

# [Technical Data] Selection of Transmission Timing Belts 1

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 1] Setting the Required Design Conditions

- (1) Machine Type (2) Power Transmission (3) Load Variances (4) Operation Duration per Day (5) Small Pulley Rotational Speed  
 (6) Rotation Ratio (Lg. Pulley # of Teeth / Small Pulley # of Teeth) (7) Shaft Center Distance (Interim) (8) Pulley Diameter Limitation (9) Other Usage Conditions

## [Step 2-a] Calculating Design Power.....MXL/XL/L/H/S\_M/MTS\_M/T Series

• Design Power (Pd) = Transmission Power (Pt) x 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+Kr+Ki

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Ko : Overload Correction Factor (Table 1)

Kr : Rotation Ratio Correction Factor (Table 2)

Ki : Idler Correction Factor (Table 3)

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

Torque (Tq) = tqxKs

Transmitting Power (Pd) = Tqxn/9550

Tq : Design Torque (N-m)

tq : Transmission Torque

Ks : Overload Factor

Pd : Design Power (kW)

n : Speed (rpm)

i. If the maximum torque is used once or twice per day, calculate the design power by assigning "the load correction factor (Ko) = 1.0" to the expression for the overload factor and then, by multiplying the maximum torque by the overload factor (Ks) derived from the said expression.

ii. If the maximum torque is used very often, calculate the design power by multiplying the maximum torque by the applicable overload factor (Ks).

<For Timing Belts based on Spindle Motor>

Calculate the design power by calculating the transmission power from the basic rotation speed and then, by multiplying it by the applicable overload factor (Ks).

<For Timing Belts based on Linear Drive>

Calculate the design power by using the following expressions.

Te=mxα

Pt=TexV/1000

Pd=PtxKs

Te : Effective Tension (N)

m : Mass (g)

α : Acceleration (m/sec<sup>2</sup>)

V : Belt Speed (m/sec)

Pt : Transmission Power (KW)

Pd : Design Power (kW)

Ks : Overload Factor

Table 1. Load Correction Factor (Ko)

Typical Machines Using a Belt	Motor					
	Max. Output not Exceeding 300% of Rated Value			Max. Output Exceeding 300% of Rated Value		
	AC Motor (Standard Motor, Synchronous Motor)			Special Motor (High torque), Single-Cylinder Engine		
	DC Motor (Shunt), Engine with 2 or More Cylinders			DC Motor (Series), Operation with Lye Shaft or Clutch		
Operation Hours			Operation Hours			
Intermittent use	Regular Use	Continuous Use	Intermittent use	Regular Use	Continuous Use	
1 Day 3 to 5 hrs	1 Day 8 to 12 hrs	1 Day 8 to 12 hrs	1 Day 3 to 5 hrs	1 Day 8 to 12 hrs	1 Day 8 to 12 hrs	
Exhibit Instrument, Projector, Measuring Instrument, Medical Machine	1.0	1.2	1.4	1.2	1.4	1.6
Cleaner, Sewing Machine, Office Machine, Carpentry Lathe, Belt Sawing Machine	1.2	1.4	1.6	1.4	1.6	1.8
Light Load Belt Conveyor, Packer, Sifter	1.3	1.5	1.7	1.5	1.7	1.9
Liquid Mixer, Drill Press, Lathe, Screw Machine, (Circular Sawing) Machine, Planer, Washing Machine, Paper Manufacturing Machine (Excluding Pulp Manufacturing Machine), Printing Machine	1.4	1.6	1.8	1.6	1.8	2.0
Mixer (Cement and Viscous Matter), Belt Conveyor (Ore, Coal and Sand), Grinder, Shaping Machine, Boring Machine, Milling Machine, Compressor (Centrifugal), Vibration Sifter, Textile Machine (Warper and Winder), Rotary Compressor, Compressor (Reciprocal)	1.5	1.7	1.9	1.7	1.9	2.1
Conveyor (Apron, Pan, Bucket and Elevator), Extraction, Fan, Blower (Centrifugal, Suction and Discharge), Power Generator, Exciter, Hoist, Elevator, Rubber Processor (Calender, Roll and Extruder), Textile Machine (Weaving Machine, Fine Spinning Machine, Twisting Machine and Weft Winding Machine)	1.6	1.8	2.0	1.8	2.0	2.2
Centrifugal Separator, Conveyor (Feed and Screw), Hammer Mill, Paper Manufacturing Machine (Pulpaport)	1.7	1.9	2.1	1.9	2.1	2.3

☞ Typical machines using a belt are listed above. For other machines using a belt, a load correction coefficient should be determined by reference to this table.

☞ In the case of starts / stops over 100 times per day or rapid acceleration / deceleration, check the above values multiplied by 1.3. (MTS\_M only)

Table 2. Speed Ratio Correction Coefficient (Kr)

Speed Ratio	Coefficient (Kr)
1.00 to 1.25	0
1.25 to 1.75	0.1
1.75 to 2.50	0.2
2.50 to 3.50	0.3
3.50 or more	0.4

Table 3. Idlers Correction Coefficient (Ki)

Position of Idler	Coefficient (Ki)
Outside the loose side of the belt	0
Inside the loose side of the belt	0.1
Outside the tensioned side of the belt	0.1
Inside the tensioned side of the belt	0.2

## [Step 2-b] Calculating Design Power .....For P\_M/UP\_M Series

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

• Calculate Transmission Power at Motor Rated Power Output. (It is ideal to calculate from the actual load applied to the belt.)

• Normal Motor Load Factor (Ks)=Ko+Ki+Kr+Kh

Ko : Application Coefficient (Table 4)

Ki : Idler Correction Factor (Table 5)

Kr : Speed Multiplication Correction Factor (Table 6)

Kh : Operation Time Correction Factor (Table 7)

Table 4. Service Coefficient (Ko)

Type of Driven machine		Type of Motor			
		I	II	III	
Peak Output/Basic Output		200% or Less	200 to 300	300% or More	
A	Extremely Smooth Transmission	1.0	1.2	1.4	
B	Fairly Smooth Transmission	1.3	1.5	1.7	
C	Transmission with Moderate Impact	1.6	1.8	2.0	
D	Transmission with Considerable Impact	1.8	2.0	2.2	
E	Transmission with Large Impact	2.0	2.2	2.5	
Motor	AC Motor	Single-Phase	-	-	All Types
		Squirrel-Cage Induction	2 Poles	100kW or More	90~3.7kW
	4 Poles		55kW or More	45kW or Less	-
	6 Poles		37kW or More	30kW or Less	-
	8 Poles		15kW or More	11kW or Less	-
	Wire-Wound	4 Poles	-	15kW or Less	11kW or Less
		6 Poles	-	11kW or Less	7.5kW or Less
		8 Poles	-	5.5kW or Less	3.7kW or Less
	Synchronous Motor		-	Average Torque	High Torque
	DC Motor		Shunt	Compound	Series
Internal Combustion Engine		8 or More Cylinders	7 ~ 5 Cylinders	4 ~ 2 Cylinders	
Hydraulic Motor		-	-	All Types	

Note) For transmission involving forward/reverse operation, a large moment of inertia, extremely large impact, etc., the basic service coefficient may be 2.5 or more.

