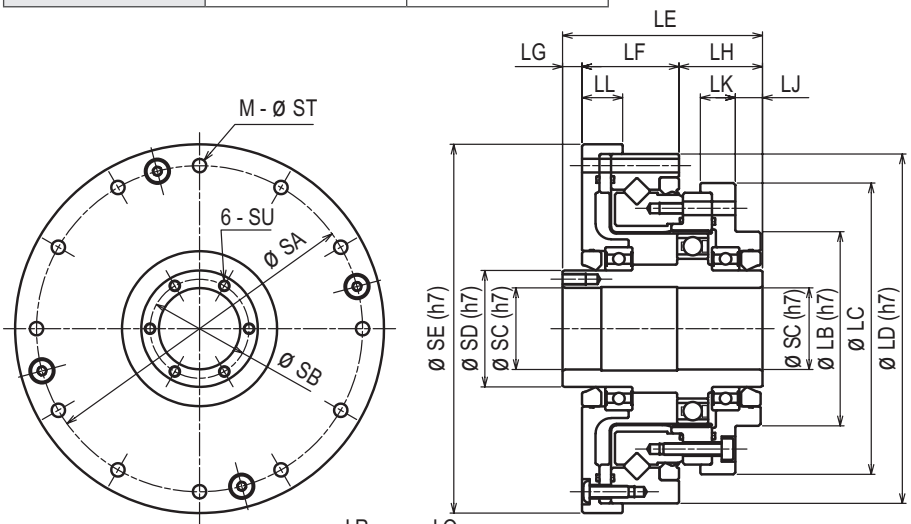
*2 Inner dimensions of CV, CW, CY, CZ are recommended dimensions.

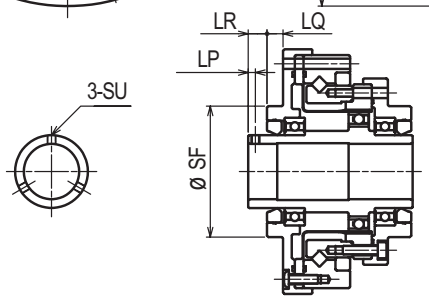
Dimensions

Open type: Unit (Hollow shaft)

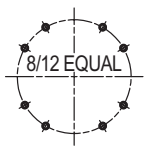
WPU-□-□-SRH

Size	Weight	Moment of Inertia
	kg	x10⁻⁴kgm²
35	0.72	0.0924
42	1.0	0.207
50	1.4	0.408
63	2.1	1.06
80	4.2	2.72
100	7.2	8.66

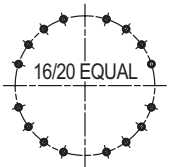




INPUT SHAFT FOR 35 & 42



"N-LT" ARRANGEMENT FOR 35



"N-LT" ARRANGEMENT FOR 42

[mm]

Size	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LP	LQ	LR
-	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	-	-	-
100	122	100	140	170	79	38	8	33	7	13	14	-	-	-

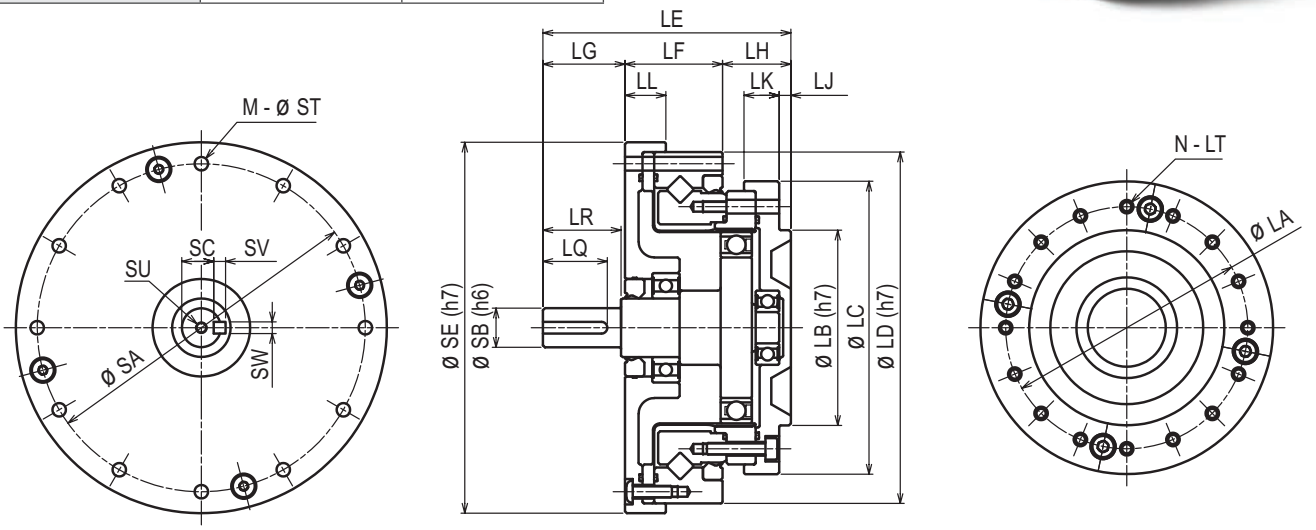
Size	SA	SB	SC	SD	SE	SF	M	ST	SU	N	LT
35	64	-	14	20	74	36	8	3.5	M3	8	M3 × 5, Ø 3.5 × 11.5
42	74	-	19	25	84	45	12	3.5	M3	16	M3 × 6, Ø 3.5 × 12
50	84	25.5	21	30	95	-	12	3.5	M3 × 6	16	M3 × 6, Ø 3.5 × 13.5
63	102	33.5	29	38	115	-	12	4.5	M3 × 6	16	M4 × 7, Ø 4.5 × 15.5
80	132	40.5	36	45	147	-	12	5.5	M3 × 6	16	M5 × 8, Ø 5.5 × 20.5
100	158	52	46	59	175	-	12	6.6	M4 × 8	16	M6 × 10, Ø 6.6 × 25

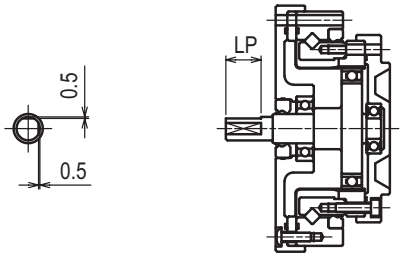
Dimensions

Open type: Unit (Input shaft)

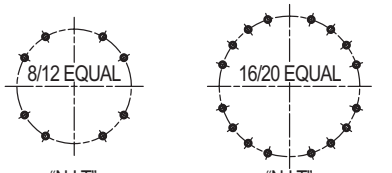
WPU-□-□-SRJ

Size	Weight	Moment of Inertia
	kg	x10^{-4}kgm^2
35	0.65	0.0266
42	0.91	0.0666
50	1.4	0.155
63	2.1	0.382
80	4.1	1.28
100	6.9	3.15





INPUT SHAFT FOR 35 & 42



"N-LT" ARRANGEMENT FOR 35

"N-LT" ARRANGEMENT FOR 42

[mm]

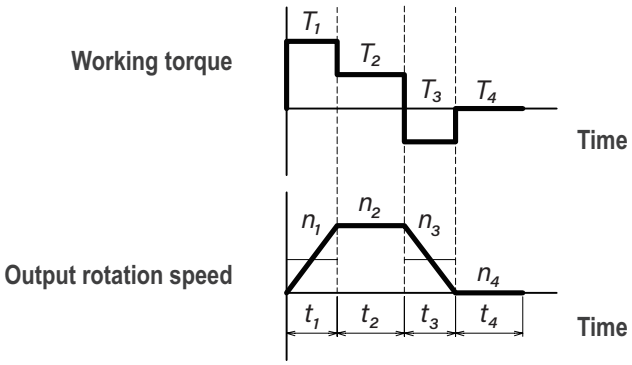
Size	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LP	LQ	LR
35	44	36	54	70	50.5	20.5	15	15	2.5	8	9	11	-	-
42	54	45	64	80	56	23	17	16	3	8.5	10	12	-	-
50	62	50	75	90	63.5	25	21	17.5	3	9	10.5	-	16.5	20
63	77	60	90	110	72.5	26	26	20.5	3	8.5	10.5	-	22.5	25
80	100	85	115	142	84.5	32	26	26.5	5	9.5	12	-	22.5	25
100	122	100	140	170	100	38	31	31	5	13	14	-	27.5	30

Size	SA	SB	SC	SE	SV	SW	M	ST	SU	N	LT
35	64	6	-	74	-	-	8	3.5	-	8	M3 × 5, Ø 3.5 × 11.5
42	74	8	-	84	-	-	12	3.5	-	16	M3 × 6, Ø 3.5 × 12
50	84	10	8.2	95	3	3	12	3.5	M3 × 6	16	M3 × 6, Ø 3.5 × 13.5
63	102	14	11	115	5	5	12	4.5	M5 × 10	16	M4 × 7, Ø 4.5 × 15.5
80	132	14	11	147	5	5	12	5.5	M5 × 10	16	M5 × 8, Ø 5.5 × 20.5
100	158	16	13.1	175	5	5	12	6.6	M5 × 10	16	M6 × 10, Ø 6.6 × 25

Life Estimation (Elastic Bearing)

Life span for the elastic bearing

Operation cycle example



Calculation formula for output torque

Average output torque	**Tao**	**Nm**	$Tao = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot \lvert T_1 \rvert^3 + n_2 \cdot t_2 \cdot \lvert T_2 \rvert^3 + \cdots + n_n \cdot t_n \cdot \lvert T_n \rvert^3}{n_1 \cdot t_1 + n_2 \cdot t_2 \cdots n_n \cdot t_n}}$
Peak output torque value	**Tmo**	**Nm**	Tmo = maximum value of $T_1, T_2, \cdots T_n$

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**	$nao = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 \cdots n_n \cdot t_n}{t_1 + t_2 + \cdots + t_n}$
Peak output rotation speed	**nmo**	**r/min**	nmo = maximum value of $n_1, n_2, \cdots n_n$
Average input speed	**nai**	**r/min**	$nai = nao \times R$ (R = ratio)
Peak input speed value	**nmi**	**r/min**	$nmi = nmo \times R$ (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**	$Lhe = 10000 \times \left(\frac{Tar}{Tao}\right)^3 \times \left(\frac{nar}{nai}\right)$
Rating torque	**Tar**	**Nm**	*Nominal output torque in the specification table*
Rating input rotation speed	**nar**	**r/min**	*2000 r/min*

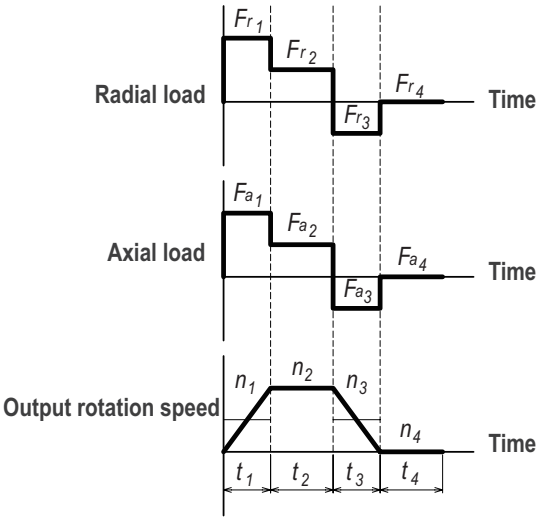
Life Estimation (Main Bearing)

Main bearing specification (Cross roller bearing)

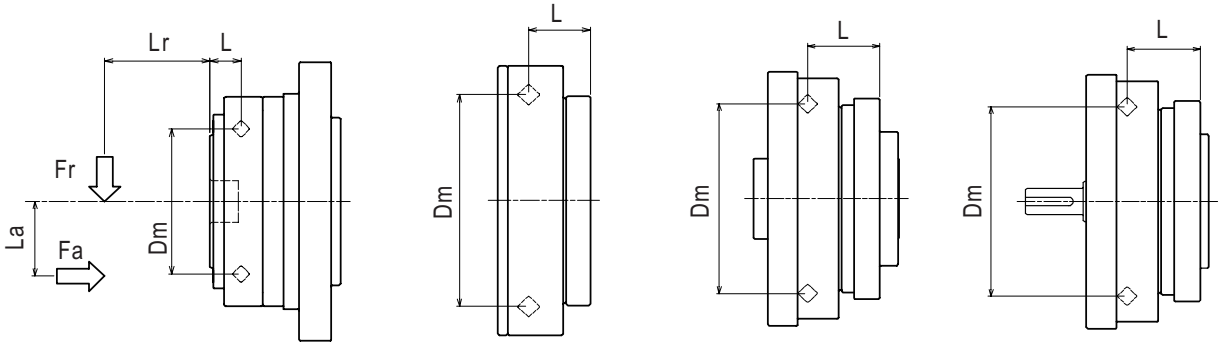
Series	Size	Pitch Circle Diameter of the Bearing Rollers	Offset	Basic Dynamic Load Rating	Basic Static Load Rating	Allowable Moment	Moment Rigidity
		Dm	L	C	Co	Mal	Km
		m	m	N	N	Nm	×10⁴ Nm/rad
WPU-□-□-CR	35	0.0350	0.0095	4700	6070	41	4.38
	42	0.0425	0.0095	5290	7550	64	7.75
	50	0.0500	0.0095	5780	9000	91	12.8
	63	0.0620	0.0115	9600	15100	156	24.2
	80	0.0800	0.0130	15000	25000	313	53.9
WPS-□-□-SR	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-□-□-SRH WPU-□-□-SRJ	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 = maximum value of $Fr_1, Fr_2, \cdots Fr_n$
Peak axial load	**Fam**	**N**	Fam = maximum value of $Fa_1, Fa_2, \cdots Fa_n$

