

SPEED CHANGERS & REDUCERS

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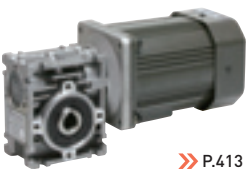
496 SCD

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Speed Changer and Reducer Models

Series	HOLLOW SHAFT / SOLID SHAFT SPEED CHANGERS AND REDUCERS			BELT-TYPE STEPLESS SPEED CHANGER UNITS
Device	Hollow Shaft Speed Changers and Reducers		Solid Shaft Speed Changers and Reducers	ANS Series
Model	RW mini	RWM BS	AXM	ANS
	 >> P.413	 >> P.416	 >> P.424	 >> P.430
Model	RWM	RWP	AXP	ANW
	 >> P.414	 >> P.418	 >> P.426	 >> P.432

Series	STAND-ALONE BELT-TYPE STEPLESS SPEED CHANGERS			
Device	Single Variable Pitch Pulleys			
Model	P	AP	PL	PK
	 >> P.466	 >> P.468	 >> P.471	 >> P.472

Series	ZERO-MAX STEPLESS SPEED CHANGERS	
Device	Stand-alone	With Motor
Model	S	MS
	 >> P.488	 >> P.490

COUPLINGS

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CLUTCHES & BRAKESSPEED CHANGERS
& REDUCERS

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ROSTA

SERIES

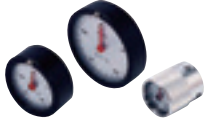
HOLLOW SHAFT /
SOLID SHAFT SPEED
CHANGERS AND
REDUCERSBELT-TYPE
STEPLESS SPEED
CHANGER
UNITSSTAND-ALONE
BELT-TYPE
STEPLESS SPEED
CHANGERSZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

		PDS Series	AH Series	Speed Changer Belts
ANG	ANB	PDS	AHS	BELT
				
>> P.436		>> P.446	>> P.456	
ACW		PDC	AHM	
				
>> P.438	>> P.440	>> P.448	>> P.458	>> P.463
		PDG		
				
		>> P.450		

		Motor Slide Bases	Intermediate Wheels		
PF	R/RK/RH		L	U	T
					
>> P.474	>> P.476		>> P.480	>> P.481	>> P.482

DC MOTORS		ROTATION SPEED INDICATORS	
DC Motors		Weight Type	Differential Type
SCD	SYD	SD Stand-alone	SD Differential Type
			
>> P.496	>> P.500	>> P.508	>> P.510
		SD with Handle	
			
		>> P.508	

STAND-ALONE BELT-TYPE STEPLESS SPEED CHANGERS

| P

| AP

| PL

| PK

| PF

| Motor Slide Bases R/RK/RH

| L

| U

| T

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SERIES

HOLLOW SHAFT /
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CHANGERS AND
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BELT-TYPE
STEPLESS SPEED
CHANGER
UNITS

STAND-ALONE
BELT-TYPE
STEPLESS SPEED
CHANGERS

ZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

MODELS

P

AP

PL

PK

PF

R/RK/RH

L

U

T

Stand-alone Belt-type Stepless Speed Changer

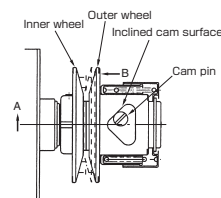
P

Standard applied motor output	0.2 kW to 3.7 kW (4-pole)
Speed change ratio	Approx. 1:1.5
External pulley diameter	86 mm to 218 mm

A VARI-DIA Pulley Using a Standard V-Belt



- Using a Standard V-Belt
- A Cam Mechanism Prevents Slip
- An Adapter Facilitates Mounting



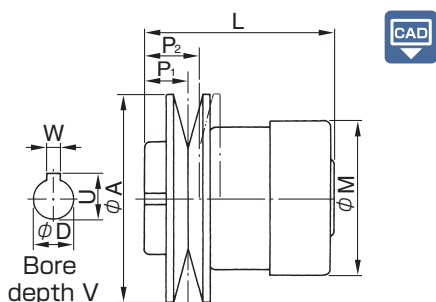
Specifications

Model	Motor in use (4P)	Speed change ratio	Belt	Transmission capacity [kW]			Mass [kg]
				High speed	Intermediate speed	Low speed	
P-86-MA	0.2 ~ 0.4 kW	1:1.5	A	0.7	0.4	0.3	1.1
P-98-MA	0.4 ~ 0.75 kW	1:1.4	A	1.2	0.7	0.4	1.8
P-106-MA	0.4 ~ 0.75 kW	1:1.6	B	1.3	0.9	0.6	2.0
P-124-MA	0.75 ~ 1.5 kW	1:1.5	B	1.8	1.2	0.8	3.0
P-164-MA	1.5 ~ 2.2 kW	1:1.5	C	3.2	2.2	1.2	6.0
P-218	2.2 ~ 3.7 kW	1:1.4	C	6.2	4.4	3.2	14.0

Types of Adapters

Model	φ D [mm]	Bore depth [mm]
P-86-MA	10 11 12 13 14 15 16	30
P-98-MA	11 12 13 14 15 16 18 19	40
P-106-MA		40
P-124-MA	14 15 16 18 19 20 22 24 25	50
P-164-MA		50
P-218		60

Dimensions



														Unit [mm]		
Model	A	P ₁	P ₂	L	M	D		W		U		V	Max. P.D.	Min. P.D.	Movement distance	
P-86-MA	86	18	21.5	78	63	11	14	—	—	—	—	30	77	51	20	
P-98-MA	98	19	22.5	85	73	14	19	5	6	16	21.5	40	89	62	21	
P-106-MA	106	21	26	96	73	14	19	5	6	16	21.5	40	95	58	29	
P-124-MA	124	22	27	101	84	19	24	6	8	21.5	27	50	113	75	30	
P-164-MA	164	25	32	130	102	24	*28	8		27	31	50	150	96	42	
P-218	218	27	34	163	132	28		8		31		60	204	150	42	

Movement distance refers to a distance to move the motor that is required to change speed. If a repeated load (brake, motor, etc.) is imposed, specify the key method.

* The bore of the P-164 for a 2.2 kW motor is a straight type.

For details on motor slide bases, refer to the Motor Slide Bases section.

Driven Side Rotation Speed

(Rotation speed by driven pulley diameter when mounted to a 4-pole motor) 50 Hz, 1430 min⁻¹ 60 Hz, 1720 min⁻¹

Model		Unit [min ⁻¹]							
		4 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.	18 in.
P-86-MA	50Hz	785 ~ 1180	510 ~ 765	375 ~ 560					
	60Hz	945 ~ 1420	610 ~ 920	450 ~ 675					
P-98-MA	50Hz	970 ~ 1365	630 ~ 880	460 ~ 650					
	60Hz	1165 ~ 1645	755 ~ 1060	555 ~ 780					
P-106-MA	50Hz		585 ~ 950	425 ~ 690					
	60Hz		705 ~ 1150	510 ~ 830					
P-124-MA	50Hz		760 ~ 1140	560 ~ 840	440 ~ 665				
	60Hz		910 ~ 1370	670 ~ 1010	530 ~ 800				
P-164-MA	50Hz			720 ~ 1120	570 ~ 885	475 ~ 735			
	60Hz			865 ~ 1350	685 ~ 1065	570 ~ 885			
P-218	50Hz				890 ~ 1205	740 ~ 1000	625 ~ 850	545 ~ 740	485 ~ 660
	60Hz				1070 ~ 1445	890 ~ 1205	750 ~ 1020	655 ~ 890	585 ~ 790

How to Place an Order

P-86-MA-11

Size — Bore diameter

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SERIES

HOLLOW SHAFT / SOLID SHAFT SPEED CHANGERS AND REDUCERS

BELT-TYPE STEPLESS SPEED CHANGER UNITS

STAND-ALONE BELT-TYPE STEPLESS SPEED CHANGERS

ZERO-MAX (STEPLESS SPEED CHANGERS)

DC MOTORS

ROTATION SPEED INDICATORS

MODELS

P	
AP	
PL	
PK	
PF	
R/RK/RH	
L	
U	
T	

Stand-alone Belt-type Stepless Speed Changer

AP

Standard applied motor output	0.2 kW to 3.7 kW (4-pole)
Speed change ratio	Approx. 1:1.5
External pulley diameter	86 mm to 218 mm

Speed Change without Changing the Distance between Shafts



- Using a Standard V-Belt
- An Adapter Facilitates Mounting
- Speed Can Be Changed without Changing the Distance between Shafts
- AP Is Used in Combination with P

