

# [Technical Data] Selection of Transmission Timing Belts 2

Selection is easy with Timing Pulleys and Belts automatic calculation tool available at:  
[http://fawos.misumi.jp/FA\\_WEB/pulley\\_sea/](http://fawos.misumi.jp/FA_WEB/pulley_sea/)

## [Step 2-c] For 2GT/3GT Series

• Design Power (Pd) = Transmission Power (Pt) × Overload Coefficient (Ks)

• Calculate the Transmission Power (Pt) from the motor rated power (Originally, it is ideal to calculate from the actual load applied to the belt)  
• Normal Motor Load Factor (Ks)=Ko+Ki+Kr+Kh

Ko : Load Correction Factor (Table 8)  
Ki : Idler Correction Factor (Table 9)  
Kr : Speed Increase Correction Factor (Table 10)  
Kh : Operation Time Correction Factor (Table 11)

<For Servo Motor Applications>

In the process of designing, apply Ko=2.5 for the rated torque and Ko=0.5 for the max. torque.

\* If the max. torque is generated each time the belt system is started up or stopped, choose an applicable load correction factor Ko from the Table 8., "Load Correction Factors based on Frequency of Start/Stop (Ko) operation," and apply it to the above expression.

<For Spindle Motor Applications>

In the process of designing, apply Ko=2.2 for the rated output and the basic rotation speed.

**Table 8. Load Correction Factor (Ko)**

Type of Motor		I	II	III	
Peak Output/Basic Output		150% or Less	Over 150%-200% or Less	Over 250%	
AC Motor	Single-Phase	—	—	All Types	
	Squirrel Cage Type	2 Phase	—	All Types	
		4 Phase	—	37Kw or More	30Kw or Less
		6 Phase · 8 Phase	—	—	All Types
	Wound Field Type	4 Phase	—	—	15Kw or Less
		6 Phase	—	—	11Kw or Less
		8 Phase	—	—	5.5Kw or Less
Synchronous Motor		—	Standard Torque Type	High Torque Type	
DC Motor		Shunt	Wound Field	Series	
Hydraulic Motor		—	—	All Types	
Office Machinery	Printer · Fax Machine · Copy Machine	—	1.2	1.4	
Home Appliance	Juicer	—	1.4	1.6	
	Vacuum Cleaner	1	1.2	1.4	
Finance Equipment	Money Exchanger · Ticket Machine · Ticket Gates · Bank Teller Machine	1.3	1.4	1.5	
Food · Medicine · Medical Equipment	Bakery Equipment	1.2	1.4	1.6	
	Mixer · Granulator	1.4	1.6	1.8	
	Centrifuge	1.5	1.7	1.9	
	Medical Machinery · Measurement Equipment	1	1.2	1.4	
Machine Tool	Drill Press · Lathe	1.2	1.4	1.6	
	Milling Machine	1.3	1.5	1.7	
	Wood Lather	1.2	1.4	1.6	
Printing Book Making	Printer · Book Making Machine · Cutter	1.2	1.4	1.6	
Textile Machine	Textile · Knitting Machinery	1.3	1.5	1.7	
Sawing Machine	Sawing Machine – Home Use	—	1.2	1.4	
	Sawing Machine – Industrial	—	1.6	1.8	
Belt Conveyor · Packaging Machine	Belt Conveyor – Light Objects	1.1	1.3	1.5	
	Packaging Machine	1.2	1.4	1.6	
Film · Wire Making Machine	Calender · Extruder	1.4	1.6	1.8	
	Wire Making Machinery	1.4	1.6	1.8	

**Table 9. Idler Correction Factor (Ki)**

Idler Position	Inside	Outside
Loose Side of the Belt	0	+0.1
Tense Side of the Belt	+0.1	+0.2

**Table 11. Operation Time Correction Factor (Kh)**

Operation Time	Correction Factor
Less than 10 hours (Everyday)	0
10~16 Hours Continuous (Everyday)	+0.2
16~24 Hours Continuous (Everyday)	+0.4
300 Hours/Year or Less (Seasonal operations etc.)	-0.2

**Table 13. Load Correction Factor based on Frequency of Start/Stop (Ko) operation**

When the frequency of Start/Stop is less than 100 times per day	Ko=1.5
When the frequency of Start/Stop is 100 times or more but less than 1,000 times per day	Ko=2.0
When the frequency of Start/Stop is more than 1,000 times per day	Ko=2.5