Type	Typical Driven Machines
A	Measuring Instrument, Camera Device, Radar, Medical Machine, Projector
B	Belt Conveyor (For Light Load), Chain Conveyor (For Light Load), Driller Press, Lathe, Screw Machine, Electric Typewriter, Calculator, Duplicator, Printing Press, Cutter, Paper Folder, Printer, Mixer, Calender-Dryer, Lathe, Belt Sawing Machine, Plane, Circular Sawing Machine, Planer, Mixer (Liquid), Bread Baking Machine, Flour Kneading Machine, Sifter (Drum and Cone), Sawing Machine
C	Belt Conveyor (Ore, Coal, Sand), Elevator, Boring Mill, Grinder, Milling Machine, Shaper, Metal Sawing Machine, Wind Hoist, Dryer, Washing Machine (Including a Wringer), Excavator, Mixer, Granulating Machine, Pump (Centrifugal, Gear and Rotary), Compressor (High-Speed Center), Stirrer, Mixer (Viscous Matter), Centrifugal Forced Blower, General Rubber Handling Machine, Power Generator, Sifter (Electric)
D	Conveyor (Apron, Bucket, Flight, Screw), Hoist, Cutting Press, Shattering Machine, Pulp Manufacturing Machine, Weaving Machine, Spinning Machine, Twisting Machine, Blender, Centrifugal Separator, Blower (Axial Flow, for Mining and Roots), General Construction Equipment, Hammer Mill, Rollgang
E	Crank Press, Pump (Reciprocal), Compressor (Reciprocating), Civil Engineering, Mining Equipment Including Crushing Machine (Ball, Rod, Gravel), Rubber Mixer

Table 5. Correction Coefficient when Idler is Used (Ki)

Location of Idler in Use	Inside	Outside
Loose Side of the Belt	0	+0.1
Tense Side of the Belt	+0.1	+0.2

Should be applied for each idler.

Table 6. Speed Increase Correction Coefficient (Kr)

Speed Increase Ratio	Correction Coefficient
1 to 1.25	0
1.25 to 1.75	+0.1
1.75 to 2.5	+0.2
2.5 to 3.5	+0.3
3.5 or more	+0.4

Table 7. Operating time Correction Coefficient (Kh)

Operation Hours	Correction Coefficient
Operated 10 or More Hours a Day	+0.1
Operated 20 or More Hours a Day	+0.2
Operated 500 Hours or Less (For Seasonal Operation)	-0.2

# [Technical Data] Selection of Transmission Timing Belts 3

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## [Step 3] Temporarily Selecting the Type of Belt from Selection Guide Table

Table 19. Selection Guide Table 1 (MXL, XL, L, H, T5, T10)

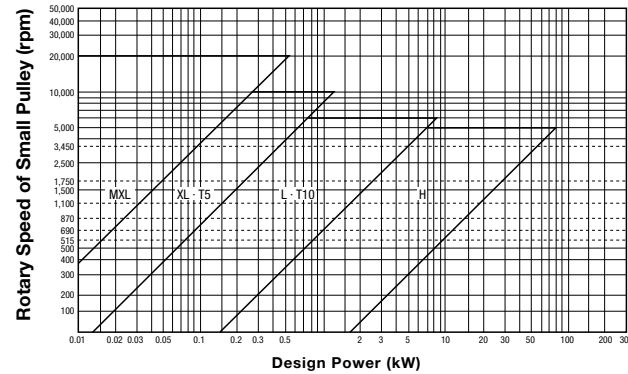


Table 20. Selection Guide Table 2 (S\_M series)

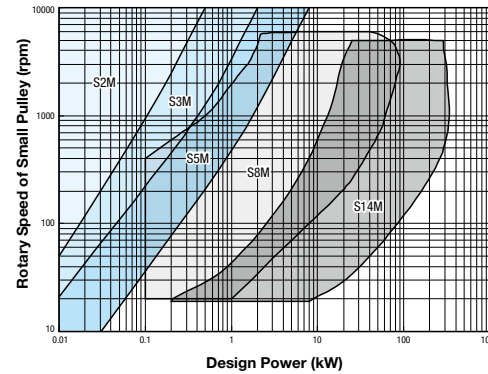


Table 21. Selection Guide Table 3 (P\_M series)

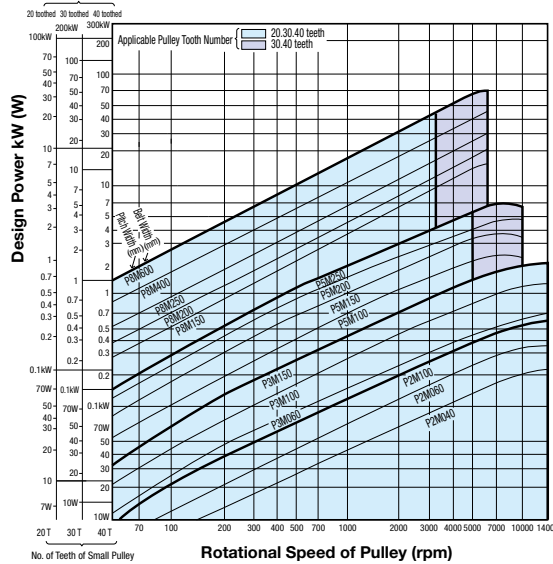


Table 22. Selection Guide Table 4 (MTS8M)

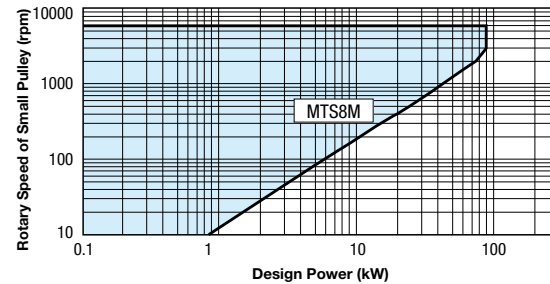


Table 23. Selection Guide Table 5 (UP\_M series)