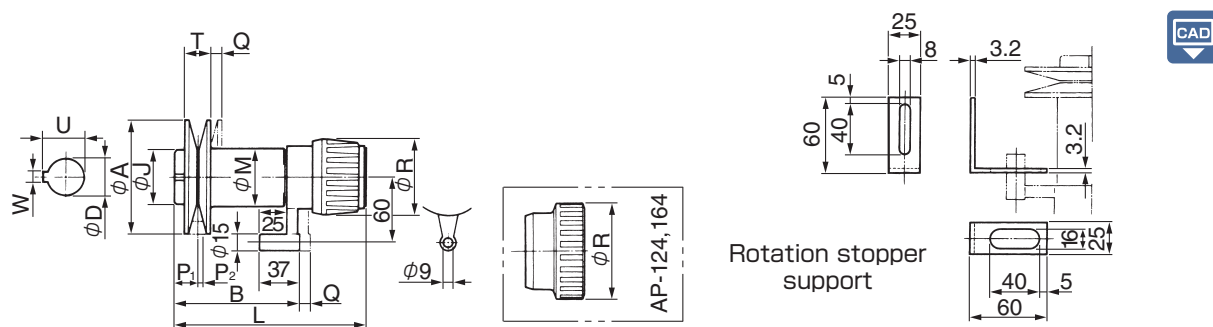
Types of Adapters

Model	φ D [mm]	Bore depth [mm]
AP - 86-MA	10 11 12 13 14 15 16	30
AP - 98-MA	11 12 13 14 15 16 18 19	40
AP-124-MA	14 15 16 18 19 20 22 24 25	50
AP-164-MA		50

Specifications

Model	Motor in use	Driven side speed changer	Belt	Speed change ratio	50Hz		60Hz	
					Output rotation speed [min ⁻¹]	Output torque [N · m]	Output rotation speed [min ⁻¹]	Output torque [N · m]
AP - 86-MA	0.2 kW4P	P-86-MA	A	1:2.2	950 ~ 2150	1.6 ~ 0.7	1140 ~ 2590	1.4 ~ 0.6
	0.2 kW4P	P-98-MA	A	1:2	820 ~ 1720	1.9 ~ 0.9	990 ~ 2060	1.6 ~ 0.8
AP - 98-MA	0.4 kW4P	P-98-MA	A	1:2	1000 ~ 2050	3.1 ~ 1.5	1200 ~ 2460	2.6 ~ 1.3
	0.4 kW4P	P-124-MA	A	1:1.9	890 ~ 1710	3.5 ~ 1.8	1070 ~ 2060	2.9 ~ 1.5
AP-124-MA	0.75kW4P	P-124-MA	B	1:2.2	950 ~ 2150	6.1 ~ 2.7	1140 ~ 2590	5.1 ~ 2.3
	0.75kW4P	P-164-MA	B	1:2	810 ~ 1660	7.2 ~ 3.5	970 ~ 2000	6.0 ~ 2.9
AP-164-MA	1.5 kW4P	P-164-MA	C	1:2.4	920 ~ 2230	12.7 ~ 5.2	1110 ~ 2680	10.5 ~ 4.4
	1.5 kW4P	P-218	C	1:2	680 ~ 1360	17.2 ~ 8.6	810 ~ 1640	14.4 ~ 7.1

Dimensions



(4-pole motor, 50 Hz 1430 min⁻¹, 60 Hz 1720 min⁻¹)

Unit [mm]

Model	A	B	J	L	M	P ₁	P ₂	Q	R	T	D	W	U	max. P.D.	min. P.D.	Mass [kg]
AP-86-MA	86	93	46	156	54	18	3.5	7	70	18	11	—	—	77	51	1.7
AP-98-MA	98	103	50	166	54	19	3.5	7	70	20	14	5	16	89	62	1.9
AP-124-MA	124	126	68	196	62	22	5	10	88	24	19	6	21.5	113	75	3.2
AP-164-MA	164	137	68	211	66	25	7	14.5	88	30	24	8	27	150	96	4.8

* Use 1800 min⁻¹ or less for the input rotation speed. (The 4-pole motor drive is appropriate)

Belt Number and Distance between Shafts

Model	Driven side speed changer	Belt number	Belt number	Belt number	Belt number	Belt number	Belt number
		Distance between shafts [mm]	Distance between shafts [mm]	Distance between shafts [mm]	Distance between shafts [mm]	Distance between shafts [mm]	Distance between shafts [mm]
AP-86-MA	P-86-MA	A-20	A-21	A-22	A-23	A-24	A-25
		153	165	179	191	204	216
AP-86-MA	P-98-MA	A-20	A-21	A-22	A-23	A-24	A-25
		143	155	169	181	194	206
AP-98-MA	P-98-MA	A-21	A-22	A-23	A-24	A-25	A-26
		147	160	172	186	198	211
AP-98-MA	P-124-MA	A-23	A-24	A-25	A-26	A-27	A-28
		163	177	189	202	215	227
AP-124-MA	P-124-MA	B-25	B-26	B-27	B-28	B-29	B-30
		168	181	194	206	220	232
AP-124-MA	P-164-MA	B-28	B-29	B-30	B-31	B-32	B-33
		190	203	216	228	241	254
AP-164-MA	P-164-MA	C-32	C-33	C-34	C-35	C-36	C-37
		211	224	237	249	262	275
AP-164-MA	P-218	C-38	C-39	C-40	C-41	C-42	C-43
		241	254	267	279	293	305

* For details on the travel line, refer to the following page.

How to Place an Order

AP-86-MA-11

Size — Bore diameter

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SERIES

HOLLOW SHAFT /
SOLID SHAFT SPEED
CHANGERS AND
REDUCERS

BELT-TYPE
STEPLESS SPEED
CHANGER
UNITS

STAND-ALONE
BELT-TYPE
STEPLESS SPEED
CHANGERS

ZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

MODELS

P

AP

PL

PK

PF

R/RK/RH

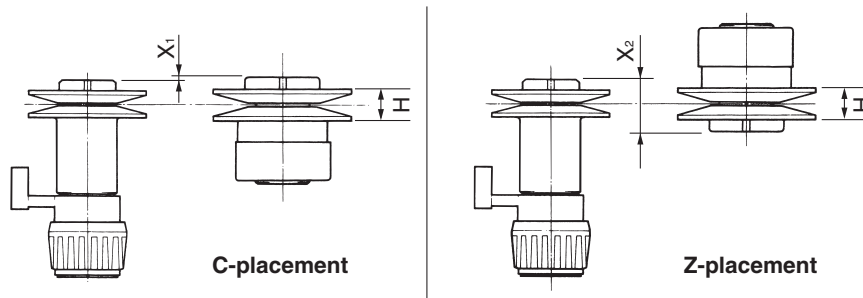
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AP Models

Placement



The belt travel lines X are shown as below.

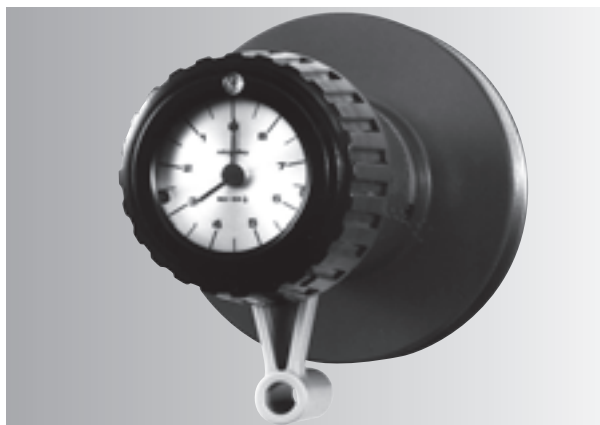
Combination	AP-86-MA P-86-MA	AP-86-MA P-98-MA	AP-98-MA P-98-MA	AP-98-MA P-124-MA	AP-124-MA P-124-MA	AP-124-MA P-164-MA	AP-164-MA P-164-MA	AP-164-MA P-218
H	25	24.5	25	31	34	39.5	44	42.5
C-placement X_1	0	1	0	3	0	3	0	1.5
Z-placement X_2	39.5	40.5	41.5	44.5	49	52	57	58.5

Items Checked for Design Purposes

1. Use the AP model on the drive (motor) side and the P model on the driven side.
2. Use 900 to 1800 min⁻¹ for the input rotation speed range.
3. Before mounting the AP model, be sure to lock the rotation stopper rod part of the AP model with the included rotation stopper support.
If the included rotation stopper support cannot be used, secure the rotation stopper so that it can be slid effortlessly.
4. Avoid a humid or dusty place, a place where the ambient temperature is high, a place exposed to water or oil, and a place where corrosive and flammable gases are present in the atmosphere, and select a well-ventilated place. Mount the device in a location that provides easy access for inspection. The operating ambient temperature range is -10°C to 40°C.
5. Securely mount the device to the shaft. When mounting the device to the machine, provide the rotating part with a cover.
6. Do not turn the handle when the speed changer is stopped.
7. If you will use the device for a machine where normal-reverse operation is performed, or a repeated or impact load is imposed, please consult with us.

Options

Handle with Turn Indicator



A rotation speed indicator (SD model) can be mounted in the standard handle part.