**Table 10. Speed Multiplication Correction Factor (Kr)**

Speed Increase Ratio	Correction Factor
1 or More Less than 1.25	0
1.25 or More Less than 1.75	+0.1
1.75 or More Less than 2.5	+0.2
2.5 or More Less than 3.5	+0.3
3.5 or More	+0.4

**Table 12. Special Motor Correction Factor (Kp)**

Motor Type	Load Correction Factor
Servo Motor	Design as Kp=2.5 for Rated Output, and Kp=0.5 for Peak Output (Rational speed as applied speed)
Spindle Motor	Design as Kp=2.2 for Rated Output and Base Rotational Speed

## [Step 2-d] For EV5GT/EV8YU Series

• Design Power (Pd) = Transmission Power (Pt) × Overload Factor (Ks)

• Calculate Transmission Power at Motor Rated Power Output. (It is ideal to calculate from the actual load applied to the belt.)  
• Overload Factor (Ks)=Ko+Ki+Kr+Kh+Km

Ko : Load Correction Factor (Table 14)  
Ki : Idler Correction Factor (Table 15)  
Kr : Speed Multiplication Correction Factor (Table 16)  
Kh : Operation Time Correction Factor (Table 17)  
Km : Start/Stop Correction Factor (Table 18)

• When converting the torque (Tq) into transmission power (Pd), calculate the applicable values by using the following expressions.

Tq : Design Torque (N-m)  
tq : Transmission Torque  
Ks : Overload Factor  
Pd : Design Power (kW)  
n : Speed (rpm)

**Table 14. Load Correction Factor (Ko)**

Prime Motor Type		Induction Motor	Spindle Motor	Servo Motor (Peak Output/Rated Output)		
				200% or Less	201~299%	300% or More
Robot	Scara Type	2.0	2.0	1.6	1.7	1.8
Injection Mold Machine	Mold Fastening · Ball Screw Drive	1.8	1.8	1.3	1.4	1.5
Machine Tool	Lathe · Drill Press	1.6	1.3	1.2	1.3	1.4
Machine Tool	Milling Machine	1.7	1.3	1.2	1.3	1.4
Conveyor		1.8	1.8	1.4	1.5	1.6
Medical Machinery · Measurement Equipment		1.5	1.5	1.1	0.1	0.2
Packaging Machine		1.6	1.5	1.1	0.1	0.2
Agitator · Mixer	Liquid	1.6	1.6	1.2	1.3	1.4
	Viscous Material	1.7	1.7	1.3	1.4	1.5
Drilling Machine · Granulator		1.8	1.8	1.4	1.5	1.6
Centrifuge		1.9	1.9	1.5	1.6	1.7
Mills	Ball · Rods	2.2	2.2	1.7	1.8	1.9
Printing Machine · Book Making Machine		2.0	2.0	1.6	1.7	1.8
Paper Making Machine	Calender · Dryer	2.0	2.0	1.6	1.7	1.8
Textile Machine		2.0	2.0	1.6	1.7	1.8
Wire Related	Wire Drawing & Twisting Machine	2.1	2.0	1.6	0.1	0.2
Woodworking Machine		1.7	1.7	1.2	1.3	1.4
Pump		2.0	2.0	1.6	1.7	1.8
Compressor	Reciprocating · Rotating	2.0	2.0	1.6	1.7	1.8
Fan · Blower	Axial Flow · Roots	2.0	1.8	1.3	1.4	1.5
Generator · Exciter		1.8	1.8	1.4	1.5	1.6
Rubber Industry Machinery · Lumber Mill Machinery		2.0	2.0	1.6	1.7	1.8

**Table 15. Idler Correction Factor (Ki)**

No Idler	0
Inside Idler	0.1×(Qty-1)
Outside Idler	0.1×(Qty-1)

**Table 16. Speed Multiplication Correction Factor (Kr)**

Operation Duration (Hours/Day)	Correction Factor
1 or More Less than 1.25	0
1.25 or More Less than 1.75	0.1
1.75 or More Less than 2.5	0.2
2.5 or More Less than 3.5	0.3
3.5 or More	0.4

**Table 17. Operation Time Correction Factor (Kh)**

Operation Duration (Hours/Day)	Correction Factor
≤8	0.1
8<16	0.2
16≤	0.3

**Table 18. Start/Stop Correction Factor (Km)**

Start/Stop Frequency (Times/Day)	Correction Factor
≤10	0.1
11<100	0.2
101<500	0.3
501<	0.4