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**	$Fra = \sqrt[10/3]{\dfrac{n_1 \cdot t_1 \cdot \lvert Fr\rvert^{10/3} + n_2 \cdot t_2 \cdot \lvert Fr_2\rvert^{10/3} + \cdots + n_n \cdot t_n \cdot \lvert Fr_n\rvert^{10/3}}{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots + n_n \cdot t_n}}$
Axial load	**Faa**	**N**	$Faa = \sqrt[10/3]{\dfrac{n_1 \cdot t_1 \cdot \lvert Fa_1\rvert^{10/3} + n_2 \cdot t_2 \cdot \lvert Fa_2\rvert^{10/3} + \cdots + n_n \cdot t_n \cdot \lvert Fa_n\rvert^{10/3}}{n_1 \cdot t_1 + n_2 \cdot t_2 + \cdots + n_n \cdot t_n}}$
Average output rotation speed	**nao**	**r/min**	$nao = \dfrac{n_1 \cdot t_1 + n_2 \cdot t_2 \cdots n_n \cdot t_n}{t_1 + t_2 + \cdots + t_n}$
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**	**-**	$\dfrac{Faa}{Fra + 2Ma / Dm} \leqq 1.5$ in the case of, $Xc = 1.0, Yc = 0.45$
			$\dfrac{Faa}{Fra + 2Ma / Dm} > 1.5$ in the case of, $Xc = 0.67, Yc = 0.67$
Equivalent radial load	**Pc**	**N**	$Pc = Xc \cdot (Fra + 2Ma/Dm) + Yc \cdot Faa$

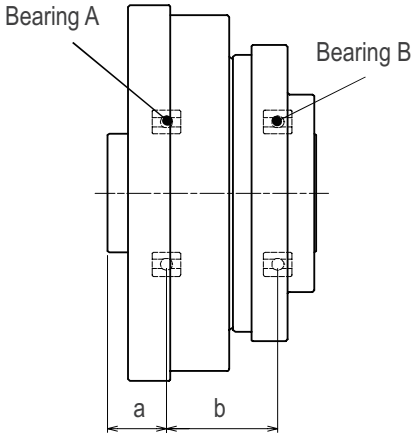
Life span for the main bearing

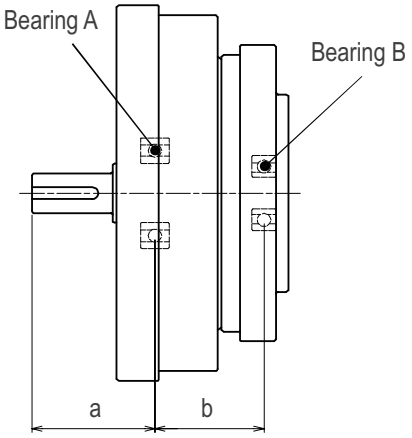
Life span for the main bearing	**Lhc**	**h**	$Lhc = \dfrac{10^6}{60 \cdot nao} \cdot \left(\dfrac{C}{fw \cdot Pc}\right)^{\frac{10}{3}}$
Impact factor	**f w**	**-**	1.0: no shock
			1.2: with some shock
			1.5: with shock and vibration

Maximum Load at Input Shaft

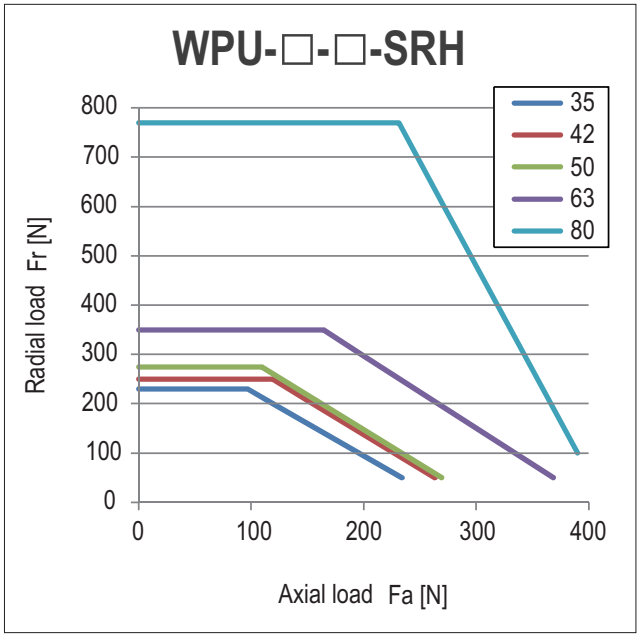
Bearing specification (Open type, Unit)

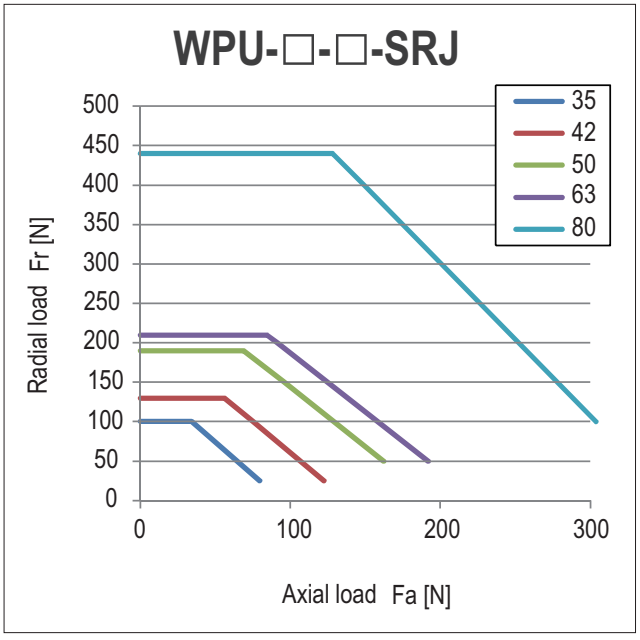
Series	Size	A Bearing A		B Bearing B		a	b
		Basic Dynamic Load Rating	Basic Static Load Rating	Basic Dynamic Load Rating	Basic Static Load Rating		
		C	Co	C	Co		
		N	N	N	N	mm	mm
WPU-□-□-SRH	35	4000	2470	4000	2470	16.5	26.5
	42	4300	2950	4300	2950	17.5	29.5
	50	4500	3450	4500	3450	16	26
	63	4900	4350	4900	4350	17	29
	80	14100	10900	5350	5250	20	35.5
WPU-□-□-SRJ	35	2240	910	1080	430	24.5	21
	42	2700	1270	1610	710	27.5	23
	50	4350	2260	2240	910	32.3	25.2
	63	5600	2830	2700	1270	37.3	29.2
	80	9400	5000	4350	2260	39.4	38.1





Maximum load (Average input rotation speed : 2000r/min, Life span : 10000h)





Lubricant Information

Grease

Sumiplex SFB No.1 (SUMICO LUBRICANT CO., LTD.)
Operating temperature range: 0~40˚C (ambient temperature)

Grease application

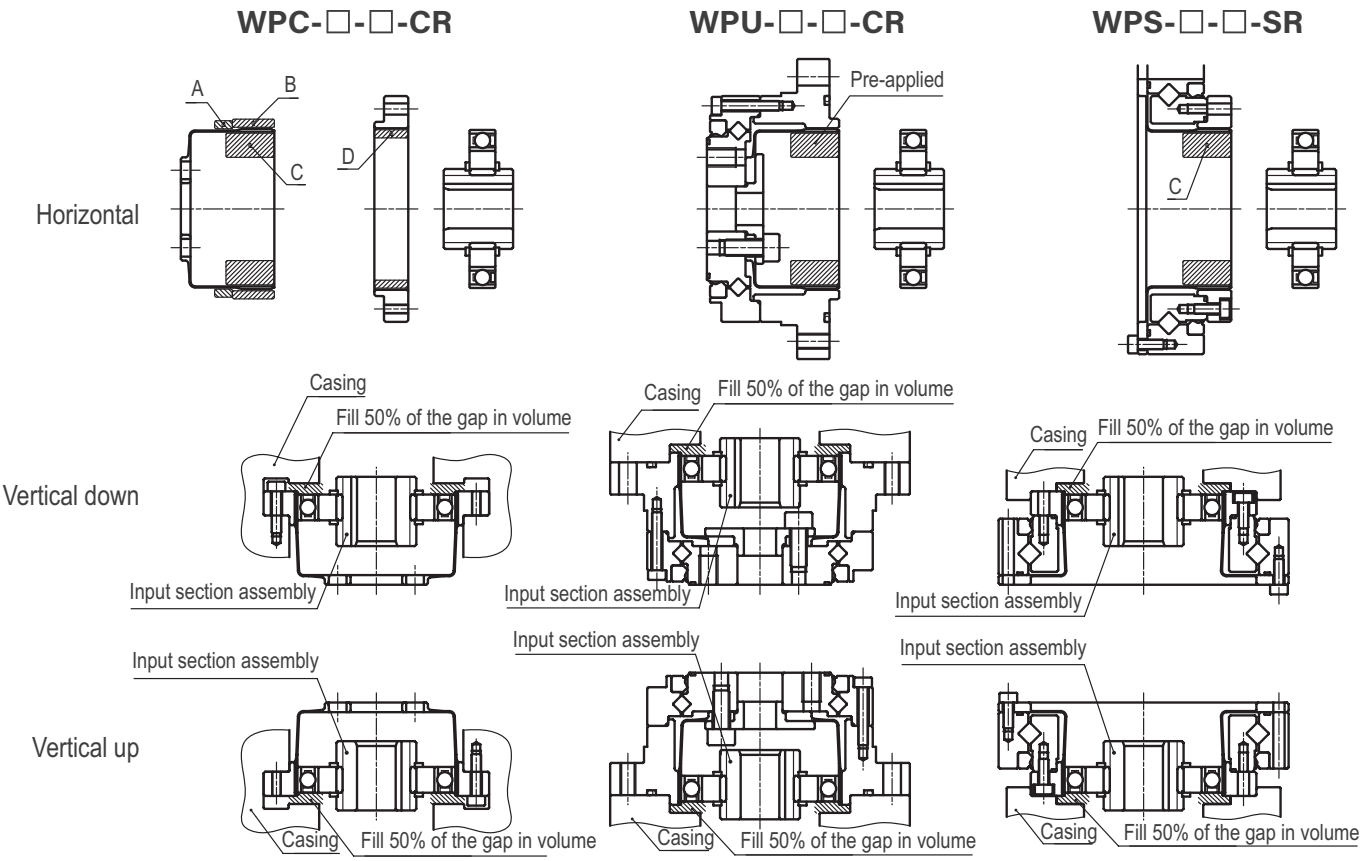
- The quantity of grease applied to C should be adjusted depending on the mounting direction. C of the unit type product is already filled with the same quantity of grease as horizontal mounting.
- 50% of the space between input assy and casing inner wall should be filled with grease.
- If the amount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

Please apply grease according to the table below.

[grams]

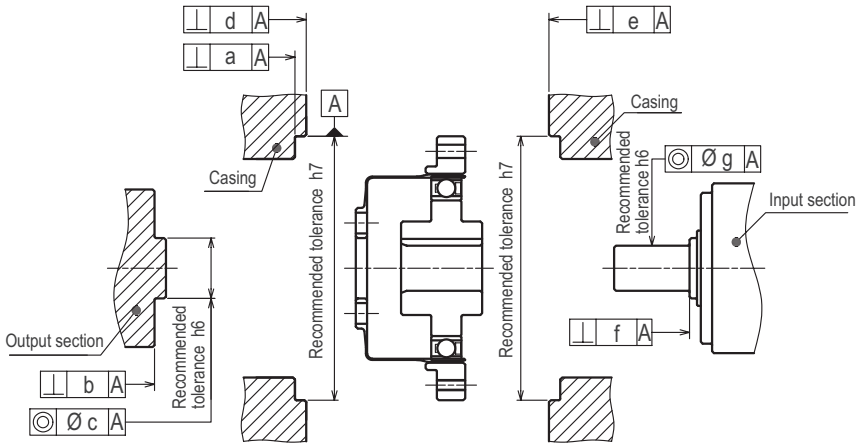
Size	Applied part					
	A	B	C Horizontal	C Vertical Up	C Vertical Down	D
35	0.3	0.3	6	8	9	0.3
42	0.5	0.5	10	12	14	0.5
50	0.8	0.8	16	18	21	0.8
63	1.5	1.5	30	35	40	1.5
80	3.0	3.0	60	70	80	3.0

Grease application location



Attachment Fixture Requirement

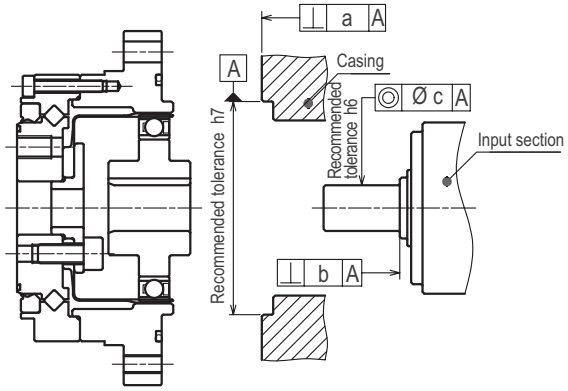
WPC-□-□-CR



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

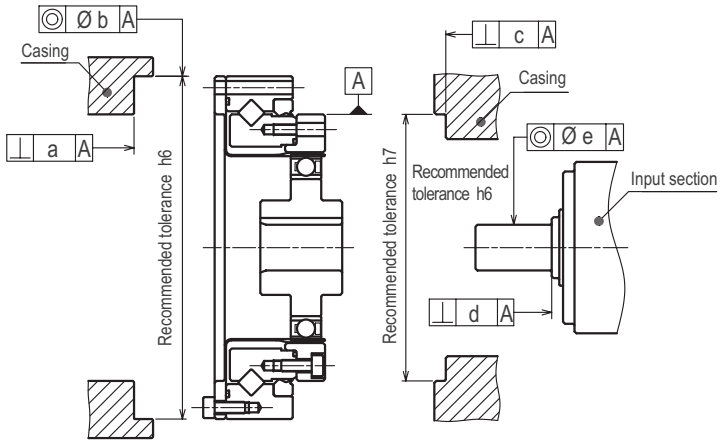
WPU-□-□-CR



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-□-□-SR



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

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

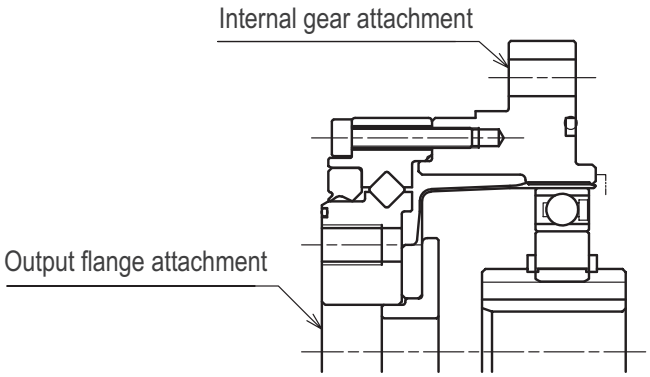
Bolt specifications and transmitting torque (Closed Type, Unit)