Model	Number of handle turns	SD model
AP-86 -MA- □ -SD	3.5	SD-53B-5L
AP-98 -MA- □ -SD	3.5	
AP-124-MA- □ -SD	5	SD-75B-9L
AP-164-MA- □ -SD	7	

Stand-alone Belt-type Stepless Speed Changer

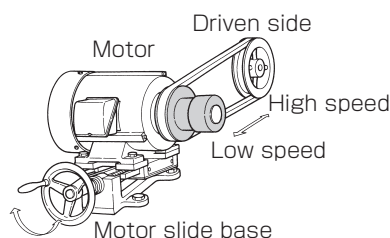
PL

Standard applied motor output	0.2 kW to 1.5 kW (4-pole)
Speed change ratio	Approx. 1:2
External pulley diameter	116 mm to 212 mm

The Model Designed to Increase the Speed Change Ratio



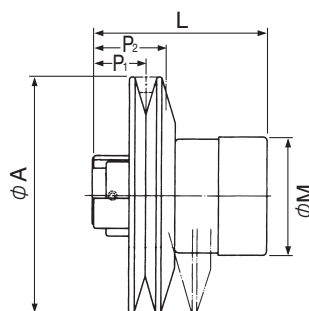
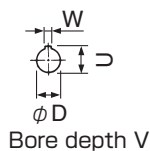
- Using a Standard V-Belt
- Large Speed Change Ratio



Specifications

Model	Motor in use [kW] (4P)	Speed change ratio	Belt	Transmission capacity [kW]			Mass [kg]
				High speed rotation	Intermediate speed rotation	Low speed rotation	
PL-116-11	0.2	1 : 2.3	M	0.5	0.3	0.2	2.0
PL-140-14N	0.4	1 : 2	A	2.1	1.4	0.6	2.7
PL-170-19N	0.75	1 : 2.1	B	3.6	2.4	1.0	5.5
PL-210-24N	1.5	1 : 2.4	B	5.2	3.1	1.5	7.8

Dimensions



Model	A	P ₁	P ₂	L	M	D	W	U	V	Max. P.D.	Min. P.D.	Movement distance
PL-116-11	116	24	33.5	90	56	11	—	—	40	111	48	49
PL-140-14N	140	28	38	97	84	14	5	16	40	131	65	52
PL-170-19N	170	38.5	52	126	84	19	6	21.5	50	159	74	67
PL-210-24N	212	41	59	148	95	24	8	27	60	201	83	93

* Movement distance refers to a distance to move the motor for changing speed.

MODELS

P	
AP	
PL	
PK	
PF	
R/RK/RH	
L	
U	
T	

How to Place an Order

PL-116-11

Size — Nominal hole diameter

Stand-alone Belt-type Stepless Speed Changer

PK

Standard applied motor output	0.2 kW to 11 kW (4-pole), 11 kW to 18.5 kW (6-pole)
Speed change ratio	Approx. 1:3
External pulley diameter	150 mm to 400 mm

A VARI-DIA Pulley Using a Wide Speed Changer Belt

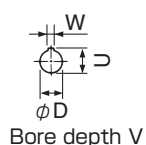


■ Using a Wide Speed Changer Belt

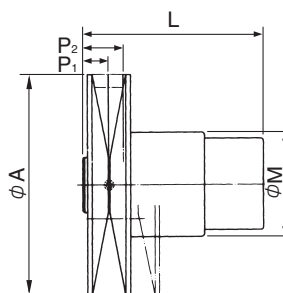
■ Large Speed Change Ratio

■ Large Transmission Capacity

Dimensions



Bore depth V



Model	A	P ₁	P ₂	L	M	D	W	U	V	Max. P.D.	Min. P.D.	Unit [mm]
												Movement distance
PK-150-14N-044	150	19	28.5	120	81	14	5	16	30	144	48	75
PK-200-19N-074	200	23	35.5	160	95	19	6	21.5	40	192	64	101
PK-200-24N-154												
PK-250-28N-224	250	31	49.5	210	126	28	8	31	60	240	80	126
PK-250-28N-374												
PK-300-38N-554	305	50	76	300	143	38	10	41	80	290	96	152
PK-300-38N-754												
PK-300-42N-1104						42	12	45	110			
PK-355-42N-1106	355	54	81.5	355	214	42	12	45	110	343	137	162
PK-355-48N-1506						48	14	51.5				
PK-400-55N-1806	400	51	77	355	214	55	16	59	110	388	194	152

* Movement distance refers to a distance to move the motor for changing speed.

Specifications

Model	Applied motor [kW]	Speed change ratio	Belt	Transmission capacity [kW]			Mass [kg]
				High speed rotation	Intermediate speed rotation	Low speed rotation	
PK-150-14N-044	0.4 (4P)	1 : 3	1422V	1.5	1.0	0.4	3.2
PK-200-19N-074	0.75 (4P)	1 : 3	1922V	3.7	2.3	0.5	6.2
PK-200-24N-154	1.5 (4P)						
PK-250-28N-224	2.2 (4P)	1 : 3	2926V	8.0	5.2	1.1	13
PK-250-28N-374	3.7 (4P)						
PK-300-38N-554	5.5 (4P)	1 : 3	4430V	13	12	2.5	24
PK-300-38N-754	7.5 (4P)						
PK-300-42N-1104	11 (4P)						
PK-355-42N-1106	11 (6P)	1 : 2.5	4430V	16	11	5.5	58
PK-355-48N-1506	15 (6P)						
PK-400-55N-1806	18.5 (6P)	1 : 2	4430V	18	15	9.8	66

* If you want to use a slide base for the PK-355/400, please consult with us.

Driven Side Rotation Speed (when 1430 min⁻¹ (50 Hz) or 1720 min⁻¹ (60 Hz) are input with 4-pole motor)

Model	Driven side pulley diameter	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.	20 in.	24 in.
PK-150	50Hz	470 ~ 1410	350 ~ 1050	280 ~ 840	230 ~ 690				
	60Hz	565 ~ 1700	420 ~ 1260	335 ~ 1010	275 ~ 830				
PK-200	50Hz	640 ~ 1920	470 ~ 1410	380 ~ 1140	310 ~ 930				
	60Hz	765 ~ 2300	565 ~ 1700	460 ~ 1380	375 ~ 1130				
PK-250	50Hz			470 ~ 1410	390 ~ 1170	330 ~ 990	290 ~ 870		
	60Hz			565 ~ 1700	470 ~ 1410	395 ~ 1190	345 ~ 1040		
PK-300	50Hz			580 ~ 1740	470 ~ 1410	400 ~ 1200	350 ~ 1050		
	60Hz			695 ~ 2090	565 ~ 1700	480 ~ 1440	420 ~ 1260		
PK-355 *	50Hz				440 ~ 1100	380 ~ 950	330 ~ 825	260 ~ 655	
	60Hz				530 ~ 1325	450 ~ 1130	395 ~ 985	310 ~ 780	
PK-400 *	50Hz					530 ~ 1060	470 ~ 940	370 ~ 740	310 ~ 620
	60Hz					635 ~ 1270	565 ~ 1130	445 ~ 890	370 ~ 740

* The values for the model with * mark: When 950 min⁻¹ (50 Hz) or 1130 min⁻¹ (60 Hz) are input with 6-pole motor.

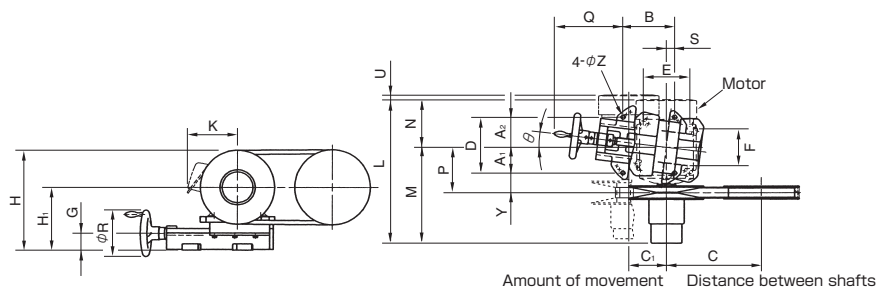
* For details on the driven side pulley, refer to P475. For the driven side pulley, be sure to use one with the same diameter or larger.

Maintaining a Constant Belt Travel Line

The PK pulley is open at one side. So every time the distance between shafts is increased or decreased to change speed, the belt travel line is moved between P₁ and P₂. However, since this type uses a wide speed changer belt, the travel line must be maintained constant relatively strictly. Therefore, the pulley itself must be moved backward or

forward when the distance between shafts is increased or reduced. A motor slide base (RK) is required to do this.

This base can simultaneously increase/decrease the distance between shafts and move the pulley forward/backward. Thus, the belt travel line can always be maintained constant using this base.