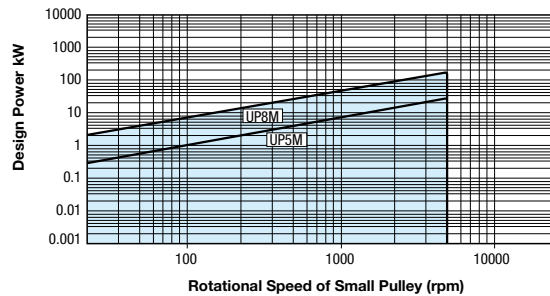


Table 24. Selection Guide Table (2GT-3GT series)

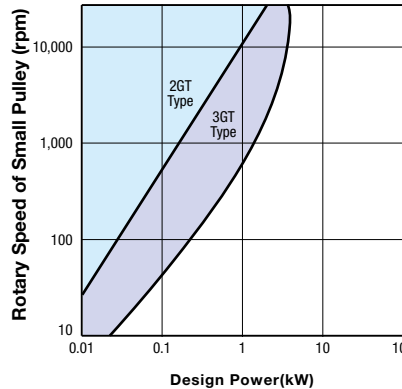
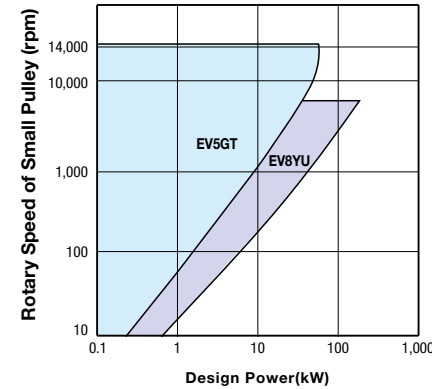


Table 25. Selection Guide Table (EV5GT-EV8YU series)



## [Step 4] Determining Number of Teeth of Large and Small Pulley, Belt Length, Inter-Shaft Distance

- Select the number of teeth of large and small pulley from P.2261~2271, which can satisfy the predetermined speed ratio. (However, select the small pulley with number of teeth more than Min. Number of Teeth on Table 26.)

$$\text{Speed Ratio} = \frac{\text{Number of Teeth of Large Pulley}}{\text{Number of Teeth of Small Pulley}}$$

Table 26. Allowable min. number of teeth

Rotary Speed of Small Pulley (rpm)	Type of Belt, Minimum Number of Teeth																						
	MXL	XL	L	H	S2M	S3M	S5M	S8M	S14M	P2M	P3M	P5M	P8M	UP5M	UP8M	MTS8M	T5	T10	2GT	3GT	EV5GT	EV8YU	
900 or Less	12	11	14	16	16	16	16	24	-	14	14	18	22	18	22	24	12	16	12	14	18	26	26
Over 900 1200 or Less	15	11	14	18	16	16	20	25	40	14	14	20	24	20	24	24	14	18	14	14	20	28	28
Over 1200 1800 or Less	15	12	16	20	18	18	24	28	48	14	14	24	26	24	26	26	16	20	16	16	24	32	32
Over 1800 3600 or Less	16	16	19	24	20	20	24	30	-	16	18	28	28	28	28	28	18	22	18	20	28	36	36
Over 3600 4800 or Less	-	16	20	24	20	20	24	32	-	18	20	30	30	30	30	30	18	22	20	20	30	-	-
Over 4800 10000 or Less	-	-	-	-	20	20	26	-	-	20	28	40	-	40	-	-	-	-	-	-	-	-	-

- Determine approx. belt circum. length (Lp) in terms of temporary inter-shaft distance (C), diameter of large pulley (Dp) and diameter of small pulley (dp). (Calculate pulley diameter with P.D. dimensions.)

$$L_p = 2C + \frac{\pi(D_p + d_p)}{2} + \frac{(D_p - d_p)^2}{4C}$$

C : Temporary Inter-shaft Distance  
Dp : Pitch Diameter of Large Pulley (mm)  
dp : Pitch Diameter of Small Pulley (mm)  
Lp : Approx. Belt Circum. Length (mm)

- Determine a belt circum. length (Lp) that is the nearest value to approx. belt circum. length referring to P.1459~1470, and then calculate the correct inter-shaft distance using the following formula.

$$C = \frac{b + \sqrt{b^2 - 8(D_p - d_p)^2}}{8}$$

$$b = 2L_p - \pi(D_p + d_p)$$

Dp : Pitch Diameter of Large Pulley (mm)  
dp : Pitch Diameter of Small Pulley (mm)  
Lp : Belt Circum. Length (mm)  
C : Inter-shaft Distance

## [Step 5] Determining Belt Width

- Calculate an approx. belt width using the following formula, and then select a belt width (Bw':mm) that is the nearest value to the approximated value.

$$Bw' = \frac{P_d}{P_s \cdot K_m} \times W_p$$

Pd : Design Power  
Ps : Reference Transmission Capacity.....Use the Reference Transmission Capacity Table on P.2261~2271.  
Km : Engagement Correction Coefficient (Table 27)  
Wp : Reference Belt Width (Table 28)

Table 27. Engagement Correction Coefficient (Km)

No. of Teeth Engaged Zm	More than 6	5	4	3	2
Km	1.0	0.8	0.6	0.4	0.2
*Km	1.0	0.7	0.5	-	-

Table 28. Reference Belt Width (Wp)

Type of Belt	MXL	XL	L	H	S2M	S3M	S5M	S8M	S14M	MTS8M
Reference Belt Width	6.4	25.4	25.4	25.4	4	6	10	60	120	60

Type of Belt	P2M	P3M	P5M	P8M	T5	T10
Reference Belt Width	4	6	10	15	10	10

$$\text{No. of Teeth Engaged (Zm)} = \frac{Z_d \cdot \theta}{360^\circ}$$

$$\theta = 180^\circ - \frac{57.3(D_p - d_p)}{C}$$

Zd : No. of Teeth of Small Pulley  
Dp : Pitch Diameter of Large Pulley (mm)  
C : Inter-shaft Distance (mm)  
θ : Contact Angle (°)  
dp : Pitch Diameter of Small Pulley (mm)

- Check if Design Power (Pd) satisfies the following formula. (If not, select the belt width of one size larger again.)