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 (CR)

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



Transmitting Torque

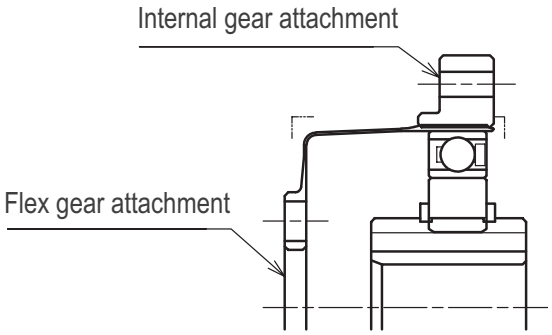
Bolt specifications and transmitting torque (Closed type, Component)

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 [mm]	17	19	24	30	40
Tightening Torque [Nm]	4.3	8.7	8.7	15	36
Transmitting Torque [Nm]	41	75	126	223	539

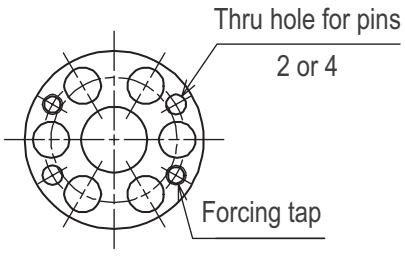
Internal gear attachment (CR)

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

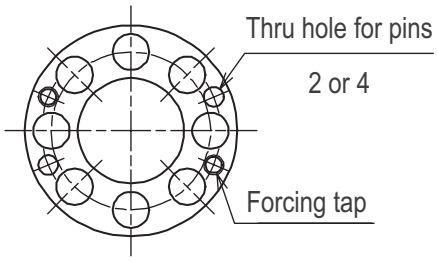


Reinforcement

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



WP-35, 42



WP-50, 63, 80

Transmitting Torque

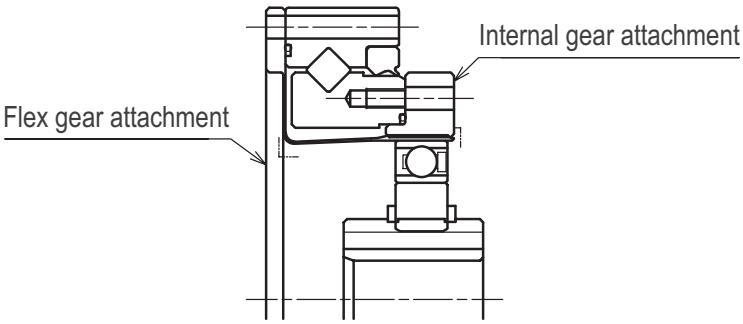
Bolt specifications and transmitting torque (Open type)

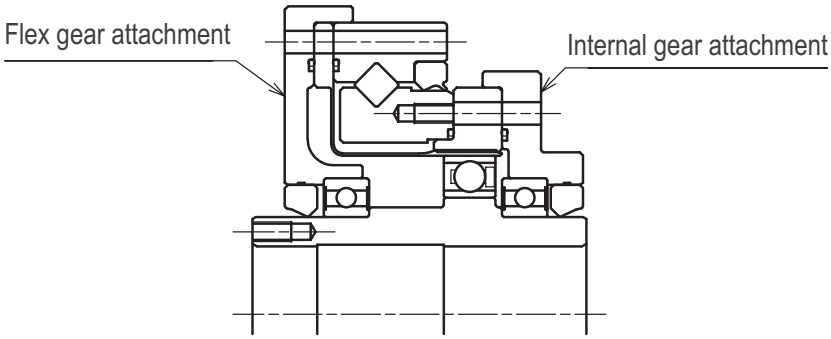
Flex Gear Attachment

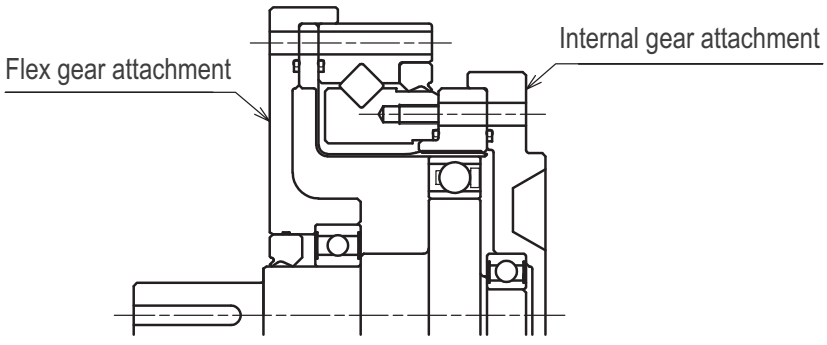
Size	35	42	50	63	80
Bolt Size	M3	M3	M3	M4	M5
Bolt Count	8	12	12	12	12
Bolt PCD [mm]	64	74	84	102	132
Tightening Torque [Nm]	1.9	1.9	1.9	4.3	8.7
Transmitting Torque [Nm]	119	206	234	495	1037

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 [mm]	44	54	62	77	100
Tightening Torque [Nm]	1.9	1.9	1.9	4.3	8.7
Transmitting Torque [Nm]	82	200	230	498	1048



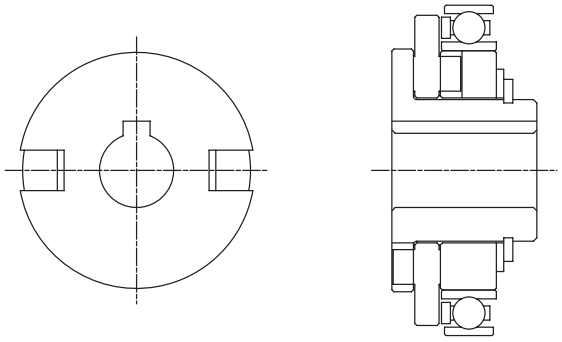




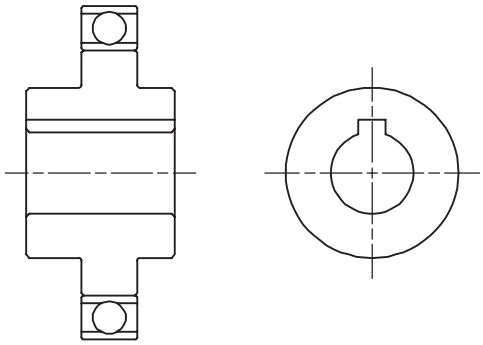
Input Section Structure

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

Oldham type (Self-centering)

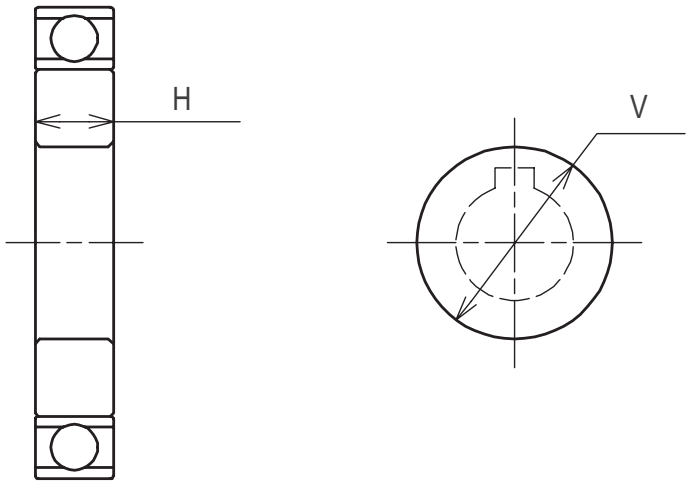


Rigid type



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
V Minimum Thickness	6	7	8	9	11

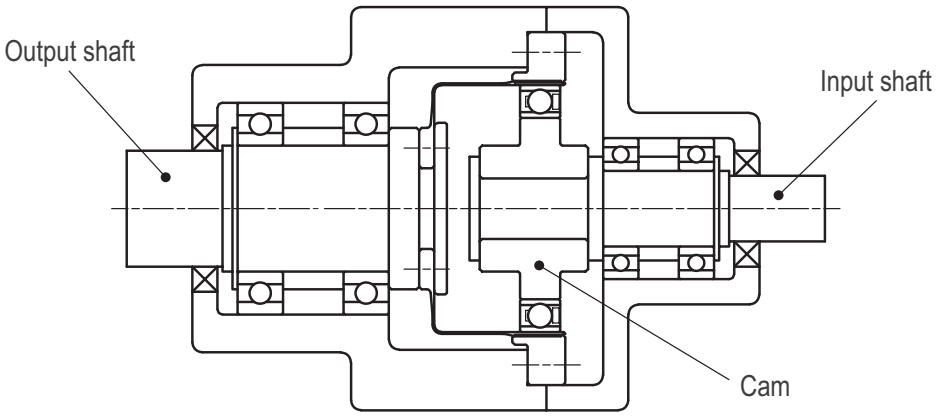
Installation and Assembly Instructions

WPC-□-□-CR

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.



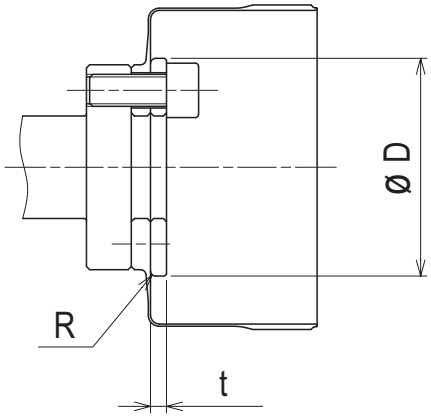
WPC-□-□-CR

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

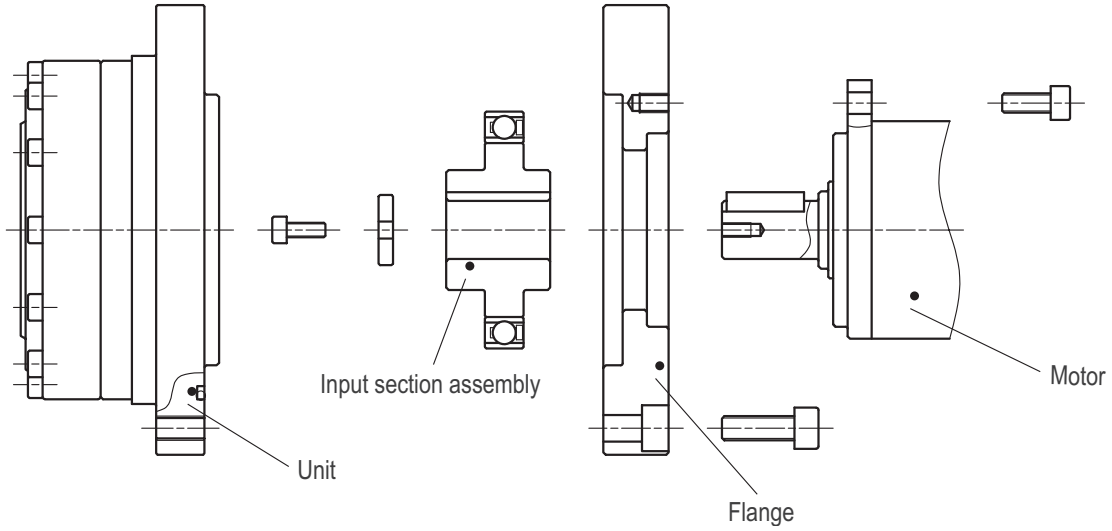
- Load - No load
- Input rotation speed - Start slowly from 1,000r/min or less, then accelerate up to 3,000r/min
- Test time - About 1 hour
- Output rotation angle - As large as possible

Motor Installation Procedure

WPU-□-□-C□

Procedure 1

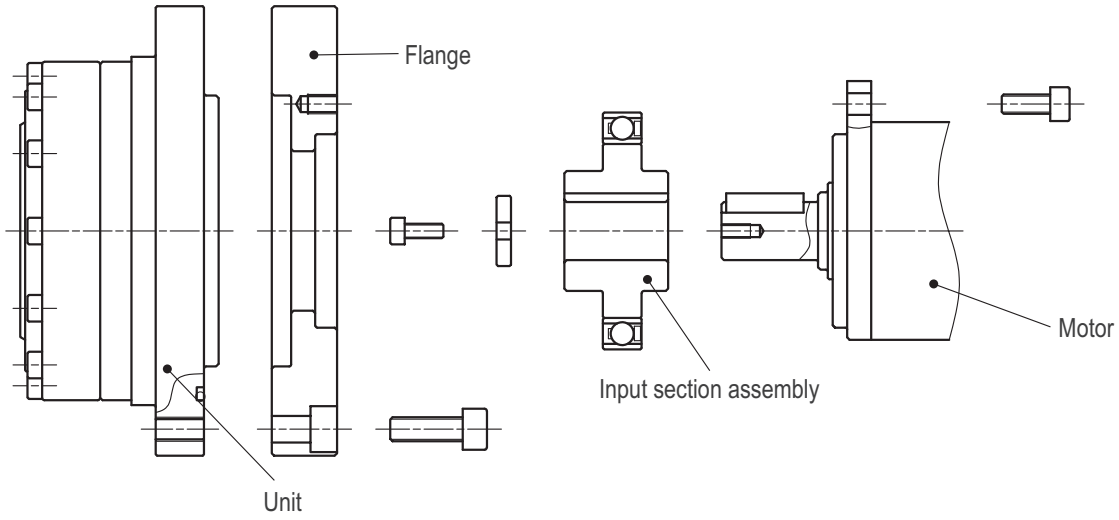
- Attach the flange on to the motor
- Attach the input section assembly with elastic bearings to the motor shaft
- Attach the unit