Model	Applied speed changer	Applied motor	A ₁	A ₂	B	C ₁	D	E	F	G	H	H ₁	K	L	M	N	P	Q	R	S	U	Y	Z	θ [°]
RK-05	PK-150-14N-044	0.4kW (4P)	75	85	140	75	160	112	90	20	195	121	127	330	210	116	109	150	125	33	9	34	11	7
RK-20	PK-200-19N-074	0.75kW (4P)	69	81	140	101	150	125	100	45	270	170	135	390	260	130	123	195	125	22	12	54	11	7
	PK-200-24N-154	1.5kW (4P)						140	125		280	180	151	430	279	151	142					73		
RK-50	PK-250-28N-224	2.2kW (4P)	90	110	200	126	200	160	140	50	310	200	162	510	343	167	164	186	140	40	19	74	11	9
	PK-250-28N-374	3.7kW (4P)						190	140		335	212	172	524	350	174	171					81		
RK-100	PK-300-38N-554	5.5kW (4P)	146	174	250	152	320	216	140	60	390	252	206	663	459	204	209	249	200	52	26	63	15	10
	PK-300-38N-754	7.5kW (4P)						216	178		390	252	206	701	478	223	228					82		
RK-200	PK-300-42N-1104	11kW (4P)	146	174	250	152	320	254	210	60	440	280	263	785	513	272	263	249	200	48	27	116	15	10
	PK-355-42N-1106	11kW (6P)						254	254		440	280	263	884	590	294	289					143		

How to Place an Order

PK-150-14N-044

Size ————
 ———— Nominally correct motor
 ———— Nominal hole diameter

Stand-alone Belt-type Stepless Speed Changer

PF

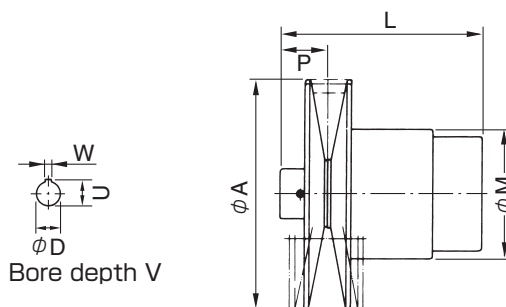
Standard applied motor output	0.4 kW to 3.7 kW (4-pole)
Speed change ratio	1:2.4
External pulley diameter	155 mm to 250 mm

Outstanding Belt Life Span



- Using a Wide Speed Changer Belt
- Open on Both Ends
- Easy Mounting
- The Belt Travel Line Is Always Maintained Constant so the Belt Life Span Is Outstanding.
- Both the Speed Changer and Belt Are Spaciously Designed to Achieve Superior Durability.

Dimensions



Model	A	P	L	M	D	U	W	V	Unit [mm]		
									Max. P.D.	Min. P.D.	Movement distance
PF-155-14N	155	29	140	94	14	16	5	30	150	62	69
PF-155-19N					19	21.5	6	40			
PF-185-19N	185	38	163	104	19	21.5	6	40	178	74	82
PF-185-24N					24	27	8	50			
PF-216-24N	216	51	203	127	24	27	8	50	208	86	96
PF-216-28N					28	31		60			
PF-250-28N	250	54	252	154	28	31	8	60	241	100	111
PF-250-28N											

* Movement distance refers to a distance to move the motor for changing speed.

Specifications

Model	Applied motor [kW] (4P)	Speed change ratio	Belt	Transmission capacity (kW)			Mass [kg]
				High speed rotation	Intermediate speed rotation	Low speed rotation	
PF-155-14N	0.4	1 : 2.4	1422V	1.6	1.1	0.4	4
PF-155-19N	0.75						
PF-185-19N	0.75	1 : 2.4	1922V	3.6	2.2	0.5	6
PF-185-24N	1.5						
PF-216-24N	1.5	1 : 2.4	2322V	5.2	3.8	1.1	10
PF-216-28N	2.2						
PF-250-28N	2.2	1 : 2.4	2926V	8.0	6.2	2.0	19
PF-250-28N	3.7						

Driven Side Rotation Speed (when 1430 min⁻¹ (50 Hz) or 1720 min⁻¹ (60 Hz) are input with 4-pole motor), Belt Number and Distance between Shafts

Model	Driven side external pulley diameter	Driven side rotation speed [min ⁻¹]	Belt and distance between shafts [mm] (when C = PF model max. P.D.)					
PF-155	6 in.	600 ~ 1440	Belt number	1422V360S	1422V400S	1422V420S	1422V466S	1422V480
		720 ~ 1728	Distance between shafts [mm]	224	276	301	355	376
	8 in.	445 ~ 1060	Belt number	1422V400S	1422V420S	1422V466S	1422V480	1422V540
		535 ~ 1290	Distance between shafts [mm]	234	260	312	334	413
PF-185	8 in.	520 ~ 1285	Belt number	1922V403S	1922V417S	1922V426S	1922V443S	1922V454S
		625 ~ 1545	Distance between shafts [mm]	220	234	245	267	280
	10 in.	415 ~ 1020	Belt number	1922V454S	1922V484S	1922V526S	1922V544	1922V604
		500 ~ 1230	Distance between shafts [mm]	238	277	329	352	430
PF-216	10 in.	495 ~ 1200	Belt number	2322V481	2322V521	2322V541	2322V601S	2322V621
		600 ~ 1440	Distance between shafts [mm]	254	299	329	406	429
	12 in.	415 ~ 1000	Belt number	2322V541	2322V601S	2322V621	2322V661	2322V681
		500 ~ 1205	Distance between shafts [mm]	287	364	387	444	462
PF-250	12 in.	485 ~ 1165	Belt number	2926V574	2926V586	2926V606S	2926V616	2926V636
		580 ~ 1400	Distance between shafts [mm]	303	318	344	366	381
	14 in.	410 ~ 990	Belt number	2926V616	2926V636	2926V646	2926V666	2926V686
		495 ~ 1185	Distance between shafts [mm]	321	336	350	375	401

* For the driven side pulley, be sure to use one with the same diameter or larger.

Driven Side Pulley

(V-pulley for a wide speed changer belt)

The cross-sectional shape of the wide speed changer belt is different from that of the standard V-belt. So a commercially available V-pulley cannot be used as is. To use a V-pulley, purchase a JIS standard multi V-pulley and modify it to adjust the V-groove shape to the shape of wide speed changer belt.

Commercially available V-pulleys	Belt size
C type 1 belt	1422V
A type 2 belts	1922V
B type 2 belts	2322V
C type 2 belts	2926V
D type 4 belts	4430V

Belt size	1422V	1922V	2322V	2926V	4430V	
Commercially available V-pulleys	C type 1 belt	A type 2 belts	B type 2 belts	C type 2 belts	D type 4 belts	Surface roughness
Machining drawing						

* For the driven side pulley, purchase a commercially available V-pulley and modify it. The same applies for the driven side pulley of the PK model.

How to Place an Order

PF-155-14N

Size Nominal hole diameter

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REDUCERSBELT-TYPE
STEPLESS SPEED
CHANGER
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BELT-TYPE
STEPLESS SPEED
CHANGERSZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

MODELS

P

AP

PL

PK

PF

R/RK/RH

L

U

T

Motor Slide Bases

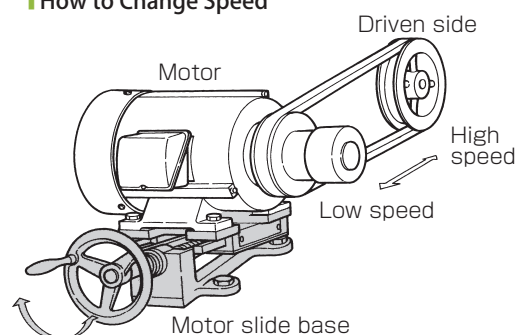
R/RK/RH

Standard applied motor output	0.2 kW to 18.5 kW (4-pole)
Movable distance	0 mm to 200 mm

Motor Slide Base for Easy Speed Change



How to Change Speed



Specifications

Model	Applied motor [kW]	Motor frame number	Movable distance [mm]	Applicable speed changer model				Mass [kg]
				P model	PL model	PK model	PF model	
R-05	0.2 (4-pole)	63	70	P-86	PL-116-11			8.5
	0.4 (4-pole)	71		P-86/P-98/P-106	PL-140-14N		PF-155-14N	
	0.75 (4-pole)	80		P-98/P-106/P-124	PL-170-19N		PF-155-19N/PF-185-19N	
R-20	1.5 (4-pole)	90L	110	P-124/P-164	PL-210-24N		PF-185-24N/PF-216-24N	10.5
R-30	2.2 (4-pole)	100L	140	P-164/P-218			PF-216-28N/PF-250-28N	16
RK-05	0.2 (4-pole)	63	90	P-86	PL-116-11			5.5
	0.4 (4-pole)	71		P-86/P-98/P-106	PL-140-14N	PK-150-14N-044	PF-155-14N	
RK-20	0.75 (4-pole)	80	140	P-98/P-106/P-124	PL-170-19N	PK-200-19N-074	PF-155-19N/PF-185-19N	11
	1.5 (4-pole)	90L		P-124/P-164	PL-210-24N	PK-200-24N-154	PF-185-24N/PF-216-24N	
RK-50	2.2 (4-pole)	100L	160	P-164/P-218		PK-250-28N-224	PF-216-28N/PF-250-28N	18.5
	3.7 (4-pole)	112M		P-218		PK-250-28N-374	PF-250-28N	
RK-100	5.5 (4-pole)	132S	200			PK-300-38N-554		40
	7.5 (4-pole)	132M				PK-300-38N-754		
RK-200	11 (4-pole)	160M	200			PK-300-42N-1104		43
	11 (6-pole)	160L				PK-355-42N-1106		
	15 (4-pole)	160L						
	18.5 (4-pole)*	160L						
RH-50	3.7 (4-pole)	112M	170	P-218			PF-250-28N	25
	5.5 (4-pole)	132S						

* The 18.5-kW (4-pole) motor of the RK-200 is supposed to use a drip proof frame number 160L.