For belt types P□M and UP□M, substitute \*Km for meshing compensation factor

- Pd < Ps · Km · Kb
  - 2GT · 3GT · EV5GT · EV8YU
  - Pd < Ps · Km · Kb · KL
- Pd : Design Power  
Ps : Reference Transmission Capacity  
Km : Engagement Correction Coefficient  
Kb : Width Correction Coefficient (Table 29)  
KL : Length Correction Coefficient (Table 30)

Table 29. Width Correction Coefficient (Kb)

Type of Belt	Nominal mm	Width Correction Coefficient Kb	Type of Belt	Nominal mm	Width Correction Coefficient Kb	Type of Belt	Nominal mm	Width Correction Coefficient Kb	Type of Belt	Nominal mm	Width Correction Coefficient Kb		
MXL	019	4.8	S2M	040	4	P2M	40	4	2GT	4	4		
	025	6.4		060	6		60	6		6	6	6	
	037	9.5		100	10		100	10		10	9	9	
	050	12.7		150	15		150	15		150	15	150	15
	075	19.1		250	25		250	25		250	25	250	25
XL	025	6.4	S3M	100	10	P3M	100	10	3GT	6	6		
	031	7.9		150	15		150	15		150	15	150	15
	037	9.5		250	25		250	25		250	25	250	25
	050	12.7		400	40		400	40		400	40	400	40
	075	19.1		600	60		600	60		600	60	600	60
L	100	25.4	S5M	100	10	P5M	100	10	EV5GT	9	9		
	150	38.1		150	15		150	15		150	15	150	15
	200	50.8		250	25		250	25		250	25	250	25
	300	76.2		400	40		400	40		400	40	400	40
	400	101.6		600	60		600	60		600	60	600	60
H	075	19.1	S8M	150	15	P8M	150	15	EV8YU	15	15		
	100	25.4		250	25		250	25		250	25	250	25
	150	38.1		400	40		400	40		400	40	400	40
	200	50.8		600	60		600	60		600	60	600	60
	300	76.2		1000	100		1000	100		1000	100	1000	100

Table 30. Length Correction Coefficient (KL)

Length Correction Coefficient (KL)	0.80	0.90	1.00	1.10	1.20
2GT Belt Length (mm)	130 or less	131~182	183~280	281~419	420 or less
3GT Belt Length (mm)	190 or less	191~260	261~400	401~599	600 or less
EV5GT Belt Length (mm)	440 or less	441~550	551~800	801~1100	1101 or less
EV8YU Belt Length (mm)	600 or less	601~900	901~1250	1251~1799	1800 or less



[Technical Data]

# Selection of Transmission Timing Belts 9

-Transmission Capacity Table-

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[http://fawos.misumi.jp/FA\\_WEB/pulley/](http://fawos.misumi.jp/FA_WEB/pulley/)