* 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

Characteristics Data

Closed type

Ratcheting torque

[Nm]

Ratio	Size				
	35	42	50	63	80
50	120	220	340	650	1400
80	140	250	410	700	1600
100	130	210	340	690	1300
120	-	200	310	680	1200
160	-	-	300	620	1000

Buckling torque

[Nm]

Ratio	Size				
	35	42	50	63	80
50 ~ 160	260	500	800	1700	3500

Open type

Ratcheting torque

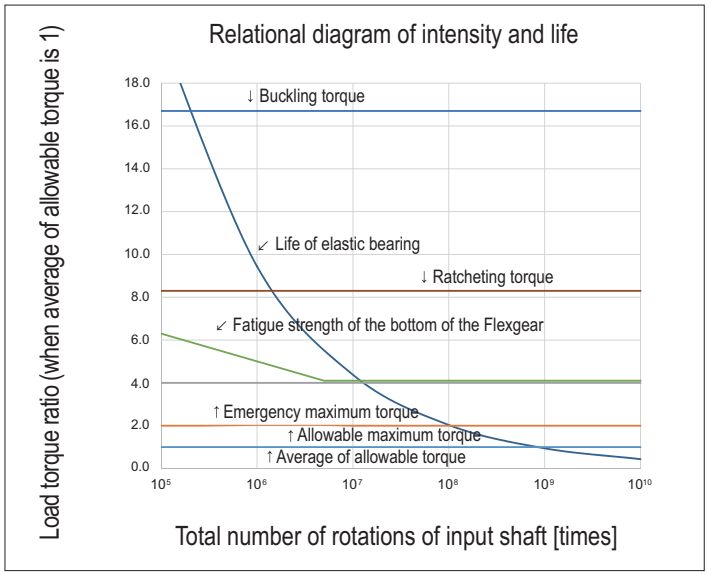
[Nm]

Ratio	Size				
	35	42	50	63	80
50	120	220	340	650	1400
80	140	250	410	700	1600
100	130	210	340	690	1300
120	-	200	310	680	1200
160	-	-	300	620	1000

Buckling torque

[Nm]

Ratio	Size				
	35	42	50	63	80
50 ~ 160	180	350	590	1100	2400



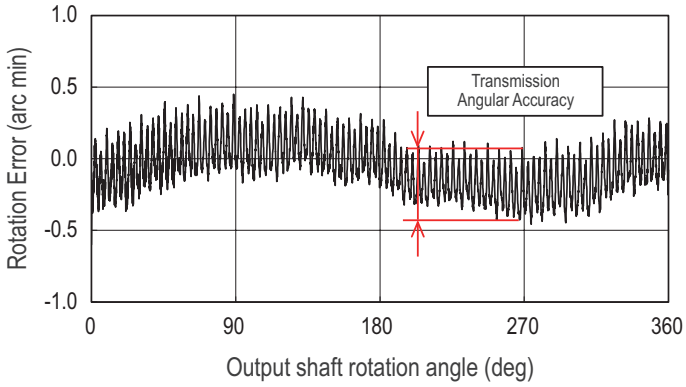
* The graph is based on actual measurement value. For reference only.

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	1.5	1.5	1.0	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

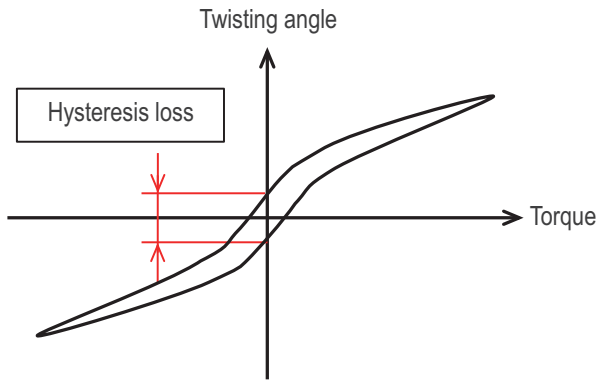
Table values are reference values.

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	1.0	1.0	1.0	1.0	1.0
100	1.0	1.0	1.0	1.0	1.0
120	-	1.0	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 oldham type input shaft.

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

[arc min]

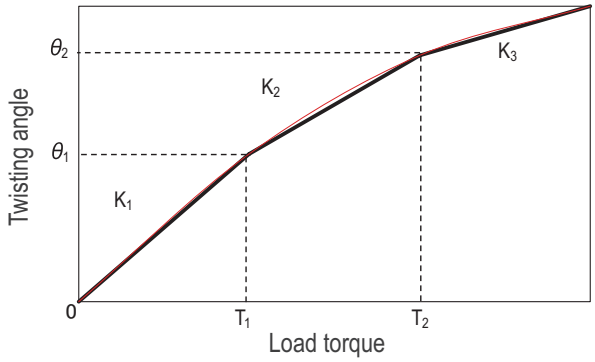
Ratio	Size				
	35	42	50	63	80
50	35	29	25	20	16
80	22	18	16	12	10
100	18	15	13	10	8
120	-	12	10	8	6
160	-	-	8	6	5

Stiffness (Closed type, Unit)

What is Stiffness?

In this context, stiffness is the output shaft twisting angle and the spring coefficient, while torque load is applied to the output shaft with input side fixed.

K1... Spring coefficient at 0 ~ T_1 torque
K2... Spring coefficient at T_1 ~ T_2 torque
K3... Spring coefficient at T_2 ~ 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	× 10^4Nm/rad	0.41	0.87	1.3	2.5	5.5
	K_2	× 10^4Nm/rad	0.57	1.1	1.8	3.4	7.9
	K_3	× 10^4Nm/rad	0.70	1.4	2.4	4.5	10
	θ_1	arcmin	1.7	1.5	1.9	1.9	1.8
	θ_2	arcmin	4.6	4.1	5.3	5.4	5.3
80 100 120 160	K_1	× 10^4Nm/rad	0.51	0.90	1.3	2.8	5.8
	K_2	× 10^4Nm/rad	0.67	1.3	2.1	4.5	9.6
	K_3	× 10^4Nm/rad	0.78	1.5	2.5	5.2	10.5
	θ_1	arcmin	1.3	1.5	1.9	1.7	1.7
	θ_2	arcmin	3.9	3.6	4.8	4.3	4.5

Average value shown in the table.

Characteristics Data

Starting torque

What is Starting Torque?

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

Closed type, Unit

Open type, Simple unit

[cNm]

Ratio	Size				
	35	42	50	63	80
50	2.1	3.9	7.7	17	22
80	2.0	3.4	6.6	14	21
100	1.9	3.0	6.2	12	20
120	-	2.7	5.8	11	17
160	-	-	5.3	10	16

*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.

Open type, Unit (Hollow shaft)

[cNm]

Ratio	Size				
	35	42	50	63	80
50	5.6	8.1	10.2	20.1	26.0
80	5.5	7.6	9.1	17.0	25.0
100	5.4	7.2	8.7	15.2	24.0
120	-	6.9	8.3	14.2	21.0
160	-	-	7.8	13.2	20.0

*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.

Open type, Unit (Input shaft)

[cNm]

Ratio	Size				
	35	42	50	63	80
50	5.0	7.3	9.2	18.1	23.4
80	5.0	6.8	8.2	15.3	22.5
100	4.9	6.5	7.8	13.6	21.6
120	-	6.2	7.5	12.7	18.9
160	-	-	7.0	11.8	18.0

*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

Output starting torque

What is Output Starting Torque?

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

Closed type, Unit

Open type, Simple unit

[Nm]

Ratio	Size				
	35	42	50	63	80
50	1.5	2.2	3.3	8.4	16
80	1.6	2.7	3.5	10	21
100	1.8	3.2	4.2	12	24
120	-	3.4	5.6	14	27
160	-	-	6.6	20	38

*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.

Open type, Unit (Hollow shaft)

[cNm]

Ratio	Size				
	35	42	50	63	80
50	3.3	4.3	5.8	11.6	18.0
80	3.8	5.6	7.0	16.0	28.9
100	4.6	7.2	9.2	22.4	40.4
120	-	8.6	13.3	30.0	53.8
160	-	-	19.4	54.4	99.3

*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.

Open type, Unit (Input shaft)

[cNm]

Ratio	Size				
	35	42	50	63	80
50	2.9	3.9	5.2	10.4	16.2
80	3.4	5.0	6.3	14.4	26.0
100	4.2	6.5	8.3	20.1	36.4
120	-	7.8	11.9	27.0	48.5
160	-	-	17.5	48.9	89.4

*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) (Open type, Simple 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	3.8	6.4	10	18	38
	1000r/min	4.9	7.7	12	22	54
	2000r/min	5.9	8.2	14	24	57
	3500r/min	6.3	8.7	15	26	63
80	500r/min	3.0	5.8	8.4	21	34
	1000r/min	3.7	7.4	10	24	41
	2000r/min	4.6	8.0	12	25	47
	3500r/min	5.1	8.8	12	26	53
100	500r/min	2.8	5.5	7.3	16	35
	1000r/min	3.6	7.3	9.2	19	44
	2000r/min	4.3	7.9	12	22	54
	3500r/min	4.6	8.8	13	23	57
120	500r/min	-	5.0	5.9	14	34
	1000r/min	-	5.7	8.1	18	41
	2000r/min	-	6.5	9.7	20	43
	3500r/min	-	7.2	11	21	45
160	500r/min	-	-	7.2	15	25
	1000r/min	-	-	8.9	19	30
	2000r/min	-	-	11	22	37
	3500r/min	-	-	11	22	40

*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 (Open type, Unit (Hollow shaft))

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	11.0	16.5	22.4	34.1	40.5
	1000r/min	11.9	19.2	26.1	39.5	45.0
	2000r/min	13.0	21.7	28.9	44.4	49.7
	3500r/min	15.0	21.7	33.0	51.5	58.8
80	500r/min	10.3	13.5	22.9	34.7	51.5
	1000r/min	11.7	14.9	23.4	38.2	60.0
	2000r/min	12.4	17.0	25.6	41.7	63.0
	3500r/min	12.7	19.3	29.6	44.4	67.5
100	500r/min	10.3	15.8	20.9	37.3	53.5
	1000r/min	11.6	17.3	24.2	41.5	55.0
	2000r/min	13.1	20.2	25.8	49.4	60.0
	3500r/min	13.7	21.0	27.5	54.8	68.5
120	500r/min	-	12.8	23.5	34.6	38.0
	1000r/min	-	13.3	26.3	39.0	42.3
	2000r/min	-	15.2	30.4	47.5	46.7
	3500r/min	-	18.7	34.7	51.7	51.9
160	500r/min	-	-	21.5	28.5	47.5
	1000r/min	-	-	23.3	30.0	53.5
	2000r/min	-	-	27.0	32.6	56.4
	3500r/min	-	-	29.1	35.4	63.7

*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.

Characteristics Data

No-load running torque (Open type, Unit (Input shaft))

What is No-load Running Torque?

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

Ratio	Input Rotation Speed	Size				
		35	42	50	63	80
50	500r/min	4.4	8.1	12.2	17.7	26.3
	1000r/min	5.3	8.8	13.8	19.4	28.0
	2000r/min	6.2	9.2	15.2	23.8	30.0
	3500r/min	6.5	9.8	17.0	25.8	30.5
80	500r/min	4.8	7.6	13.6	23.1	30.4
	1000r/min	5.6	8.3	15.1	23.1	32.0
	2000r/min	6.0	9.2	16.2	25.4	36.0
	3500r/min	5.7	9.6	17.1	25.7	39.0
100	500r/min	5.1	8.8	13.4	22.2	30.0
	1000r/min	5.7	9.8	14.3	23.1	31.7
	2000r/min	5.6	10.5	16.3	24.7	36.5
	3500r/min	5.7	11.2	16.4	29.6	38.0
120	500r/min	-	7.4	11.7	15.7	31.7
	1000r/min	-	8.6	13.9	16.7	35.0
	2000r/min	-	10.5	15.9	17.6	38.5
	3500r/min	-	11.0	18.1	19.3	40.0
160	500r/min	-	-	9.8	14.1	20.0
	1000r/min	-	-	11.9	15.8	22.7
	2000r/min	-	-	13.4	16.9	26.0
	3500r/min	-	-	15.1	18.6	27.5

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

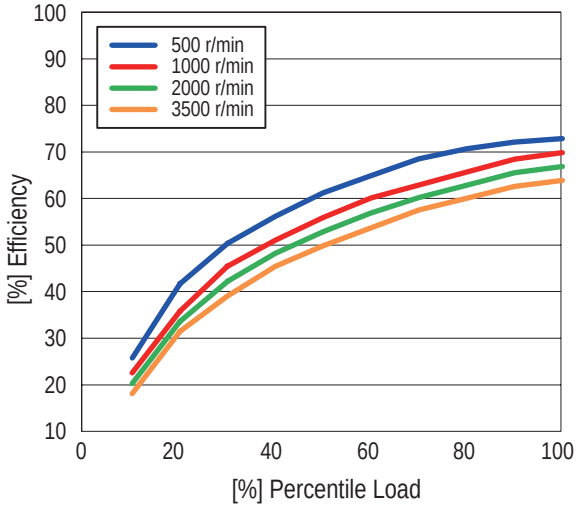
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