How to Place an Order

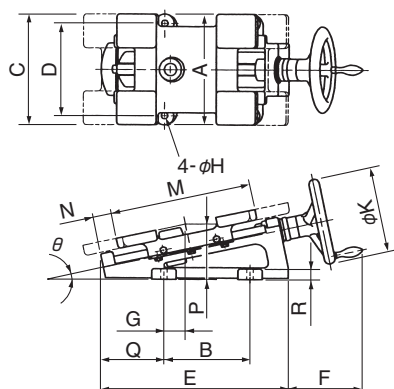
R-05
Model _____ Size _____

RK-05
Model _____ Size _____

RH-50
Model _____ Size _____

Dimensions

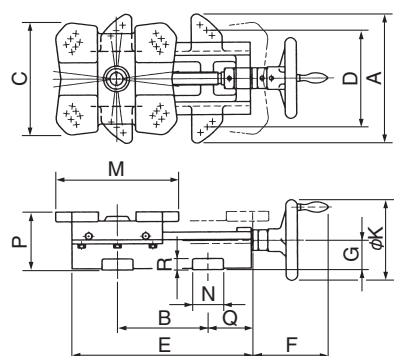
R-□



Model	A	B	C	D	E	F	G	H	K	M	N	P	Q	R	θ [°]
R-05	145	120	130	115	245	100	15	10.5	125	180	27	86	92	16	12
R-20	180	140	180	150	305	120	35	10.5	140	230	30	90	102	17	12
R-30	200	160	190	160	365	200	42	13	160	270	42	114	123	17	12

Unit [mm]

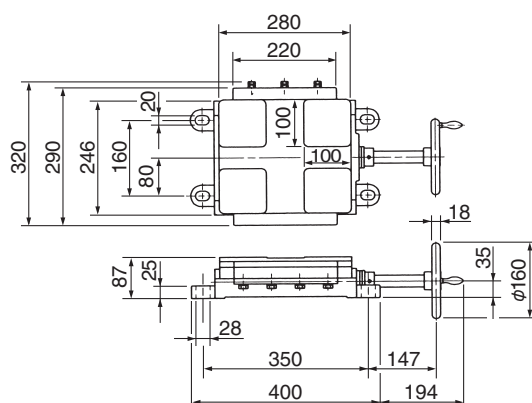
RK-□



Model	A	B	C	D	E	F	G	K	M	N	P	Q	R
RK-05	200	140	131	160	222	110	20	125	153	40	50	42	10
RK-20	200	140	175	150	280	122	45	125	190	48	90	70	17
RK-50	260	200	210	200	320	128	50	140	250	60	100	60	17
RK-100	390	250	252	320	450	150	60	200	283	105	120	100	20
RK-200	390	250	350	320	450	150	60	200	350	105	120	100	20

Unit [mm]

RH-50



Unit [mm]

How to mount the motor to the slide base

- * Determine the position to mount the motor and create tapped (threaded) holes on the slide base.
- * Secure the legs of the motor with bolts. Mount the speed changer to the motor shaft.

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CHANGER
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BELT-TYPE
STEPLESS SPEED
CHANGERSZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

MODELS

P

AP

PL

PK

PF

R/RK/RH

L

U

T

P/AP/PL/PK/PF/R/RK/RH Models

Items Checked for Design Purposes

Design Capacity

The design capacity can be calculated with the following expression. For the torque constant, however, obtain the capacity for the maximum and minimum rotation of the driven shaft.

$Prd = Pr \times F$ Prd: Design capacity [kW]

F: Correction factor based on load characteristic

Pr: Transmission capacity [kW]

Correction factor based on the load characteristic: F

Load characteristic	Operating time per day		
	8 hours	16 hours	24 hours
Light load (When the load is constant, the rated capacity is not exceeded, and the number of starts and stops is small)	1.0	1.1	1.2
Medium load (the maximum load is 125% or less)	1.2	1.3	1.4
Heavy load (the maximum load is 150% or less)	1.3	1.4	1.5

Relational expression for the torque capacity

$$T [N \cdot m] = 9550 \times \frac{P}{N}$$

T: Transmission torque [N · m]

P: Transmission capacity [kW]

N: Rotation speed [min⁻¹]

Input Shaft Rotation Speed

The speed change pulley is designed to be normally mounted to a 4-pole motor, so make sure at the design phase that the belt's peripheral speed does not exceed 25 m/sec at the maximum rotation speed.

Furthermore, the speed change pulley is designed to use the belt's low speed limit. If it is used at a lower rotation speed than the rated one, the belt's life span may be adversely affected.

In addition, the more the rotation speed decreases, the slower the speed change operation becomes. Therefore, the standard minimum rotation speed is about 500 min⁻¹.

Calculation of the belt's peripheral speed

$$V = \frac{\pi \times D \times N}{60 \times 1000}$$

V: Belt's peripheral speed [m/sec]

D: Pulley's pitch diameter [mm]

N: Rotation speed [min⁻¹]

How to Obtain the Driven Shaft's Rotation Speed

Your desired rotation speed range can be obtained by selecting an appropriate driven pulley for the speed change pulley. The appropriate pitch diameter range that can be selected for the driven pulley is from the same diameter as the maximum pitch diameter (max. P.D) of the speed change pulley to around twice of it. Obtain the rotation speed of the driven shaft with the following expression.

$$N_{\max} = \frac{d_{\max} \times n}{D} \dots \dots \dots \text{maximum rotation speed [min}^{-1}\text{]}$$

$$N_{\min} = \frac{d_{\min} \times n}{D} \text{ or } \frac{N_{\max}}{\alpha} \dots \dots \dots \text{minimum rotation speed [min}^{-1}\text{]}$$

n: Speed change pulley's rotation speed [min⁻¹]

α: Speed change pulley's speed change ratio

d_{max}: Speed change pulley's maximum pitch diameter [mm]

D: Driven pulley's pitch diameter [mm]

d_{min}: Speed change pulley's minimum pitch diameter [mm]

Selecting the Belt Size

Selecting the type

Consider the design capacity and the maximum and minimum rotation speed of the driven shaft.

If there are two candidate types, make a design based on the two types, and select the one that matches the design purpose.

Trial calculation of the distance between shafts (guide)

To place a speed change pulley, you must determine the distance between shafts. It varies depending on the diameter of the driven pulley, the length of the available belt, the space of the machine and equipment, etc. A trial calculation must be performed according to these conditions.

The standard distance between shafts can be calculated with the following expression.

$$\text{Shortest distance between shafts } C_{\min} = \frac{(D_1 + D_2)}{2} + 50 [\text{mm}]$$

$$\text{Longest distance between shafts } C_{\max} = 1.5 (D_1 + D_2) [\text{mm}]$$

D₁: Speed change pulley's external diameter [mm]

D₂: Driven pulley's external diameter [mm]

How to obtain the belt length

When the driven pulley and guide distance between shafts (C) are calculated, calculate the belt length (L) with the following expression.

$$L = 2C + \frac{\pi}{2} (D + d_{\min}) + \frac{(D - d_{\min})^2}{4C}$$

L: Belt's pitch perimeter [mm]

d_{min}: Speed change pulley's minimum pitch diameter [mm]

D: Driven pulley's pitch diameter [mm]

Based on the obtained L, select one with the appropriate length.

How to obtain the distance between shafts

Obtain the actual distance between shafts (C) from the selected belt.

Calculate it with the following expression.

$$C = \frac{b + \sqrt{b^2 - 8(D - d_{\min})^2}}{8} \quad \text{However, } b = 2L - \pi(D + d_{\min})$$

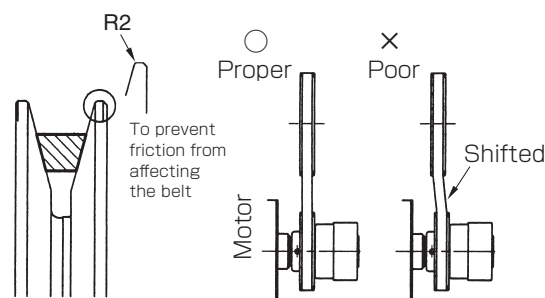
d_{min}: Speed change pulley's minimum pitch diameter [mm]

D: Driven pulley's pitch diameter [mm]

Note that this distance between shafts is one when the speed change pulley is farthest away from the driven shaft. When speed is changed, the distance between shafts is decreased accordingly. Take this into consideration when you determine the mounting space.