**Table 49. Reference Transmission Capacity of T5 Ps -Belt Width 10mm-** (W)

Rotary Speed of Small Pulley (rpm)	No. of Teeth of Small Pulley		Diameter of the Pitch Circle (mm)		12		14		16		18		20		22		24		28		30		
	12	14	16	18	20	22	24	28	30	32	36	40	44	48	50	60	72	80	90	100	120	150	
1160	98.5	114.9	131.3	147.7	164.1	180.5	196.9	229.7	246.1	262.5	278.9	311.7	328.1	344.5	360.9	377.3	393.7	426.5	442.9	459.3	475.7	492.1	508.5
1750	134.3	156.7	179.1	201.5	223.9	246.3	268.7	301.5	317.9	334.3	350.7	383.5	399.9	416.3	432.7	449.1	465.5	498.3	514.7	531.1	547.5	563.9	580.3
3500	222.5	259.6	296.7	333.7	370.8	407.9	445.0	519.1	535.5	551.9	568.3	601.1	617.5	633.9	650.3	666.7	699.5	715.9	732.3	748.7	765.1	781.5	797.9
100	10.7	12.4	14.2	16.0	17.8	19.5	21.3	24.9	26.6	28.3	30.0	33.6	35.3	37.0	38.7	40.4	44.0	45.7	47.4	49.1	50.8	52.5	54.2
200	20.8	24.3	27.7	31.2	34.7	38.2	41.6	48.6	50.3	52.0	53.7	57.3	59.0	60.7	62.4	64.1	67.7	69.4	71.1	72.8	74.5	76.2	77.9
300	30.5	35.6	40.7	45.7	50.8	55.9	61.0	71.2	72.9	74.6	76.3	80.9	82.6	84.3	86.0	87.7	91.3	93.0	94.7	96.4	98.1	99.8	101.5
400	39.7	46.4	53.0	59.6	66.2	72.9	79.5	92.7	94.4	96.1	97.8	102.4	104.1	105.8	107.5	109.2	112.8	114.5	116.2	117.9	119.6	121.3	123.0
500	48.6	56.7	64.8	72.9	81.0	89.1	97.2	113.4	115.1	116.8	118.5	123.1	124.8	126.5	128.2	130.0	133.6	135.3	137.0	138.7	140.4	142.1	143.8
600	57.0	66.5	76.0	85.5	95.0	104.5	114.0	131.1	132.8	134.5	136.2	140.8	142.5	144.2	145.9	147.6	151.2	152.9	154.6	156.3	158.0	159.7	161.4
700	65.1	76.0	86.8	97.7	108.6	119.4	130.3	150.0	151.7	153.4	155.1	160.7	162.4	164.1	165.8	167.5	171.1	172.8	174.5	176.2	177.9	179.6	181.3
800	72.9	85.0	97.2	109.3	121.5	133.6	145.8	170.1	171.8	173.5	175.2	180.8	182.5	184.2	185.9	187.6	191.2	192.9	194.6	196.3	198.0	199.7	201.4
900	80.3	93.7	107.1	120.5	133.9	147.3	160.7	185.0	186.7	188.4	190.1	195.7	197.4	199.1	200.8	202.5	206.1	207.8	209.5	211.2	212.9	214.6	216.3
1000	87.5	102.1	116.7	130.1	143.5	156.9	170.3	204.6	206.3	208.0	210.0	215.6	217.3	219.0	220.7	222.4	226.0	227.7	229.4	231.1	232.8	234.5	236.2
1100	94.4	110.2	125.9	141.6	157.4	173.1	188.9	220.3	222.0	223.7	225.4	231.0	232.7	234.4	236.1	237.8	241.4	243.1	244.8	246.5	248.2	250.0	251.7
1200	101.1	117.9	134.8	151.6	168.5	185.3	202.2	235.9	237.6	239.3	241.0	246.6	248.3	250.0	251.7	253.4	257.0	258.7	260.4	262.1	263.8	265.5	267.2
1300	107.5	125.5	143.4	161.3	179.2	197.1	215.0	250.9	252.6	254.3	256.0	261.6	263.3	265.0	266.7	268.4	272.0	273.7	275.4	277.1	278.8	280.5	282.2
1400	113.8	132.8	151.7	170.7	189.7	208.6	227.6	265.5	267.2	268.9	270.6	276.2	277.9	279.6	281.3	283.0	286.6	288.3	290.0	291.7	293.4	295.1	296.8
1500	119.9	139.8	159.7	179.6	199.5	219.4	239.3	279.7	281.4	283.1	284.8	290.4	292.1	293.8	295.5	297.2	300.8	302.5	304.2	305.9	307.6	309.3	311.0
1600	125.8	146.7	167.6	188.5	209.4	230.3	251.2	293.6	295.3	297.0	302.6	304.3	306.0	307.7	309.4	311.1	314.7	316.4	318.1	319.8	321.5	323.2	324.9
1700	131.5	153.4	175.3	197.2	219.1	241.0	262.9	306.9	308.6	310.3	315.9	317.6	319.3	321.0	322.7	326.3	328.0	329.7	331.4	333.1	334.8	336.5	338.2
1800	137.1	160.0	181.9	203.8	225.7	247.6	269.5	315.5	317.2	318.9	324.5	326.2	327.9	329.6	331.3	334.9	336.6	338.3	340.0	341.7	343.4	345.1	346.8
1900	142.6	166.4	190.2	214.0	237.8	261.5	285.3	332.8	334.5	336.2	341.8	343.5	345.2	346.9	348.6	352.2	353.9	355.6	357.3	359.0	360.7	362.4	364.1
2000	148.0	172.7	197.4	222.1	246.7	271.4	296.1	345.4	347.1	348.8	354.4	356.1	357.8	359.5	361.2	364.8	366.5	368.2	370.0	371.7	373.4	375.1	376.8
2200	158.6	185.0	211.4	237.8	264.3	290.7	317.8	370.0	371.7	373.4	379.0	380.7	382.4	384.1	385.8	389.4	391.1	392.8	394.5	396.2	397.9	399.6	401.3
2400	168.8	196.9	225.1	253.2	281.4	309.5	337.6	393.9	395.6	397.3	402.9	404.6	406.3	408.0	410.0	413.6	415.3	417.0	418.7	420.4	422.1	423.8	425.5
2600	178.8	208.7	238.5	268.3	298.1	327.9	357.7	417.3	419.0	420.7	426.3	428.0	429.7	431.4	433.1	436.7	438.4	440.1	441.8	443.5	445.2	446.9	448.6
2800	188.7	220.2	251.6	283.1	314.5	346.0	377.4	440.4	442.1	443.8	449.4	451.1	452.8	454.5	456.2	460.8	462.5	464.2	465.9	467.6	469.3	471.0	472.7
3000	198.5	231.6	264.6	297.7	330.8	363.9	397.0	463.1	464.8	466.5	472.1	473.8	475.5	477.2	478.9	483.5	485.2	486.9	488.6	490.3	492.0	493.7	495.4
3200	208.2	242.8	277.5	312.2	346.9	381.6	416.3	485.7	487.4	489.1	494.7	496.4	498.1	499.8	501.5	506.1	507.8	509.5	511.2	512.9	514.6	516.3	518.0
3400	217.7	250.3	286.6	322.9	358.2	393.5	428.8	500.0	501.7	503.4	509.0	510.7	512.4	514.1	515.8	520.4	522.1	523.8	525.5	527.2	528.9	530.6	532.3
3600	227.2	261.1	300.0	340.8	381.6	422.4	463.2	536.0	537.7	539.4	545.0	546.7	548.4	550.1	551.8	556.4	558.1	559.8	561.5	563.2	564.9	566.6	568.3
3800	236.6	270.6	311.5	354.9	398.3	441.7	485.1	559.0	560.7	562.4	568.0	569.7	571.4	573.1	574.8	579.4	581.1	582.8	584.5	586.2	587.9	589.6	591.3
4000	245.8	280.8	322.7	368.7	409.7	450.7	491.6	573.6	575.3	577.0	582.6	584.3	586.0	587.7	589.4	594.0	595.7	597.4	599.1	600.8	602.5	604.2	605.9
4200	254.8	291.3	333.7	382.2	424.7	467.2	508.6	594.6	596.3	598.0	603.6	605.3	607.0	608.7	613.3	615.0	616.7	618.4	620.1	621.8	623.5	625.2	626.9
4400	263.5	301.4	345.4	395.3	439.2	483.1	527.0	614.9	616.6	618.3	623.9	625.6	627.3	629.0	633.6	635.3	637.0	638.7	640.4	642.1	643.8	645.5	647.2
4600	271.9	312.2	358.1	408.0	453.9	499.8	545.7	634.4	636.1	637.8	643.4	645.1	646.8	648.5	653.1	654.8	656.5	658.2	659.9	661.6	663.3	665.0	666.7
4800	279.7	326.4	373.0	419.6	466.2	512.8	559.3	649.7	651.4	653.1	658.7	660.4	662.1	663.8	668.4	670.1	671.8	673.5	675.2	676.9	678.6	680.3	682.0
5000	287.0	334.8	382.7	430.5	478.3	526.2	574.0	664.7	666.4	668.1	673.7	675.4	677.1	678.8	683.4	685.1	686.8	688.5	690.2	691.9	693.6	695.3	697.0
5500			402.2	452.4	502.7	553.0	603.2	703.8	705.5	707.2	712.8	714.5	716.2	717.9	722.5	724.2	725.9	727.6	729.3	731.0	732.7	734.4	736.1
6000			412.1	463.6	515.1	566.6	618.1	718.7	720.4	722.1	727.7	729.4	731.1	732.8	737.4	739.1	740.8	742.5	744.2	745.9	747.6	749.3	751.0
6500			408.2	459.7	510.2	561.7	613.2	713.8	715.5	717.2	722.8	724.5	726.2	727.9	732.5	734.2	735.9	737.6	739.3	741.0	742.7	744.4	746.1
7000			385.3	435.5	485.7	535.9	586.1	674.3	676.0	677.7	683.3	685.0	686.7	688.4	693.0	694.7	696.4	698.1	699.8	701.5	703.2	704.9	706.6
7500			337.7	379.9	422.1	464.3	506.5	591.0	592.7	594.4	600.0	601.7	603.4	605.1	609.7	611.4	613.1	614.8	616.5	618.2	619.9	621.6	623.3
8000				290.8	323.1	355.5	387.8	452.4	454.1	455.8	461.4	463.1	464.8	466.5	471.1	472.8	474.5	476.2	477.9	479.6	481.3	483.0	484.7
8500																							

[Technical Data]

# Selection of Transmission Timing Belts 10

-Transmission Capacity Table-

Table 53. Reference Transmission Capacity of EV5GT Ps -Belt Width 15mm- (W)