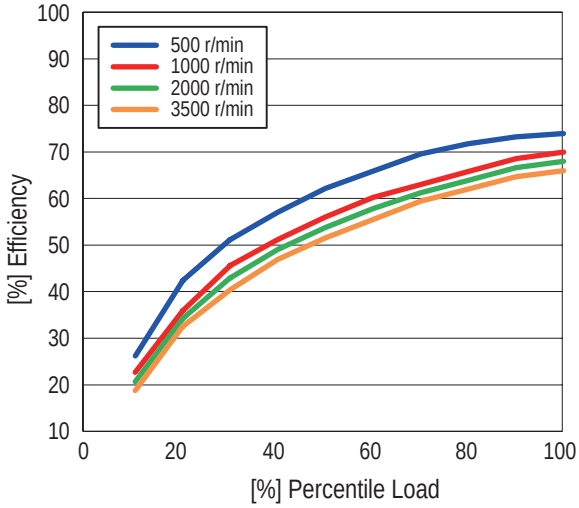
Efficiency (Closed type, Unit) (Open type, Simple unit)

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

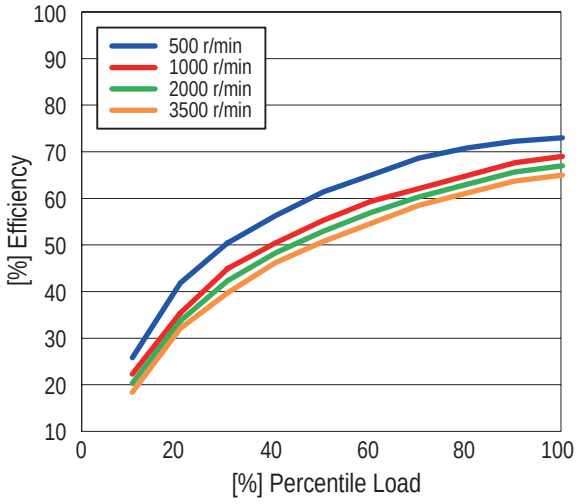
WPU-35-50



WPU-35-80



WPU-35-100



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

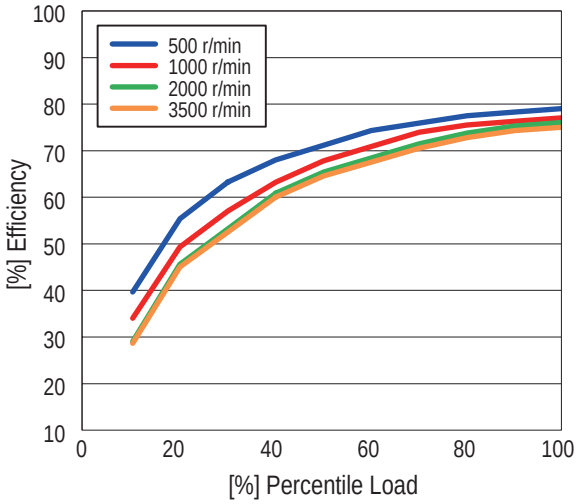
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

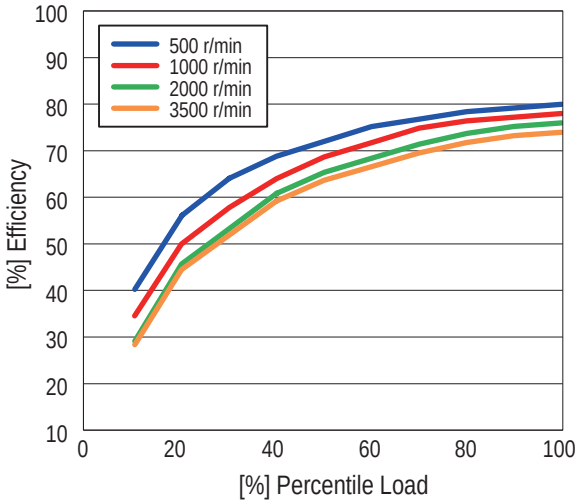
Efficiency (Closed type, Unit) (Open type, Simple unit)

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

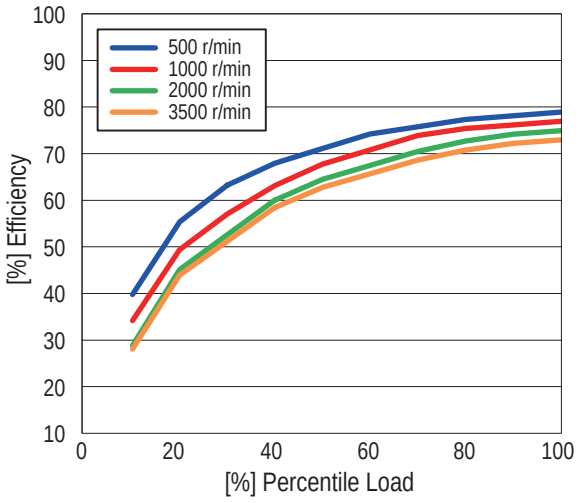
WPU-42-50



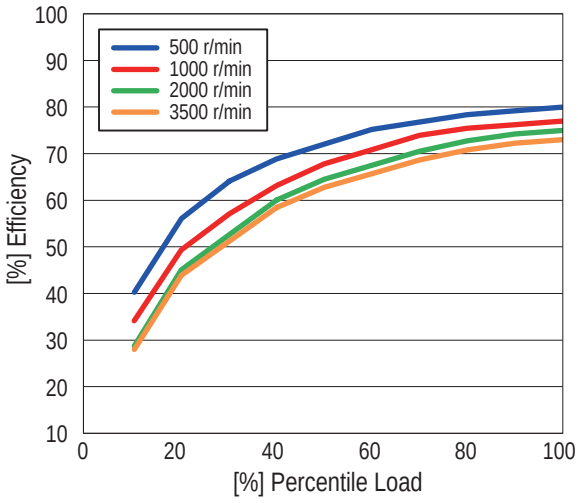
WPU-42-80



WPU-42-100



WPU-42-120



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

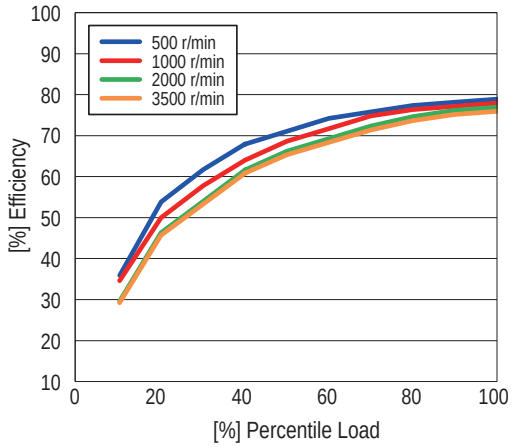
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

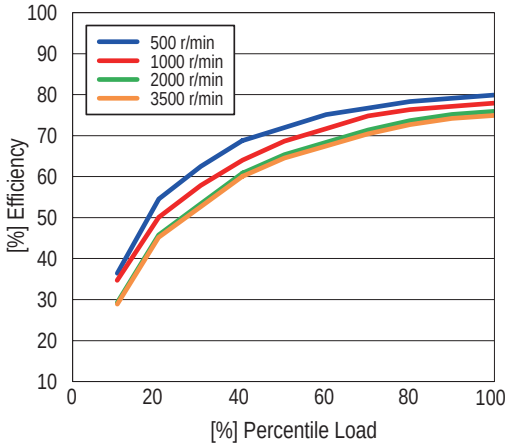
Efficiency (Closed type, Unit) (Open type, Simple unit)

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

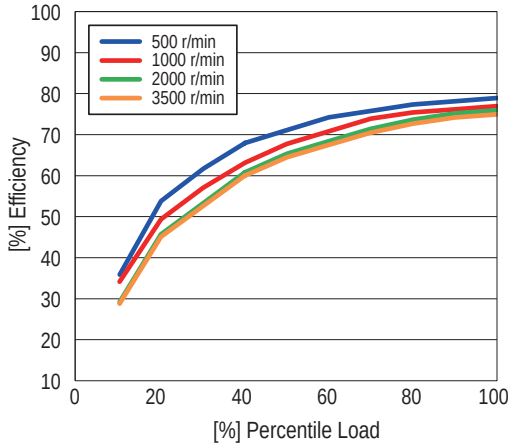
WPU-50-50



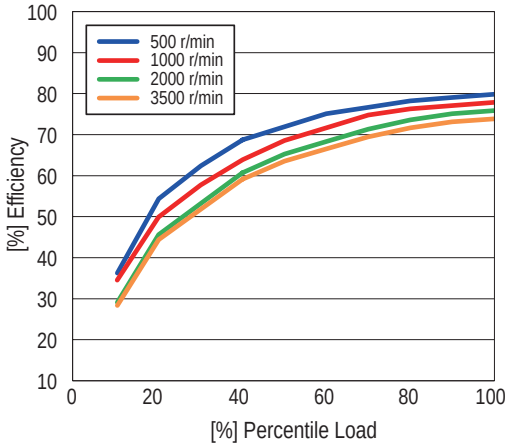
WPU-50-80



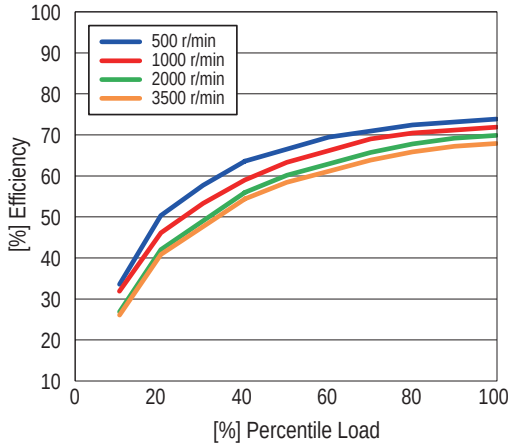
WPU-50-100



WPU-50-120



WPU-50-160



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

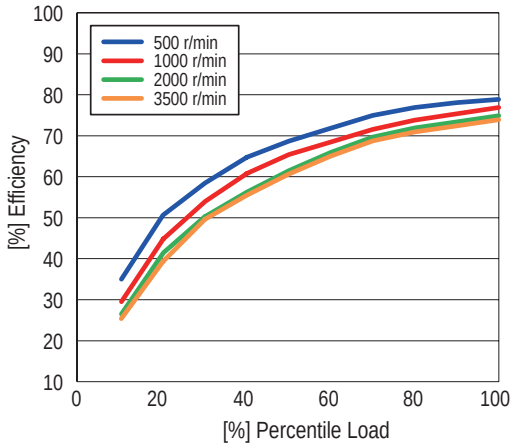
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

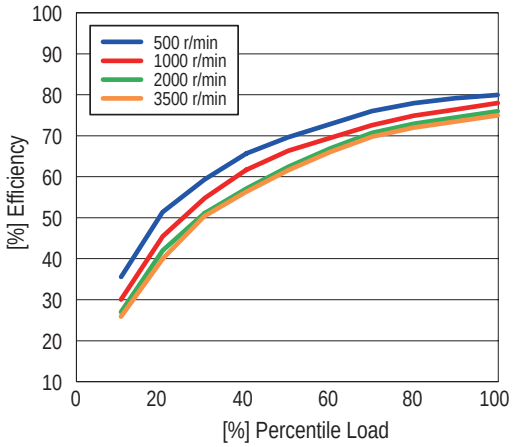
Efficiency (Closed type, Unit) (Open type, Simple unit)

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

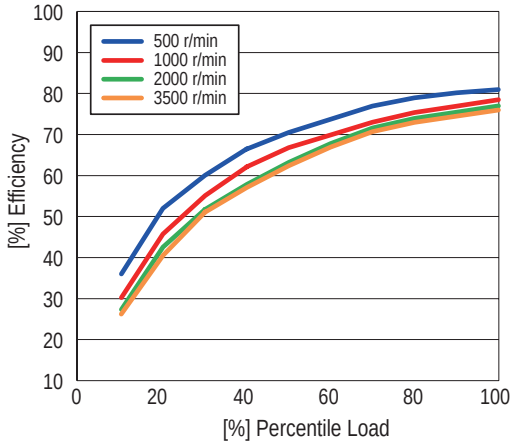
WPU-63-50



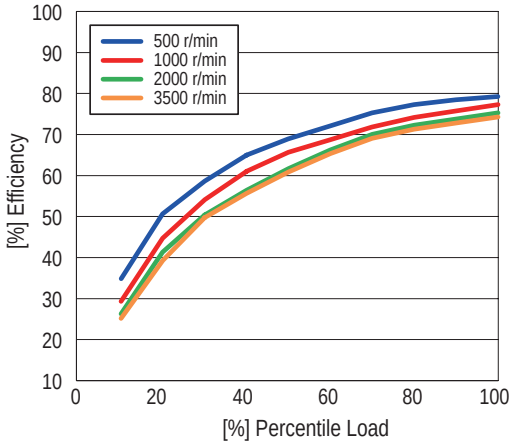
WPU-63-80



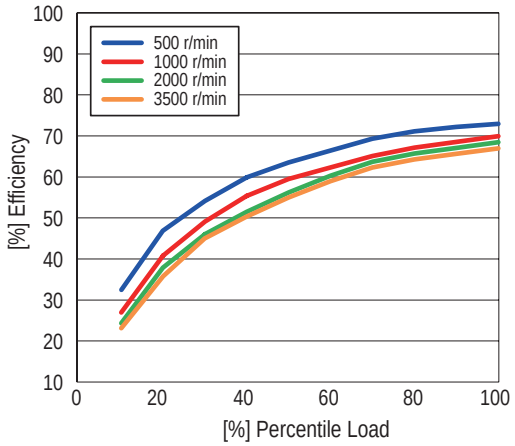
WPU-63-100



WPU-63-120



WPU-63-160



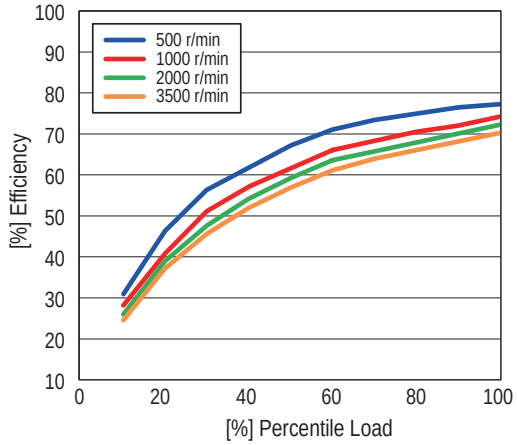
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

