SPEED CHANGERS & REDUCERS

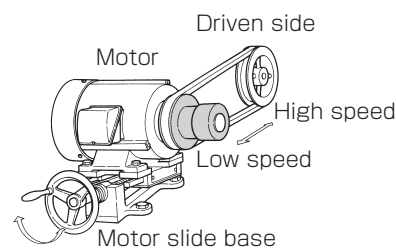# Stand-alone Belt-type Stepless Speed Changer

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

Motor
Driven side
High speed
Low speed
Motor slide base

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

▮ Driven Side Rotation Speed

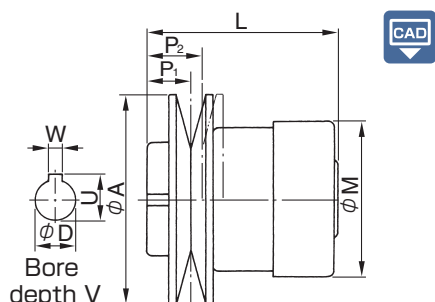(Rotation speed by driven pulley diameter when mounted to a 4-pole motor)   50 Hz,1430 min^{-1} 60 Hz,1720 min^{-1} Unit [min^{-1}]

Model		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

Dimensions

Bore depth V

COUPLINGS

ETP BUSHINGS

ELECTROMAGNETIC CLUTCHES & BRAKES

SPEED CHANGERS & REDUCERS

INVERTERS

LINEAR SHAFT DRIVES

TORQUE LIMITERS

ROSTA

Unit [mm]

Model	A	P₁	P₂	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.

Model	Bore depth [mm]	Supported shaft diameters (adapter bore) ϕ D [mm]												
		10	11	12	13	14	15	16	18	19	20	22	24	25	28
P - 86-MA	30	◎	◎	◎	◎	◎	◎	◎							
P - 98-MA	40		◎	◎	◎	●	●	●	●	●					
P-106-MA	40		◎	◎	◎	●	●	●	●	●					
P-124-MA	50					●	●	●	●	●	●	●	●	●	
P-164-MA	50					●	●	●	●	●	●	○	○	○	▲
P-218	60											○		○	○

* Bores marked with symbols above are available. ●, ◎, and ○ indicate adapter type, and ▲ indicate straight type.
* Adapters indicated as ◎ do not have a keyway. Before using with a shaft having a key, first remove the key.
* ○ indicates model that includes an L key, since adapter specifications prevent a parallel key from fitting. Use this L key when mounting.
* Bore diameters for the L key distinguish between the old JIS and new JIS codes. Specify when ordering.

How to Place an Order

P-86-MA-11

Size ⎯ Bore diameter

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

▍Cam mechanism

■ 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.
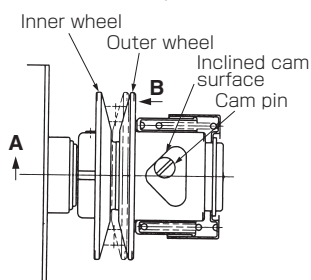
As shown in the figure below, when the motor shaft rotates in the direction of arrow A, the cam pin attached to the main body rotates the outer wheel through the inclined surface of the cam. Accordingly, a force indicated by arrow B increases in proportion to an increase in the load applied to the V-belt 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.
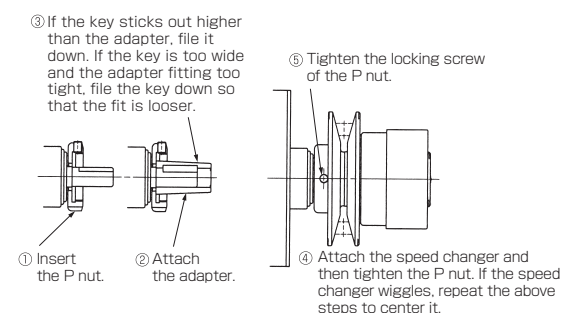
▍How to Mount to the Motor Shaft

■ Adapter method

Models using the adapter method use a tapered sleeve (adapter) for mounting the device to motors or other shafts in order to avoid subjecting the speed changer to shock.

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.

③ If the key sticks out higher than the adapter, file it down. If the key is too wide and the adapter fitting too tight, file the key down so that the fit is looser.

⑤ Tighten the locking screw of the P nut.

① Insert the P nut.

② Attach the adapter.

④ Attach the speed changer and then tighten the P nut. If the speed changer wiggles, repeat the above steps to center it.

■ 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.