No. of Teeth of Small Pulley	Diameter of the Pitch Circle(mm)																	
	14	16	18	20	22	24	26	28	30	32	36	40	44	48	54	60	72	80
Rotary Speed of Small Pulley(rpm)	22.28	25.46	28.85	31.83	35.01	38.20	41.38	44.56	47.75	50.93	57.30	63.66	70.03	76.39	85.94	95.49	114.59	127.32
20	13	18	22	27	33	38	42	47	52	56	64	72	80	87	97	108	128	139
40	24	33	41	50	61	70	79	88	96	104	120	136	150	163	183	203	240	263
60	33	46	58	72	87	100	113	126	139	150	173	196	216	236	264	293	348	380
100	50	71	91	113	136	157	178	199	219	237	273	310	343	374	419	465	552	604
200	85	125	163	205	248	287	326	365	403	438	506	575	636	695	780	867	1031	1129
300	115	173	228	289	350	407	464	520	574	625	723	823	912	996	1119	1244	1482	1623
400	142	217	289	369	447	520	594	667	737	803	931	1060	1176	1285	1445	1607	1914	2096
500	166	258	347	445	539	629	718	808	894	974	1131	1289	1430	1564	1759	1957	2333	2555
600	188	297	402	518	627	733	839	944	1046	1141	1325	1511	1678	1836	2065	2298	2740	3002
700	208	333	454	589	712	834	956	1077	1193	1302	1514	1728	1919	2101	2364	2632	3139	3439
800	227	368	505	657	795	933	1069	1206	1337	1460	1699	1940	2156	2360	2657	2958	3529	3866
870	239	392	540	704	851	1000	1147	1294	1436	1569	1826	2086	2319	2539	2858	3183	3797	4161
900	244	402	554	724	875	1028	1180	1332	1478	1615	1880	2148	2388	2615	2944	3279	3912	4286
1000	260	434	602	789	954	1122	1289	1456	1616	1767	2058	2352	2616	2865	3227	3593	4288	4698
1160	284	483	675	890	1075	1268	1459	1649	1832	2004	2337	2672	2973	3257	3669	4087	4878	5343
1200	289	495	693	915	1105	1304	1500	1696	1885	2062	2405	2751	3061	3353	3778	4209	5023	5502
1400	315	551	780	1035	1251	1478	1704	1929	2145	2349	2742	3138	3493	3828	4314	4807	5736	6282
1450	321	565	801	1065	1286	1521	1754	1986	2209	2419	2825	3233	3599	3945	4446	4954	5912	6474
1600	338	605	863	1152	1391	1647	1901	2155	2397	2627	3070	3516	3914	4291	4837	5390	6430	7040
1750	354	643	923	1237	1494	1771	2046	2320	2583	2831	3311	3793	4224	4631	5221	5817	6939	7583
1800	358	655	943	1264	1527	1811	2093	2374	2644	2899	3390	3884	4326	4743	5347	5958	7106	7777
2000	376	703	1020	1374	1659	1971	2280	2589	2884	3164	3703	4244	4728	5185	5846	6513	7765	8494
2400	406	791	1165	1584	1911	2278	2641	3003	3349	3678	4309	4943	5509	6042	6812	7587	9034	9868
2800	440	872	1301	1783	2151	2571	2986	3400	3795	4171	4892	5615	6259	6865	7737	8613	10238	11165
3200	486	945	1429	1973	2380	2851	3318	3782	4225	4647	5455	6263	6982	7657	8594	9594	11379	12384
3600	529	1011	1550	2155	2598	3120	3636	4150	4640	5107	5998	6888	7679	8419	9477	10531	12456	13522
4000	571	1072	1665	2330	2808	3379	3944	4505	5041	5550	6522	7492	8350	9151	10291	11423	13466	14575
5000	667	1202	1925	2738	3296	3986	4667	5343	5985	6597	7758	8910	9920	10854	12167	13450	15686	16815
6000	735	1305	2153	3108	3737	4539	5330	6112	6853	7559	8889	10199	11335	12372	13803	15172	17429	18431
7000	800	1382	2352	3445	4136	5044	5936	6817	7648	8438	9915	11358	12590	13695	15183	16561	18641	19343
8000	870	1450	2524	3749	4495	5501	6487	7459	8370	9235	10835	12383	13677	14812	16285	17586	19259	
9000	900	1500	2671	4023	4815	5912	6984	8037	9018	9946	11645	13265	14586	15706	17086	18212		
10000	930	1550	2826	4297	5187	6339	7491	8544	9497	10370	12139	13898	15303	16361	17560			
12000	1000	1650	2987	4571	5562	6764	7916	9068	10021	10894	12763	14612	16017	16983				
14000	1070	1750	3148	4845	5896	7148	8300	9452	10405	11278	13247	15096	16501	17467				

\* Endurance time will be reduced in [ ] marked area. Please avoid if possible. If the belt width changes, multiply the compensation factors Kb from Table 29.

Table 54. Reference Transmission Capacity of EV8YU Ps -Belt Width 20mm- (kW)