Other Precautions

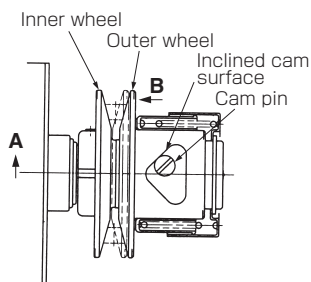
1. Avoid a humid or dusty place, a place where the ambient temperature is high, a place exposed to water or oil, and a place where corrosive and flammable gases are present in the atmosphere, and select a well-ventilated place. Mount the device in a location that provides easy access for inspection. The operating ambient temperature range is -10°C to 40°C.
2. When mounting the speed changer, make sure the parallelism and perpendicularity of the travel line of the belt and two shafts are correct. Attention needs to be paid, in particular, to a wide speed changer belt.
3. When mounting the device to the machine, provide the rotating part with a cover.
4. Select a stable mounting base to make sure it does not vibrate. The device may vibrate during use if it is not mounted properly. Be sure to mount it securely using mounting bolts of an adequate strength.
5. When using a motor with a slide base, provide a stopper for the slide base to make sure the belt is not detached or does not become too tight.
6. If you will use the device for a machine where normal-reverse operation is performed, or a repeated or impact load is applied, please consult with us.
7. Chamfer the V-groove of the driven pulley about R2 as shown in the figure below to increase the durability of the belt.



Cam mechanism

The outer wheel (moving wheel) of the speed change pulley is pushed by a spring. However, if the load changes, the tension of the V-belt changes, so the spring is pushed back and the belt moves to the inside, resulting in non-uniform rotation. The P model has a cam mechanism to prevent such non-uniform rotation.

As shown in the figure below, when the motor shaft rotates in the direction of arrow A, the cam pin attached to the main body rotates the outer wheel through the inclined surface of the cam. Accordingly, a force indicated by arrow B increases in proportion to an increase in the load applied to the V-belt and pushes the V-belt out as shown by the virtual line and increases the speed. When a load is not applied, the V-belt is loose and does not apply excessive force to the bearing or other parts. When a load is applied, the V-belt becomes moderately tight and the speed is increased to prevent a slip on the V-pulley and compensates for a decrease in the rotation speed of the motor. Thus, the rotation of the driven shaft can be maintained constant.



Key method with no cam mechanism

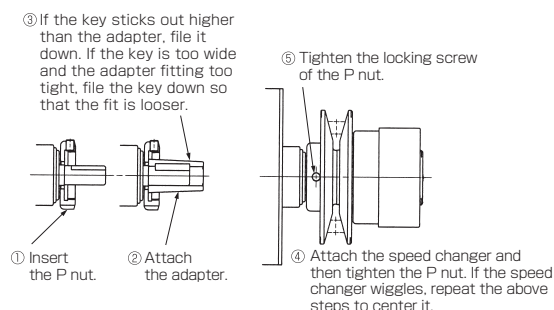
A key method is available for applications where an impact load is applied, normal-reverse operation is performed repeatedly, or the device is mounted to the brake motor. For this type, the inner and outer wheels are linked with a sliding key instead of a cam pin, and a strong spring appropriate to the belt's transmission capacity is used. Even if an impact load is applied, it is absorbed by the belt and spring, so excessive force is not applied to the machine.

How to Mount to the Motor Shaft

Adapter method

Models using the adapter method (all types of the P and AP model) use a tapered sleeve (adapter) for mounting the device to motors or other shafts in order to avoid a shock to the speed changer main body. Insert the adapter into the tapered hole of the inner wheel and tighten the nut (P nut) to push the adapter in to secure it to the shaft with a wedge effect.

Follow the following procedure to mount the device to the motor shaft.



Straight method

All types of the PL, PK, and PF models use a straight method. The mounting holes are straight. The device is connected to the motor or other shafts with a standard key and set screws.

When mounting the device, first place the V-belt to the V-groove of the speed change pulley to protect the pulley in order not to give a shock to the speed changer main body, and then apply the device to the pulley shaft end and gently hammer it in place. Firmly tighten the two set screws at two points, one on the keyway and the other one at a right angle to it.

There is a type where the set screws are not visible from the outside. They can be seen by opening the pulley using the belt.

Operation and Run

1. Do not perform speed changing operation when the speed change pulley is stopped.
2. For the rotation direction, you can use any direction.
3. Before changing between the normal and reverse directions, make sure the speed changer is stopped. (Do not do this with the P and PL models.)
4. For the P, PL, PK, and PF models that change speed by changing the distance between shafts, moving the motor closer to the machine increases the speed and moving it away from the motor decreases the speed.
5. Use a motor slide base (R or RK model) also to change the distance between shafts.
6. Place a stopper to the motor slide base to prevent the belt from becoming too tight or coming out of the pulley at a low or high speed.
7. If have not used the device for a long period of time, check the pulley surface for rust and check the belt.
8. Apply oil to the device at regular intervals (once every 1 to 6 months), and change the speed from high to low several times once a week to prevent the oil film in the sliding portion of the pulley from breaking down.
9. Check the belt to make sure there is no unusual wear.
10. A strong spring is installed in the speed change pulley. Never disassemble it because doing so is dangerous.

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BELT-TYPE STEPLESS SPEED CHANGER UNITS

STAND-ALONE BELT-TYPE STEPLESS SPEED CHANGERS

ZERO-MAX (STEPLESS SPEED CHANGERS)

DC MOTORS

ROTATION SPEED INDICATORS

MODELS

P	
AP	
PL	
PK	
PF	
R/RK/RH	
L	
U	
T	

Stand-alone Belt-type Stepless Speed Changer

L

Speed Is Changed by Operating the Lever



Transmission capacity	0.2 kW to 2.2 kW
Speed change ratio	1:2 to 1:6
External pulley diameter	103 mm to 260 mm

Speed Changer with Lever

Speed can be changed quickly by changing the lever angle.

How to Place an Order

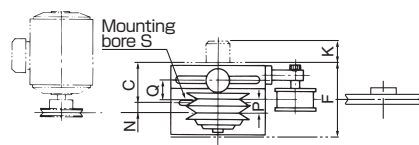
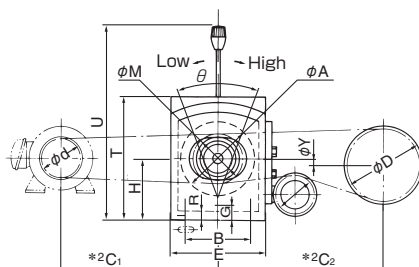
LA-100
Model — Size

Specifications

Model			LA-100			LB-140			LB-160						LC-210			LC-260					
Belt in use			A belt x1			A belt x1			A belt x1			B belt x1			B belt x1			B belt x1			C belt x1		
Speed change ratio			1 : 2			1 : 4			1:4			1:2			1:4			1 : 4			1 : 2		
Transmission capacity [kW]			0.2			0.2 ~ 0.4			0.4 ~ 0.75						0.75			1.5 ~ 2.2					
Driven shaft rotation speed			Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.
Transmission capacity [kW]	Motor pulley's external diameter [in.]	2	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18												
		2½	0.3	0.3	0.26	0.3	0.3	0.18	0.3	0.3	0.18												
		3	0.38	0.38	0.3	0.37	0.37	0.22	0.37	0.37	0.22												
		3½				0.45	0.67	0.26	0.52	0.67	0.26	0.52	0.52	0.52	0.52	0.52	0.52	0.45	0.52	0.52	0.52		
		4				0.52	0.9	0.3	0.6	0.9	0.3	0.9	0.9	0.67	0.67	0.67	0.67	0.67	0.67	0.67			
		4½				0.6	1.05	0.33	0.67	1.12	0.33	1.05	1.05	0.75	0.97	1.05	0.45	1.05	1.05	0.75			
		5							0.75	1.27	0.37	1.12	1.42	0.75	1.12	1.42	0.52	1.42	1.42	0.82	1.35	1.35	1.35
		5½							0.82	1.35	0.41	1.27	1.57	0.9	1.2	1.8	0.6	1.8	1.8	0.9			
		6							0.9	1.42	0.45	1.35	1.65	0.9	1.27	2.25	0.67	1.95	2.25	0.97	2.25	2.25	2.25
														1.35	2.4	0.67	2.1	2.62	1.05				
														1.5	2.47	0.75	2.25	3.0	1.12	3.37	3.37	2.4	
																				3.52	3.52	2.47	
Mass [kg]			3.9			7.6			15						21			37					

* The speed change ratio for the LK-110 (mass of 4 kg) with a transmission capacity of 0.1 kw using M belt is 1:5.

Dimensions



Model	A	B	C	E	F	G	H	N	P	Q	R	S	T	U	M	K	θ [°]
LK-110	116	105	58	165	125	24	105	29	23	25	18	11 × 30	200	327	80	24	32
LA-100	103	105	58	165	120	24	104	23	19	25	18	11 × 30	200	327	79	—	16
*1LB-140	140	120	75	185	140	27	118	19	25	42	20	11 × 28	235	356	98.5	—	33
*1LB-160	170	140	87	222	153	33	138	25	29	54	21	11 × 40	260	440	116 127	—	35 19
*1LC-210	212	155	104	262	191	42	162	20	37	67	28	14 × 56	290	472	142	—	39
*1LC-260	260	218	121	320	236	42	197	27	43	84	28	19 × 67	380	531	174 188	—	37 21

* Models indicated by *1 include a tension pulley (J=φ70).