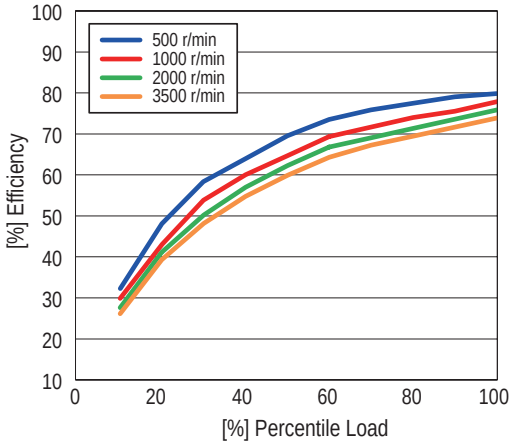
Efficiency (Closed type, Unit) (Open type, Simple unit)

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

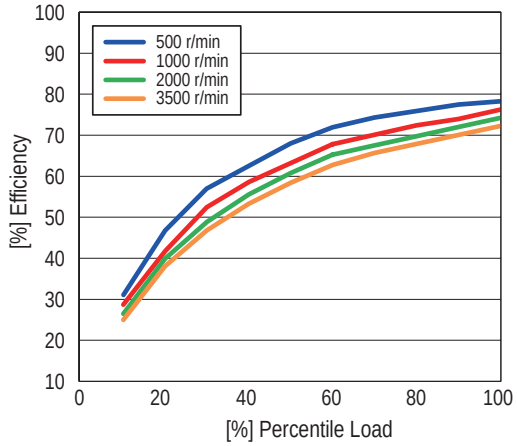
WPU-80-50



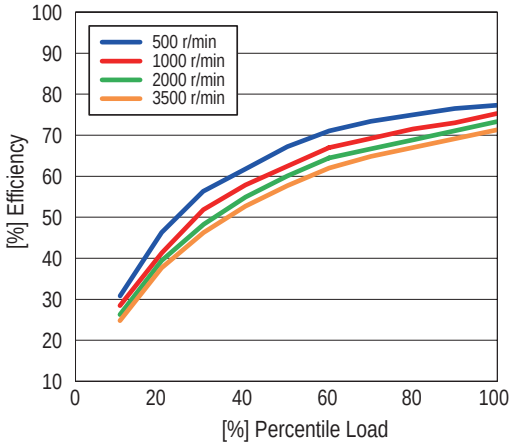
WPU-80-80



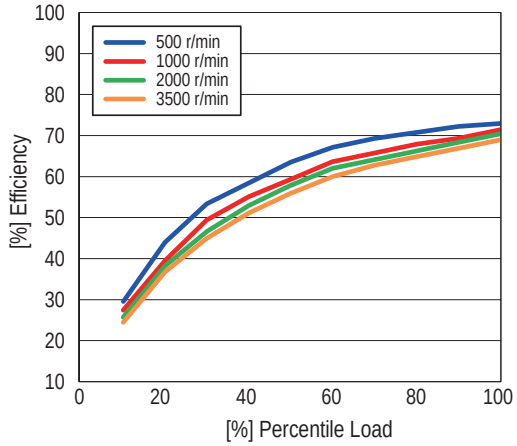
WPU-80-100



WPU-80-120



WPU-80-160



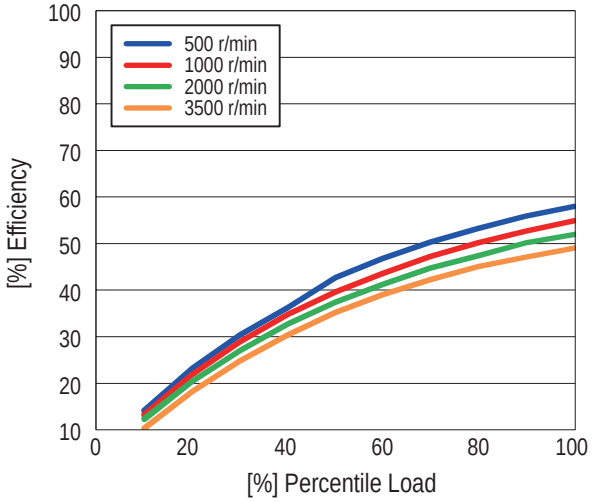
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

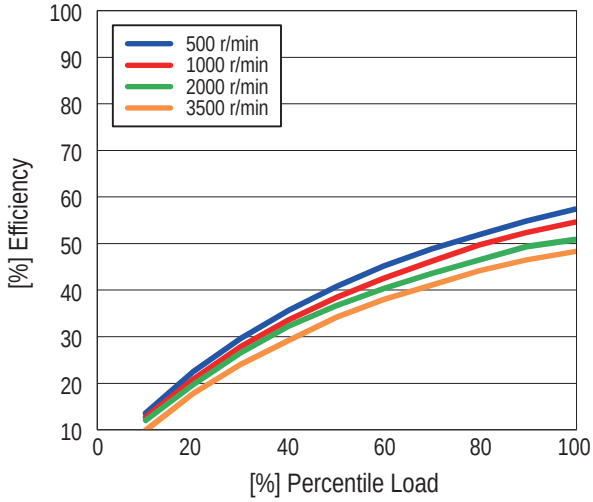
Efficiency (Open type, Unit (Hollow shaft))

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

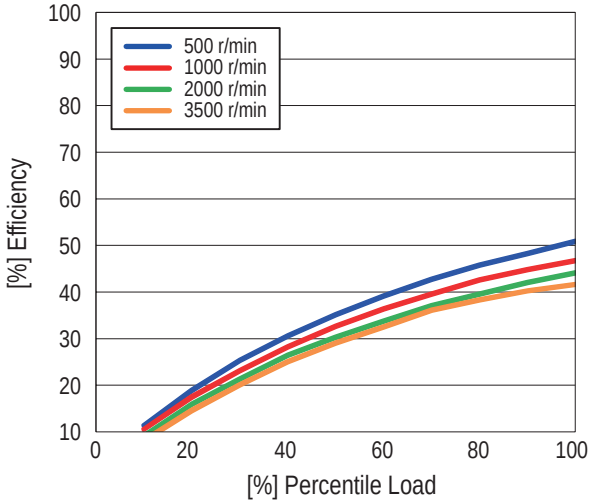
WPU-35-50



WPU-35-80



WPU-35-100



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

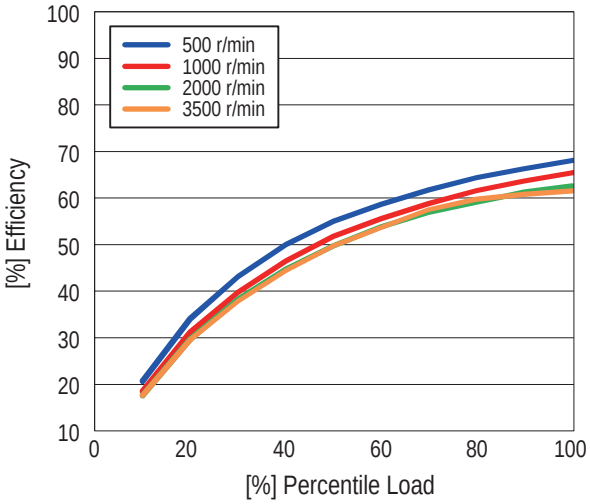
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

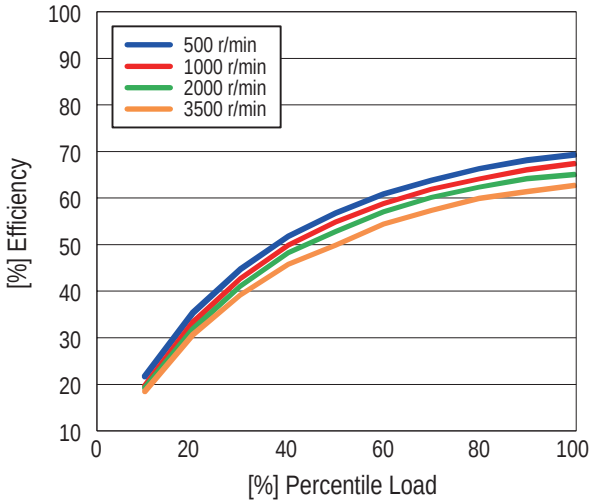
Efficiency (Open type, Unit (Hollow shaft))

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

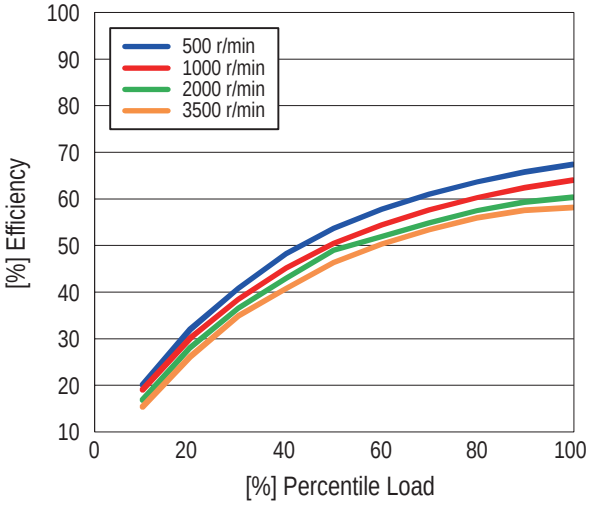
WPU-42-50



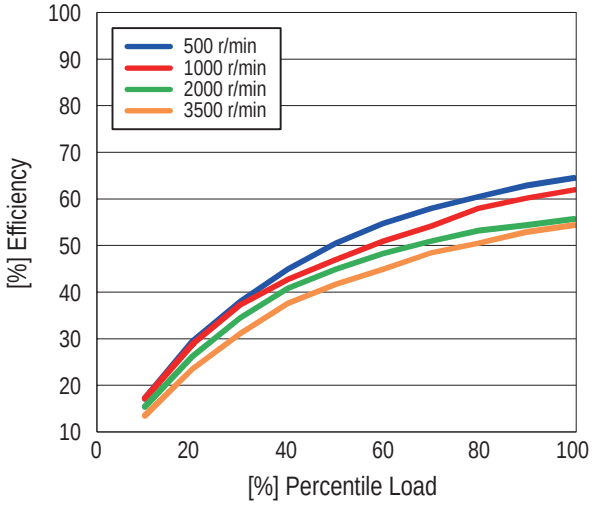
WPU-42-80



WPU-42-100



WPU-42-120



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

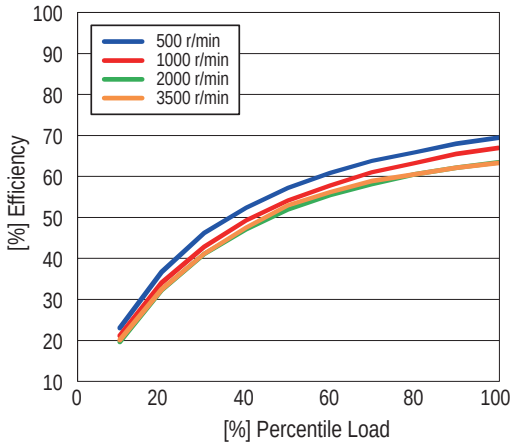
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

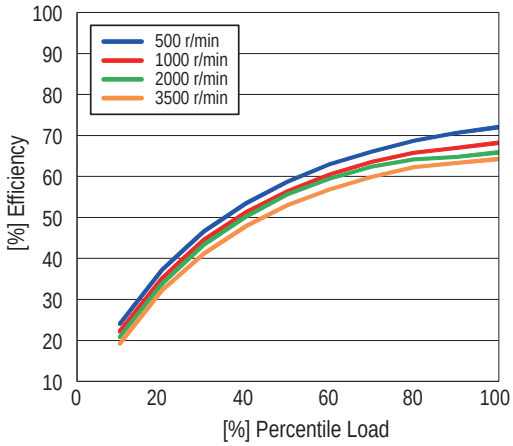
Efficiency (Open type, Unit (Hollow shaft))

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

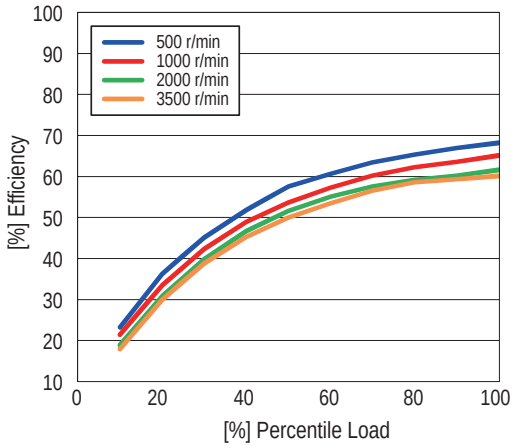
WPU-50-50



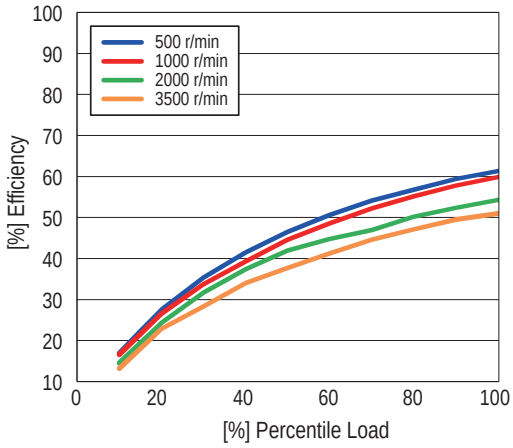
WPU-50-80



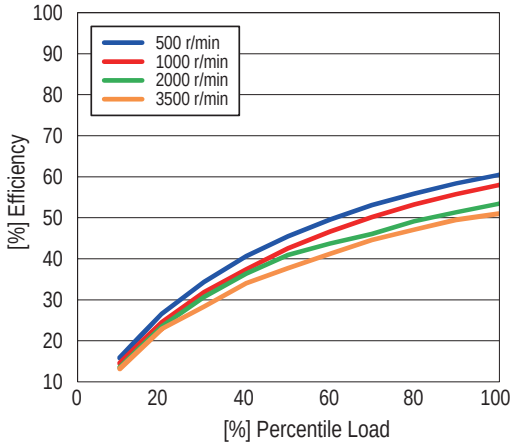
WPU-50-100



WPU-50-120



WPU-50-160



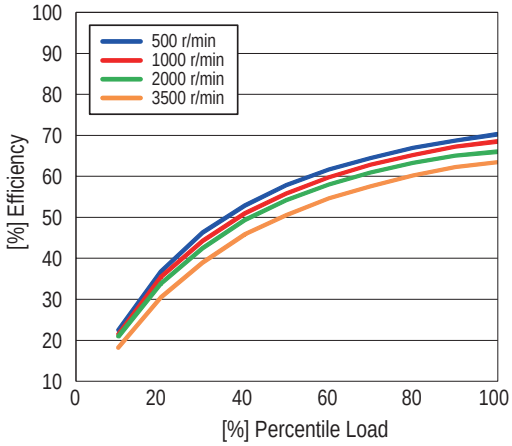
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