No. of Teeth of Small Pulley	Diameter of the Pitch Circle(mm)																	
	20	22	24	26	28	30	32	34	36	38	40	44	48	54	60	64	72	80
Rotary Speed of Small Pulley(rpm)	50.93	56.02	61.12	66.21	71.30	76.39	81.49	86.58	91.67	96.77	101.86	112.05	122.23	137.51	152.79	162.97	183.35	203.72
10	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.12	0.13	0.14	0.16	0.18	0.18
20	0.07	0.08	0.09	0.10	0.10	0.11	0.13	0.13	0.14	0.15	0.16	0.18	0.20	0.23	0.26	0.28	0.32	0.36
40	0.13	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.36	0.40	0.46	0.52	0.56	0.64	0.72
60	0.18	0.21	0.23	0.26	0.29	0.32	0.35	0.38	0.41	0.44	0.48	0.54	0.60	0.69	0.78	0.84	0.96	1.08
100	0.28	0.33	0.37	0.42	0.47	0.52	0.57	0.62	0.67	0.72	0.78	0.88	0.99	1.14	1.30	1.40	1.60	1.80
200	0.52	0.60	0.69	0.79	0.89	0.99	1.10	1.20	1.29	1.39	1.52	1.73	1.96	2.27	2.58	2.79	3.19	3.60
300	0.74	0.86	0.99	1.13	1.29	1.45	1.62	1.76	1.90	2.05	2.25	2.57	2.92	3.38	3.85	4.18	4.78	5.40
400	0.94	1.10	1.28	1.47	1.67	1.89	2.12	2.30	2.50	2.70	2.97	3.40	3.86	4.48	5.12	5.56	6.37	7.20
500	1.13	1.34	1.56	1.80	2.05	2.32	2.61	2.84	3.08	3.33	3.68	4.23	4.81	5.59	6.38	6.94	7.95	8.99
600	1.32	1.57	1.83	2.12	2.42	2.75	3.10	3.38	3.67	3.97	4.38	5.04	5.75	6.68	7.64	8.31	9.53	10.78
700	1.50	1.79	2.10	2.43	2.79	3.17	3.58	3.90	4.24	4.59	5.08	5.86	6.68	7.77	8.89	9.68	11.10	12.57
800	1.68	2.00	2.36	2.74	3.15	3.59	4.05	4.43	4.81	5.22	5.78	6.66	7.61	8.86	10.14	11.04	12.67	14.34
870	1.80	2.15	2.54	2.95	3.40	3.87	4.38	4.79	5.21	5.65	6.26	7.23	8.26	9.62	11.01	11.99	13.76	15.58
900	1.85	2.21	2.61	3.04	3.50	4.00	4.52	4.94	5.38	5.83	6.47	7.47	8.54	9.95	11.39	12.40	14.23	16.11
1000	2.02	2.42	2.86	3.34	3.85	4.40	4.99	5.46	5.94	6.45	7.15	8.27	9.46	11.03	12.63	13.75	15.78	17.88
1160	2.28	2.74	3.26	3.81	4.41	5.05	5.73	6.27	6.83	7.42	8.24	9.54	10.92	12.75	14.60	15.91	18.26	20.68
1200	2.34	2.82	3.35	3.92	4.54	5.20	5.91	6.47	7.06	7.66	8.51	9.86	11.29	13.17	15.09	16.45	18.87	21.37
1400	2.63	3.21	3.83	4.50	5.22	5.99	6.82	7.48	8.16	8.86	9.86	11.43	13.11	15.30	17.54	19.11	21.93	24.83
1450	2.73	3.31	3.94	4.64	5.39	6.19	7.05	7.72	8.43	9.16	10.20	11.82	13.56	15.83	18.15	19.78	22.69	25.68
1600	2.95	3.59	4.29	5.06	5.88	6.77	7.72	8.47	9.24	10.05	11.20	12.99	14.91	17.41	19.96	21.75	24.95	28.23
1750	3.17	3.87	4.63	5.47	6.37	7.34	8.39	9.20	10.05	10.93	12.19	14.15	16.25	18.98	21.75	23.71	27.18	30.75
1800	3.24	3.96	4.75	5.61	6.53	7.53	8.61	9.44	10.31	11.22	12.52	14.54	16.69	19.50	22.35	24.66	27.93	31.58
2000	3.52	4.32	5.19	6.14	7.17	8.29	9.48	10.41	11.37	12.38	13.82	16.06	18.46	21.56	24.71	26.94	30.85	34.86
2400	4.06	5.01	6.05	7.19	8.43	9.76	11.20	12.30	13.45	14.65	16.39	19.07	21.93	25.61	29.34	31.97	36.55	41.21
2800	4.57	5.66	6.88	8.20	9.64	11.20	12.87	14.15	15.48	16.87	18.90	22.00	25.31	29.55	33.82	36.82	41.99	47.22
3200	5.05	6.29	7.67	9.18	10.82	12.59	14.50	15.95	17.46	19.03	21.35	24.86	28.60	33.35	38.12	41.46	47.14	52.83
3600	5.50	6.89	8.43	10.12	11.96	13.95	16.08	17.69	19.38	21.12	23.72	27.62	31.78	37.01	42.22	45.86	51.95	57.98
4000	5.94	7.47	9.17	11.03	13.06	15.26	17.62	19.39	21.23	23.15	26.02	30.30	34.84	40.50	46.10	50.00		

[Technical Data]

# Selection of Transmission Timing Belts 12

-Allowable Tension Table-

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

**Table 57. S3M Allowable Tension Table: Per 6.0mm of Belt Width (Unit: N)**

Speed of Small Pulley (rpm)	Number of Small Pulley Teeth	Pitch Circle Dia. (mm)	14	15	16	18	20	22	24	26	28	30	32	36	40	44	50	60
			13.37	14.32	15.28	17.19	19.10	21.01	22.92	24.83	26.74	28.65	30.56	34.38	38.20	42.02	47.75	57.30
870	87	88	89	90	90	91	91	91	90	90	90	90	89	88	87	85		
1160	82	83	84	85	85	86	86	86	85	85	85	85	84	83	82	80		
1750	75	76	77	78	78	78	78	78	78	78	78	77	76	75	73			
3500	63	64	64	65	66	66	66	66	66	66	65	65	64	63	62	59		
50	138	139	139	140	141	141	141	141	140	140	139	138	137	136				
100	126	126	127	128	128	129	129	129	128	128	127	126	125	123				
150	118	119	120	121	121	122	122	122	121	121	120	119	118	116				
200	113	114	115	116	116	117	117	117	116	116	115	114	113	111				
250	109	110	111	112	112	113	113	113	112	112	111	110	109	107				
300	106	107	108	109	109	109	109	109	108	108	107	106	104					
350	103	104	105	106	106	107	107	107	106	106	105	104	103	101				
400	101	102	103	104	104	104	104	104	104	104	103	102	101	99				
450	99	100	101	101	102	102	102	102	102	102	101	100	99	97				
500	97	98	99	100	100	100	100	100	100	100	99	98	97	95				
550	96	96	97	98	98	99	99	99	98	98	97	96	95	93				
600	94	95	95	96	97	97	97	97	96	95	95	94	92	90				
650	93	93	94	95	95	96	96	96	95	95	94	93	92	90				
700	91	92	93	94	94	94	94	94	94	94	93	92	91	89				
800	89	90	90	91	92	92	92	92	91	90	90	89	87	85				
900	87	88	88	89	90	90	90	90	89	88	87	86	85	83				
1000	85	86	86	87	88	88	88	88	87	86	85	84	83	81				
1100	83	84	85	86	86	87	87	87	86	85	84	83	82	80				
1200	82	83	83	84	85	85	85	85	84	84	83	82	81	79				
1300	80	81	82	83	84	84	84	83	83	82	82	81	80	78				
1400	79	80	81	81	82	82	82	82	81	80	80	79	77	75				
1500	78	79	79	80	81	81	81	81	80	80	79	78	77	75				
1600	77	78	78	79	80	80	80	80	79	79	78	77	76	74				
1700	76	77	77	78	79	79	79	79	78	78	77	76	75	73				
1800	75	75	76	77	78	78	78	78	77	77	76	75	74	72				
1900	74	75	75	76	77	77	77	77	76	76	75	74	73	71				
2000	73	74	74	75	76	76	76	76	75	75	74	73	72	70				
2200	71	72	73	73	74	74	74	74	74	74	73	72	70	68				
2400	70	70	71	72	73	73	73	73	72	71	71	70	69	67				
2500	68	69	70	71	71	71	71	71	70	69	69	67	65	63				
2800	67	68	69	70	70	70	70	69	68	67	67	66	65	63				
3000	66	66	67	68	68	69	69	68	68	67	66	65	63	61				
3200	65	65	66	67	67	68	68	67	67	66	65	64	63	61				
3400	63	64	65	66	66	67	67	66	66	65	64	63	62	60				
3600	62	63	64	65	65	66	66	65	65	64	63	62	61	59				
3800	61	62	63	64	64	65	64	64	63	62	61	60	58	57				
4000	60	61	62	63	63	64	64	63	63	62	61	60	58	57				
4500	58	59	60	61	61	61	61	61	60	59	58	57	54	52				
5000	57	57	58	59	59	59	59	59	58	57	56	54	52	49				
5500	55	56	56	57	58	58	58	57	57	56	55	54	52	49				
6000	53	54	55	56	56	56	56	55	55	54	53	52	50	47				
6500	52	53	53	54	54	55	55	54	54	53	52	51	50	48				
7000	51	51	52	53	53	53	53	53	52	52	51	50	48	45				
7500	49	50	51	51	52	52	52	51	51	50	49	47	45	41				
8000	48	49	49	50	51	51	51	50	49	49	48	46	45	43				
9000	46	47	47	48	48	48	48	47	47	46	45	44	42	39				