* Calculate C₁ and C₂ indicated by *2 by reference to Items Checked for Design Purposes.

* M: Medium pitch diameter

Stand-alone Belt-type Stepless Speed Changer

U

Speed Is Changed by Operating the Handle

Transmission capacity	0.2 kW to 2.2 kW
Speed change ratio	1:2 to 1:6
External pulley diameter	103 mm to 260 mm



Speed Changer with Handle

The speed change ratio is large and the belt travel line is maintained constant.

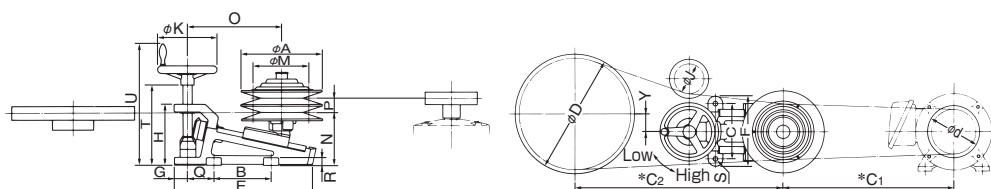
How to Place an Order

UB-160
Model — Size

Specifications

Model		UB-160						UC-210			UC-260					
Belt in use		A belt x1			B belt x1			B belt x1			B belt x1			C belt x1		
Speed change ratio		1 : 5		1 : 3				1 : 6			1:6		1 : 3			
Transmission capacity [kW]		0.4 ~ 0.75						0.75			1.5 ~ 2.2					
Driven shaft rotation speed		Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.	Max.	Intermediate	Min.
Transmission capacity [kW]	Motor pulley's external diameter [in.]	3½	0.45	0.67	0.2	0.52	0.52	0.52	0.52	0.52	0.3	0.52	0.52	0.45		
	4	0.52	0.9	0.26	0.67	0.67	0.52	0.67	0.67	0.33	0.67	0.67	0.48			
	4½	0.6	1.12	0.3	0.9	1.05	0.56	0.82	1.05	0.37	1.05	1.05	0.56			
	5	0.67	1.27	0.33	0.97	1.42	0.6	0.9	1.42	0.41	1.27	1.42	0.63	1.35	1.35	1.35
	5½	0.75	1.37	0.37	1.05	1.57	0.63	0.97	1.8	0.45	1.42	1.8	0.71			
	6	0.82	1.42	0.37	1.2	1.65	0.67	1.05	2.25	0.52	1.5	2.25	0.75	2.25	3.0	1.35
	6½							1.2	2.4	0.6	1.6	2.62	0.82			
7							1.35	2.47	0.67	1.8	3.0	0.9	2.4	3.37	1.42	
8													2.55	4.5	1.5	
Mass [kg]		14			14			20			34			34		

Dimensions



	Unit [mm]																			
Model	A	B	C	E	F	G	H	J	K	N	P	Q	R	S	T	U	M	O	Number of handle turns	Movement distance
UB-160	170	120	115	295	145	30	125	70	125	108	29	56	15	11.5	175	270	116 127	190	24 17	75 53
UC-210	212	140	150	350	180	30	140	70	140	118	37	85	16	11.5	202	298	142	225	30	92
UC-260	260	160	160	415	200	30	157	70	160	154	43	107	17	14	246	363	174 188	250	37 29	116 82

* Calculate C₁ and C₂ indicated by * by reference to Items Checked for Design Purposes.

* M: Medium pitch diameter

MODELS

P

AP

PL

PK

PF

R/RK/RH

L

U

T

Stand-alone Belt-type Stepless Speed Changer

T

Transmission capacity	0.2 kW to 2.2 kW
Speed change ratio	1:2 to 1:6
External pulley diameter	103 mm to 260 mm

Speed Can Be Changed Freely



Speed Can Be Changed Freely

This speed changer can be incorporated into a machine and used as part of the equipment.

How to Place an Order

T-100

Size

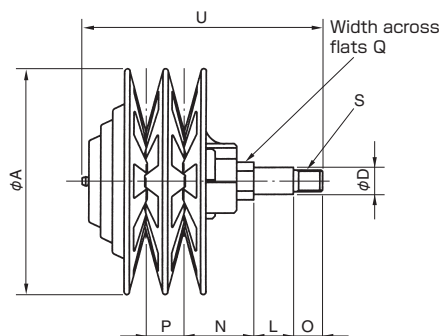
Specifications

Model	Transmission capacity [kW]	Belt	Speed change ratio	Mass [kg]
T-100	0.2	A	1 : 2	1.8
T-140	0.2	A	1 : 4	3.1
T-160	0.4	A	1 : 5	5.2
	0.75	B	1 : 3	
T-210	0.75	B	1 : 6	9.3
T-260	1.5	B	1 : 6	18
	2.2	C	1 : 3	

* The T model is an intermediate wheel pulley to be incorporated into equipment. It is not for the maintenance of the L and U models.

This product requires a moving device. Please contact with us for details.

Dimensions



Model	Unit [mm]											
	A	P	N	L	O	U	D	S	Q	Min.P.D.	Mid.P.D.	Max.P.D.
T-100	103	19	40	25	15	135	16	M12	19	64	79	94
T-140	140	25	43	25	15	145	16	M12	19	60	98.5	131
T-160	170	29	53	30	22	185	20	M16	24	71	116	161
										95	127	159
T-210	212	37	62	40	22	215	26	M20	30	84	142	201
T-260	260	43	85	50	27	275	32	M20	36	99	174	249
										131	188	246

Items Checked for Design Purposes

Speed Change Ratio

You need to consider various conditions to select the best model, and one of them is the speed change ratio.

That change ratio is expressed as how many times faster the maximum output side rotation speed is relative to the minimum rotation speed.

For example, when the minimum and maximum rotation speeds are 500 and 2,000 min⁻¹ respectively, the speed change ratio is 1:4.

The speed change ratio of a speed change pulley can be calculated as: (max. P.D/min. P.D)².

How to Calculate the Rotation Speed

You can set various driven-side rotation speeds for a speed change pulley by selecting suitable pitch diameters for the motor pulley and driven-side pulley.

Select a motor pulley with a rated size suited to your operating conditions from the table showing the transmission capacity of each model.

The driven-side rotation speed can be obtained based on the pitch diameter, but a simpler method is given below.

First, select the motor pulley diameter (d) and driven pulley diameter (D) without considering the speed change ratio.

This gives you the center rotation speed.

$$\text{Motor rotation} \times \frac{d}{D} = \text{center rotation speed}$$

If the speed change ratio is i,

the minimum rotation speed is (center rotation speed $\times 1/\sqrt{i}$),

the maximum rotation speed is (center rotation speed $\times \sqrt{i}$).

When selecting a V-pulley, you are recommended to use one of a commercially available size. A table for quickly obtaining the center rotation speed is available on the next page. If you need a very low rotation speed, consider placing the speed reducer after the speed change pulley.

Appropriate Distance between Shafts

The speed change pulley must be moved by a large amount between the fixed motor and machine to change the speed, and since the speed change ratio is large, the movement amount is large and the winding angle also changes, so the belt travel line is displaced to a certain degree. Select as large a distance between shafts as possible to reduce the adverse influence on the belt life span. Relational expressions for the appropriate distance between shafts are defined as follow. Calculate the distance between shafts using these relational expressions.

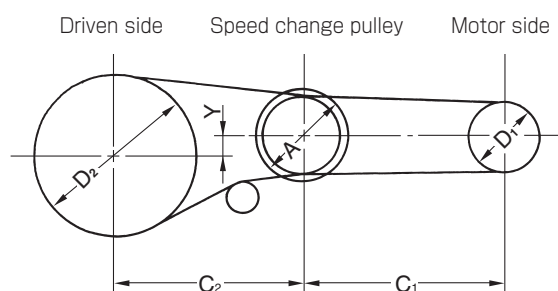
Distance between motor shaft and speed change pulley shaft (C_1)

$C_1 > 2 \times A$, where A indicates the speed change pulley's external diameter.

Distance between speed change pulley shaft and driven shaft (C_2)

$C_2 > A + D_2$, where D_2 indicates the driven pulley's external diameter.

Make sure the centers of the motor shaft, speed change pulley shaft, and driven shaft are aligned on a straight line. If the driven pulley's external diameter is larger than the speed change pulley's external diameter, displace the center of the driven pulley by Y ($=1/3 \times (D_2 - A)$).



Belt Length

When the appropriate distance between shafts is determined, calculate the length of the belts with the expressions below using the data you obtained previously: the motor pulley's pitch diameter (D_1), driven pulley's pitch diameter (D_2), and speed change pulley's medium pitch diameter (M in the specifications table = pitch diameter when 2 belts are placed around the same diameter). Select a belt that is slightly longer because heat may be generated if the belt is too tight.