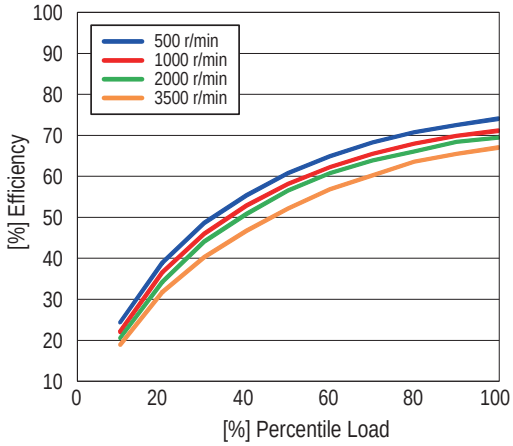
Efficiency (Open type, Unit (Hollow shaft))

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

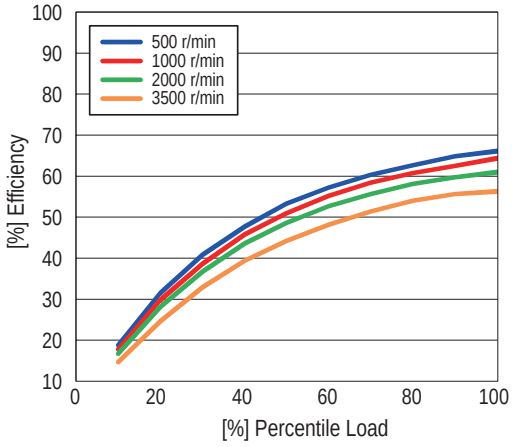
WPU-63-50



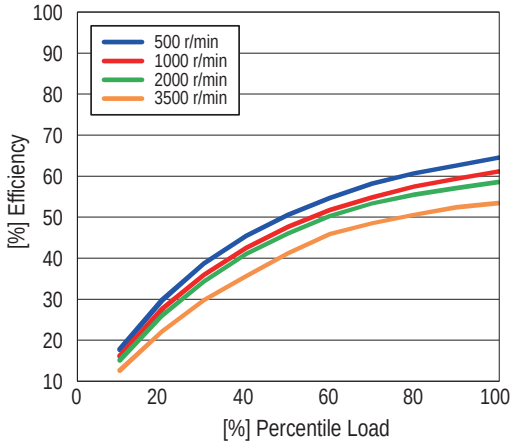
WPU-63-80



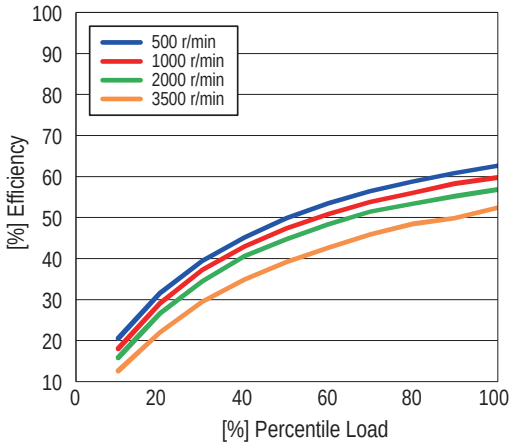
WPU-63-100



WPU-63-120



WPU-63-160



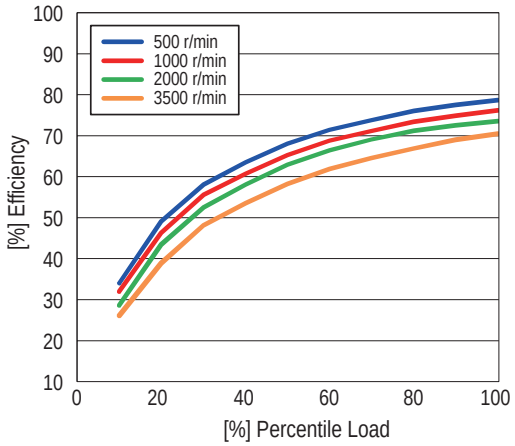
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

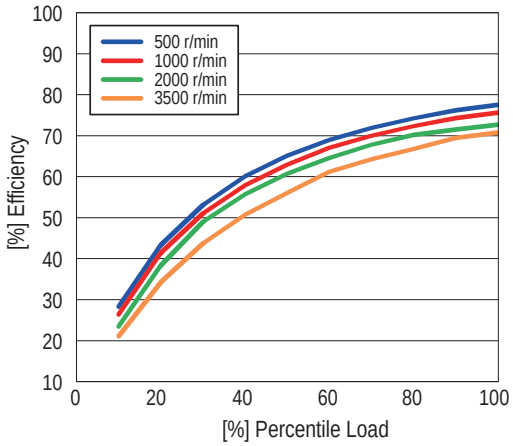
Efficiency (Open type, Unit (Hollow shaft))

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

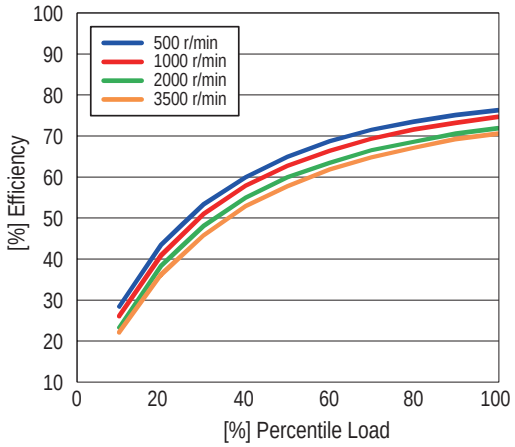
WPU-80-50



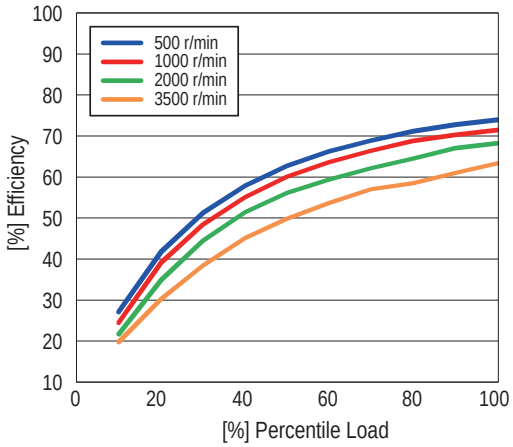
WPU-80-80



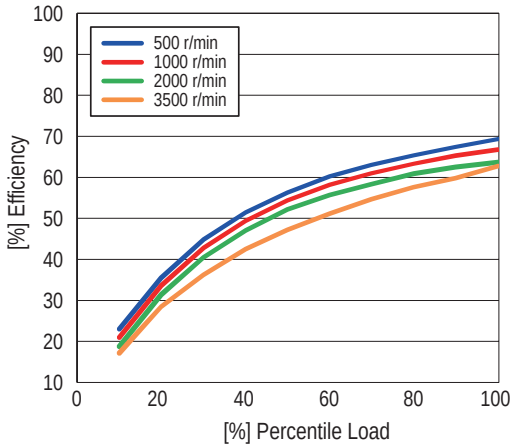
WPU-80-100



WPU-80-120



WPU-80-160



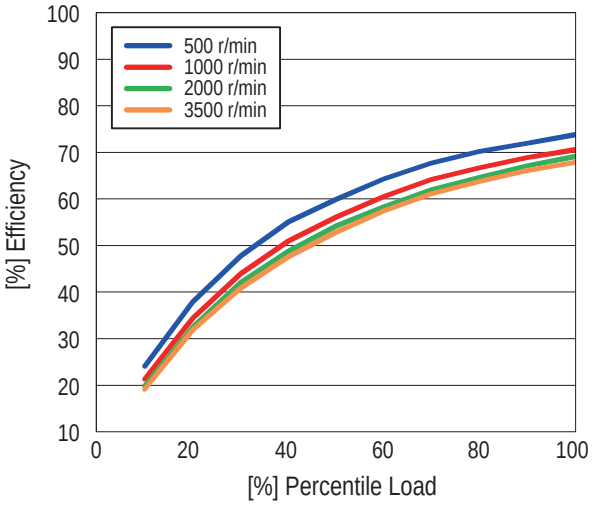
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

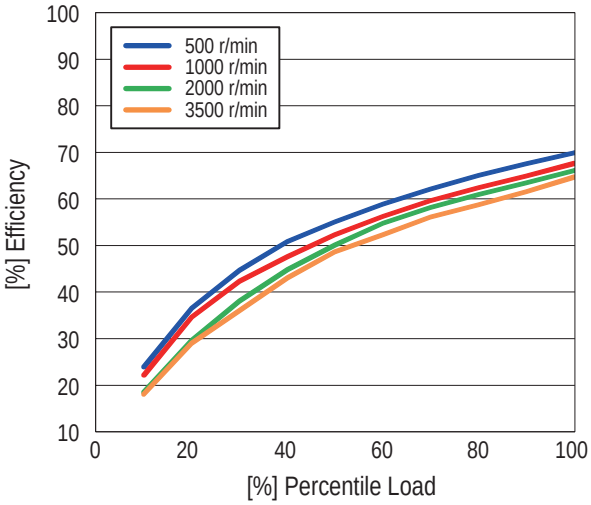
Efficiency (Open type, Unit (Input shaft))

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

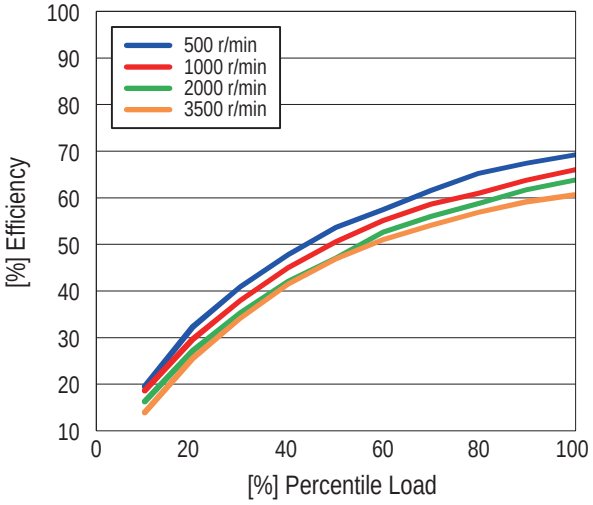
WPU-35-50



WPU-35-80



WPU-35-100



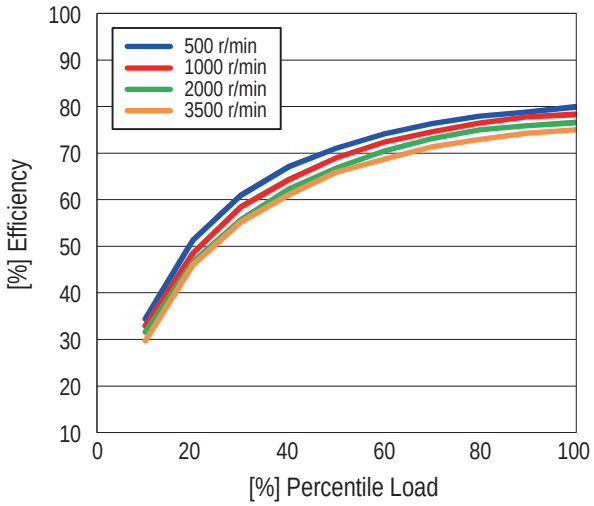
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

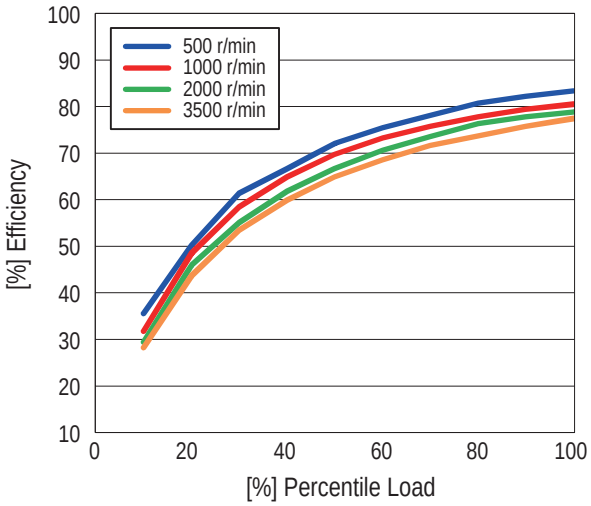
Efficiency (Open type, Unit (Input shaft))