Motor side belt length

Driven side belt length

$$L_1 = 2C_1 + \frac{\pi}{2}(M + D_1) + \frac{(M - D_1)^2}{4C_1} \quad L_2 = 2C_2 + \frac{\pi}{2}(M + D_2) + \frac{(M - D_2)^2}{4C_2}$$

In general, when the belt speed is increased with belt transmission systems, in other words, when the external diameter of the motor pulley is increased, the transmission power can be increased accordingly. But you must be aware of the fact that when the rotation speed of machines is increased, the used capacity is also increased accordingly. Pay attention to this fact when you select a speed changer and V-pulley.

How to Increase the Life Span of the Speed Changer

The speed changer needs to be oiled. Apply oil to the speed changer at regular intervals (once every 1 to 6 months), and change the speed from high to low several times once a week to prevent the oil film in the sliding portion of the pulley from breaking down.

Other Check Points

- Select a motor pulley that will result in the rotation speed of the speed changer being within 2000 min⁻¹.
- The speed changer can be mounted in any position, vertically, laterally, and horizontally.
- The tension pulley can be mounted on any side, but in principle, it is mounted on the slack side of the V-belt.
- The speed cannot be changed when the speed changer is stopped.
- Chamfer the V-groove of the V-pulley about R2 to increase the durability of the belt.

COUPLINGS

ETP BUSHINGS

ELECTROMAGNETIC
CLUTCHES & BRAKESSPEED CHANGERS
& REDUCERS

INVERTERS

LINEAR SHAFT DRIVES

TORQUE LIMITERS

ROSTA

SERIES

HOLLOW SHAFT /
SOLID SHAFT SPEED
CHANGERS AND
REDUCERSBELT-TYPE
STEPLESS SPEED
CHANGER
UNITSSTAND-ALONE
BELT-TYPE
STEPLESS SPEED
CHANGERSZERO-MAX
(STEPLESS SPEED
CHANGERS)

DC MOTORS

ROTATION SPEED
INDICATORS

MODELS

P

AP

PL

PK

PF

R/RK/RH

L

U

T

L/U/T Models

Items Checked for Design Purposes

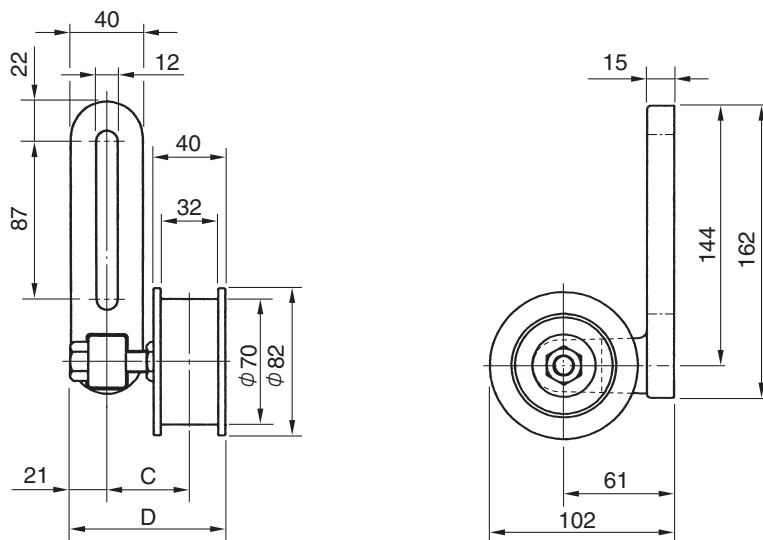
Table for Quickly Obtaining Center Rotation Speed

		Motor side V-pulley's external diameter (in.)														Motor 1720 min ⁻¹ (60 Hz)													
2	1430	20	18	16	15	14	13	12	11	10	9	8	7	6½	6	5½	5	4½	4	3½	3	2½	2						
2½	1097 1430	1429	1283	1137	1065	992	937	848	774	702	630	557	483	447	411	375	337	301	265	229	193	157	120	24					
3	890 1160 1430	1562	1402	1244	1164	1085	1005	925	846	767	686	607	528	489	449	409	370	330	289	249	210	170	131	22					
3½	748 975 1203 1430	1720	1545	1371	1288	1195	1108	1020	931	845	757	669	581	538	494	451	406	363	320	279	232	189	145	20					
4	645 842 1038 1234 1430	1720	1526	1428	1330	1233	1135	1037	941	843	745	648	599	554	502	452	404	356	306	258	209	160	118						
4½	568 738 912 1085 1257 1430	1720	1610	1500	1390	1280	1170	1061	951	841	731	676	623	566	511	456	401	346	291	240	181	136							
5	506 661 814 968 1123 1276 1430	1720	1603	1485	1367	1250	1135	1015	899	781	722	662	604	545	487	428	370	311	256	193	155								
5½	458 596 735 874 1012 1153 1291 1430	1720	1594	1467	1342	1216	1091	963	838	774	712	648	585	523	459	397	334	272	208	148									
6	416 543 670 797 923 1070 1177 1303 1430	1720	1584	1467	1312	1176	1040	905	836	767	700	632	564	495	428	360	290	224	138										
6½	383 499 615 732 848 965 1081 1197 1314 1430	1720	1572	1448	1276	1237	982	908	836	759	686	612	538	464	390	317	243	122											
7	355 462 569 676 785 892 1000 1108 1216 1323 1430	1720	1558	1397	1276	1237	992	912	831	750	670	588	507	428	347	267	119												
8	308 402 495 588 682 775 869 962 1055 1150 1243 1430	1720	1541	1397	1185	1095	1006	917	829	740	650	561	471	382	294	108													
9	272 355 438 521 604 686 768 853 934 1017 1100 1264 1430	1720	1521	1323	1223	1123	1022	924	820	726	626	526	427	327	99														
10	245 318 392 466 541 615 689 763 837 911 985 1134 1280 1430	1720	1495	1383	1269	1158	1045	932	820	707	595	483	370	88															
11	222 289 356 422 489 556 624 691 758 825 892 1028 1162 1296 1430	1720	1591	1462	1331	1262	1073	944	814	685	556	427	77																
12	202 263 325 386 448 509 571 632 693 755 817 940 1061 1184 1307 1430	1720	1581	1440	1300	1161	1020	881	740	600	461	6½																	
13	186 243 299 356 410 469 525 582 633 695 752 865 978 1091 1204 1317 1430	1720	1570	1416	1263	1120	958	807	660	501	6																		
14	173 225 277 330 382 435 486 539 592 644 696 801 907 1011 1115 1220 1325 1430	1720	1553	1386	1219	1051	884	724	550	5½																			
15	160 210 259 308 356 405 458 502 551 601 649 747 844 942 1040 1137 1234 1339 1430	1720	1534	1350	1164	979	795	609	5																				
16	150 196 242 287 333 379 425 470 516 562 608 699 791 882 972 1064 1155 1247 1339 1430	1720	1512	1306	1097	893	683	4½																					
18	133 175 215 255 296 336 376 417 461 498 539 619 701 782 862 944 1025 1105 1187 1268 1430	1720	1484	1249	1012	776	4																						
20	120 156 193 229 266 302 338 375 410 448 483 556 629 702 774 848 921 994 1065 1140 1284 1430	1720	1447	1173	900	3½																							
22	109 142 175 207 240 275 308 340 373 406 439 505 571 638 704 769 835 901 968 1034 1166 1298	1720	1395	1070	3																								
24	100 130 160 190 220 250 280 311 342 372 402 463 523 583 644 705 765 825 885 947 1067 1188	1720	1319	2½																									
	2 2½ 3 3½ 4 4½ 5 5½ 6 6½ 7 8 9 10 11 12 13 14 15 16 18 20																						1720 2						

Calculations on this table are based on the A-type belt. There is an error for the B-type and C-type belts. When using a B-type of 4-inch or more or a C-type belt of 7-inch or more, the error is about 2%, which is tolerable for practical use.

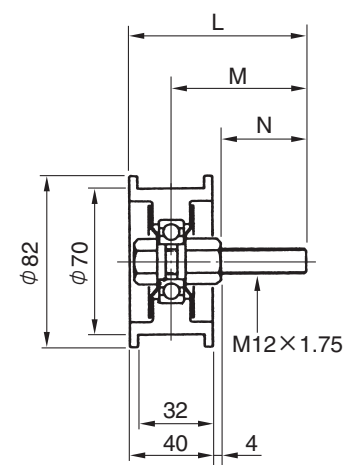
Options

Tension Pulley Set (Tension assembly)



Tension pulley set model	C	D	Applied speed changer model	Used tension pulley part model
Tension assembly L, small	46	87	LB-140,160	TP-1-A
Tension assembly L, large	61	102	LC-210,260	TP-1-B

Tension Pulley Part



Tension pulley part model	L	M	N
TP-1-A	85	65	41
TP-1-B	102	82	58