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

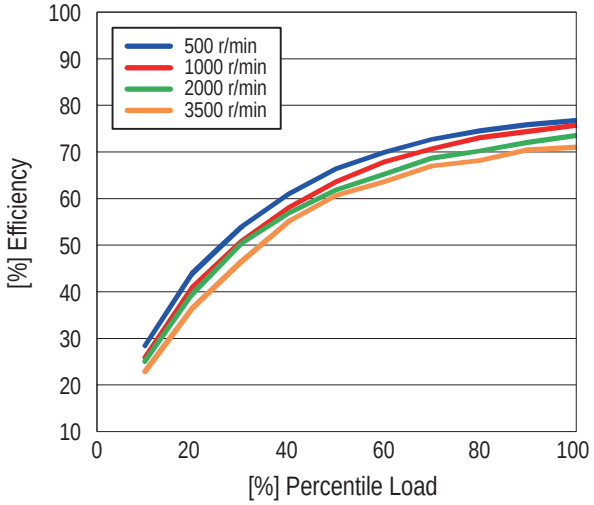
WPU-42-50



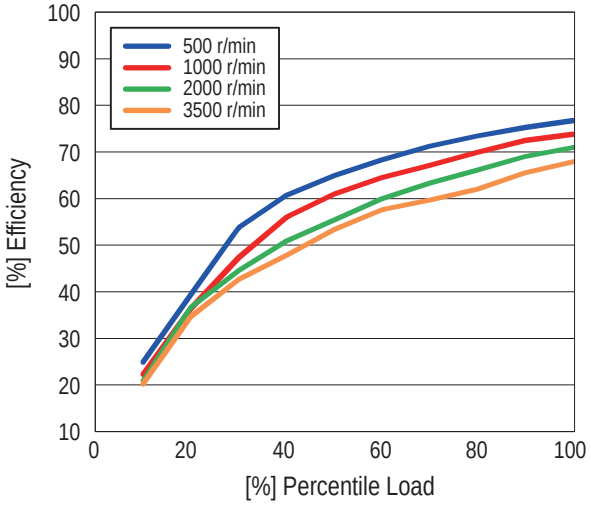
WPU-42-80



WPU-42-100



WPU-42-120



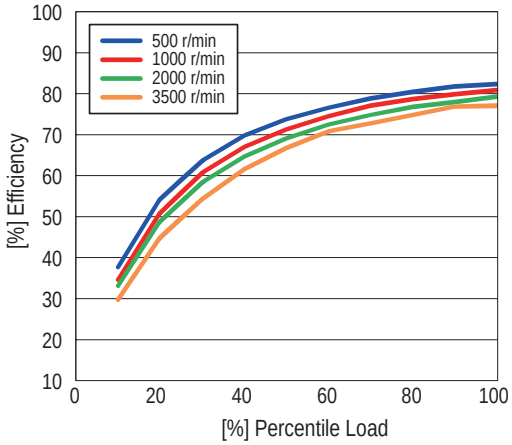
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

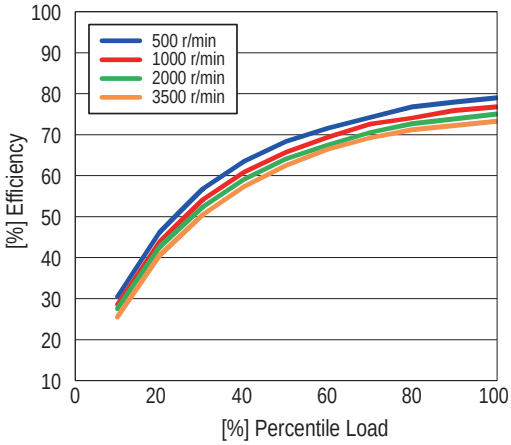
Efficiency (Open type, Unit (Input shaft))

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

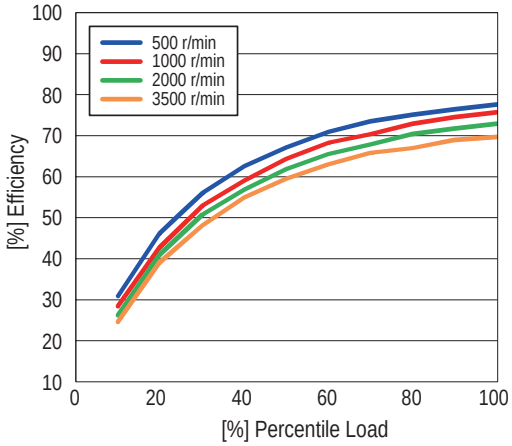
WPU-50-50



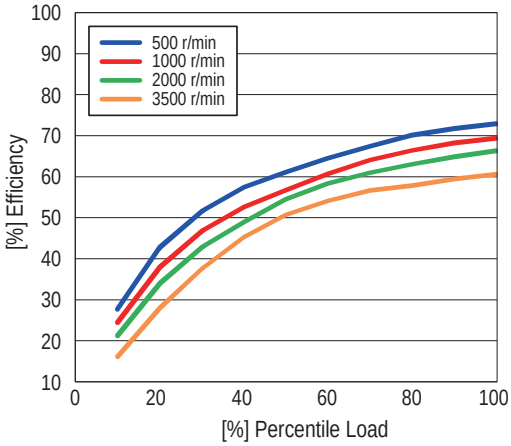
WPU-50-80



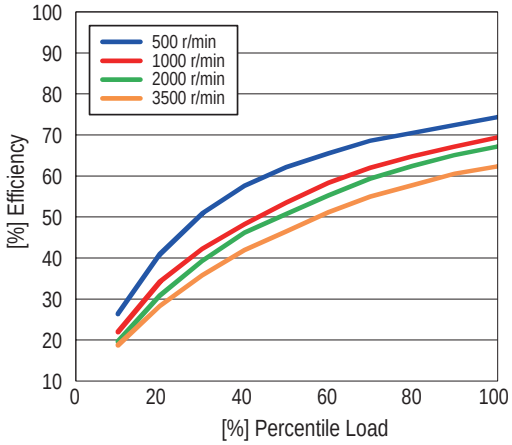
WPU-50-100



WPU-50-120



WPU-50-160



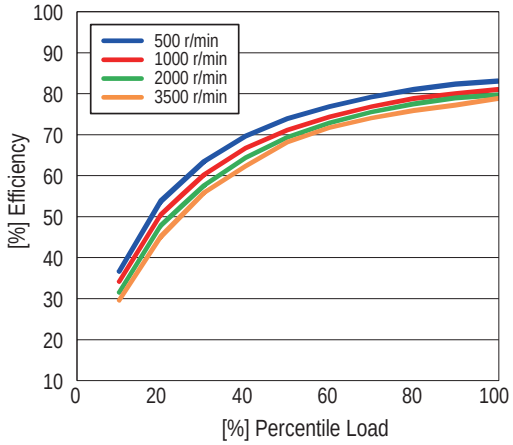
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

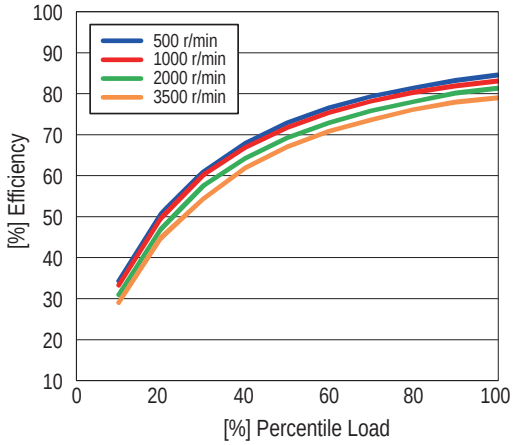
Efficiency (Open type, Unit (Input shaft))

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

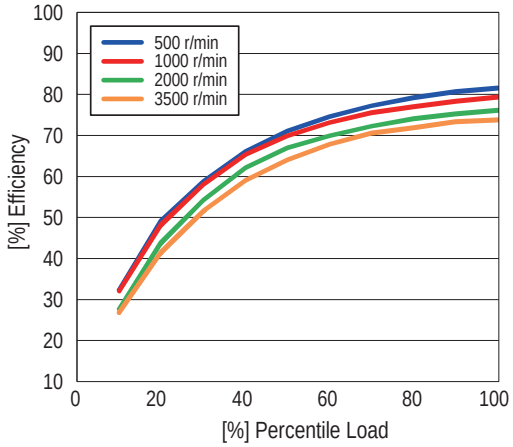
WPU-63-50



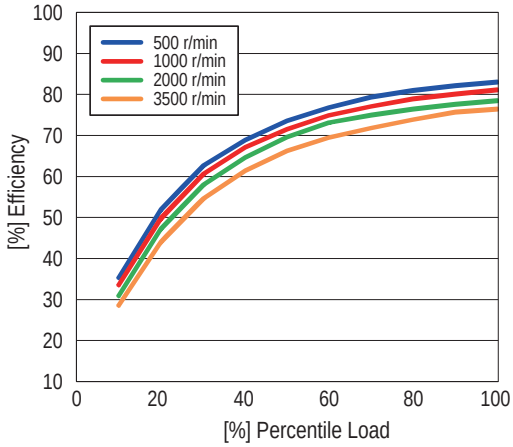
WPU-63-80



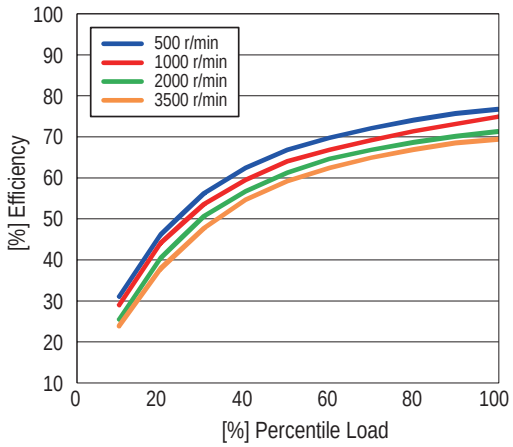
WPU-63-100



WPU-63-120



WPU-63-160



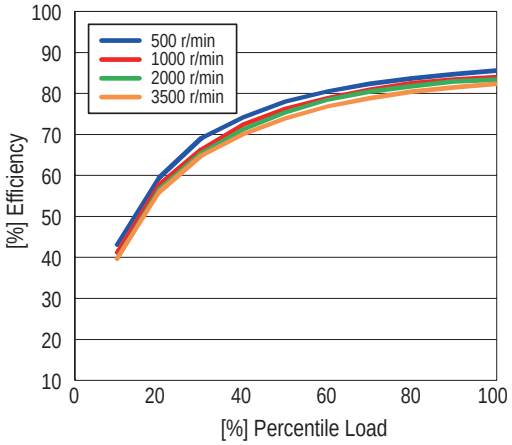
*1 These diagrams represent the average value of the actual measurement.
*2 Charts does not show effects due to rotation resistance of bearings and oil seals on the input side.

Characteristics Data

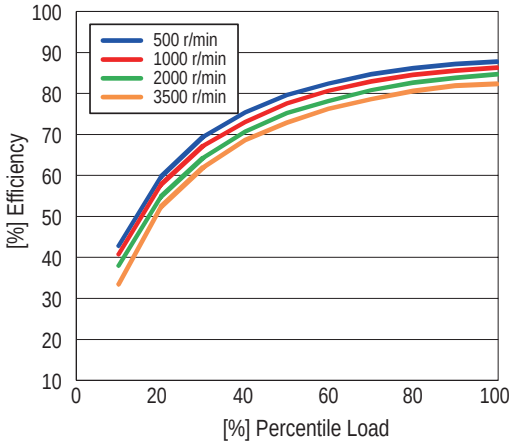
Efficiency (Open type, Unit (Input shaft))

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

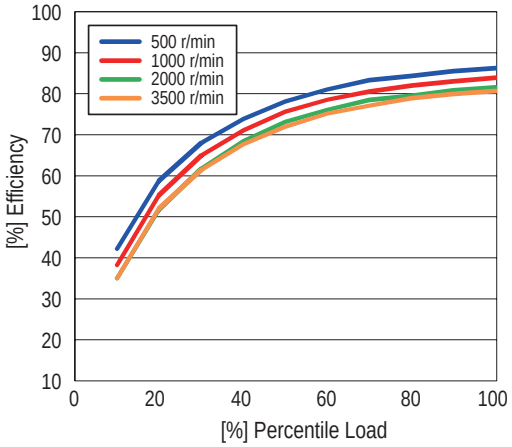
WPU-80-50



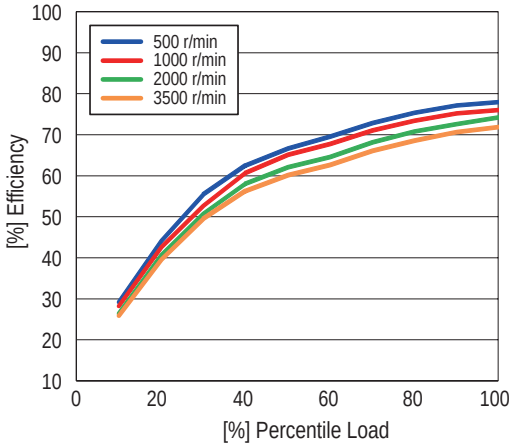
WPU-80-80



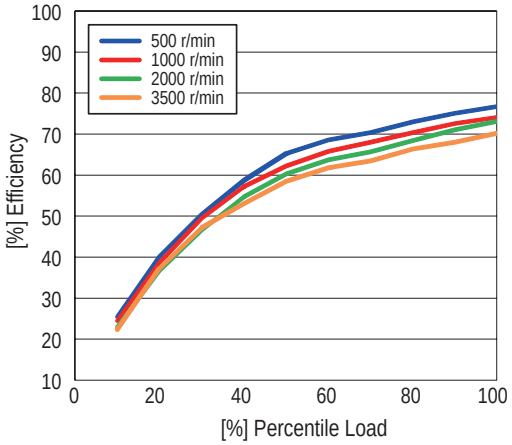
WPU-80-100



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.