\* Try to avoid use of belts within the range enclosed with □ □ □ □. Otherwise, the durable time might be shortened.  
 \* The above table is for 6.0mm of belt width. When the desired belt has the other width, multiply the value on the above table by the relevant width correction factor Kb provided on the Table 29.

**Table 58. S5M Allowable Tension Table: Per 10.0mm of Belt Width (Unit: N)**

Speed of Small Pulley (rpm)	Number of Small Pulley Teeth	Pitch Circle Dia. (mm)	14	15	16	18	20	22	24	26	28	30	32	36	40	44	48	60
			22.28	23.87	25.46	28.65	31.83	35.01	38.20	41.38	44.56	47.75	50.93	57.30	63.66	70.03	76.39	95.49
870	170	176	181	189	195	199	202	205	207	208	210	211	212	212	212	211	211	211
1160	159	165	170	178	183	188	191	194	196	197	198	200	201	201	201	201	199	199
1750	144	149	154	162	167	172	175	178	179	181	182	183	184	184	184	184	181	181
3500	116	122	127	134	140	144	147	149	151	152	153	153	153	152	151	145		
50	280	286	291	299	304	309	312	315	317	318	319	321	322	322	322	321		
100	254	264	272	278	283	287	290	292	295	296	298	299	300	300	300	294		
150	238	244	249	256	262	267	270	272	274	276	277	279	280	280	280	279		
200	227	233	238	245	251	255	259	261	263	265	266	268	269	269	268			
250	218	224	229	237	243	247	250	253	255	256	258	259	260	260	260	259		
300	211	217	222	230	236	240	243	246	248	249	251	252	253	253	253	252		
350	205	211	216	224	230	234	237	240	242	243	245	246	247	247	247	246		
400	200	206	211	219	224	229	232	235	237	238	240	241	242	242	242	241		
450	196	202	206	214	220	224	228	231	233	234	235	237	238	238	238	236		
500	192	198	202	210	216	220	224	226	228	230	231	233	233	234	234	232		
550	188	194	199	206	212	217	220	223	225	226	227	229	230	230	230	229		
600	185	191	195	203	209	213	217	219	221	223	224	225	226	227	227	225		
650	182	187	192	200	206	210	214	218	220	221	222	223	224	223	223	222		
700	179	185	189	197	203	207	211	213	215	217	218	220	220	221	221	219		
800	174	184	192	198	202	206	208	210	212	214	215	215	215	215	214			
900	169	175	180	188	193	198	201	204	205	207	208	210	211	211	211	209		
1000	165	171	176	183	189	194	197	199	201	203	204	206	206	207	207	205		
1100	161	167	172	180	186	190	193	196	199	200	202	203	203	203	203	201		
1200	158	164	169	176	182	186	190	192	194	196	197	198	199	199	199	198		
1300	155	161	166	173	179	183	187	189	191	193	194	195	196	196	196	194		
1400	153	159	163	170	176	180	184	186	188	190	191	192	193	193	193	191		
1500	149	155	160	168	173	178	181	184	186	187	188	190	190	190	188			
1600	147	153	158	165	171	175	179	181	183	184	186	187	188	187	185			
1700	145	150	155	163	169	173	176	179	181	182	183	185	185	185	183			
1800	142	148	153	161	166	171	174	176	178	180	181	182	183	183	180			
1900	140	146	151	159	164	169	172	174	176	178	179	180	181	181	180	178		
2000	138	144	149	157	162	167	170	172	174	176	177	178	178	178	177	175</		

# Synchronous Belt Reference Information

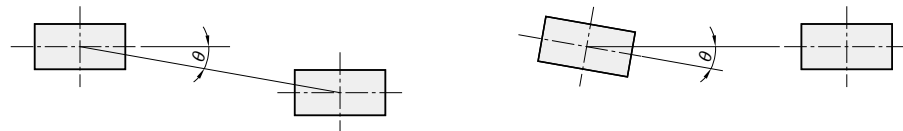
# Synchronous Belt Replacement Signs

## Early failures and countermeasures

Abnormal Phenomena	Cause	Measures
<b>Abnormal Wear of Belt Side Faces</b>	<ul style="list-style-type: none"> <li>Pulley misalignment</li> <li>Pulley shafts misalignments</li> <li>Bent pulley flanges</li> </ul>	<ul style="list-style-type: none"> <li>Realign</li> <li>Correct shaft misalignments</li> <li>Correct bent pulley flanges</li> </ul>
<b>Tooth Contact Pressure Surface Abnormal Wear</b>	<ul style="list-style-type: none"> <li>Overload</li> <li>Belt tension too high, too low</li> </ul>	<ul style="list-style-type: none"> <li>Redesign with a wide belt or use larger belt pitch</li> <li>Adjust initial belt tension</li> </ul>
<b>Belt abnormal wear on pulley contacting area</b>	<ul style="list-style-type: none"> <li>Pulley tooth shape incorrect</li> <li>Belt tension too high</li> </ul>	<ul style="list-style-type: none"> <li>Adjust initial belt tension</li> <li>Try to recreate belt systems by taking note of tooth tip radius</li> </ul>
<b>Broken/missing tooth</b>	<ul style="list-style-type: none"> <li>Pulley diameter too small</li> <li>Small pulley meshing 6 teeth or less</li> <li>Shock loading exists</li> </ul>	<ul style="list-style-type: none"> <li>Redesign</li> <li>Increase small pulley tooth mesh or redesign</li> <li>Avoid shock loading on belt</li> <li>Increase belt width</li> </ul>
<b>Severed Core Wire</b>	<ul style="list-style-type: none"> <li>Overload</li> <li>Core wire decreased elasticity or corrosion</li> <li>Induction of foreign matter</li> <li>Excessive temperature</li> </ul>	<ul style="list-style-type: none"> <li>Redesign</li> <li>Check belt storage and shipping history/condition</li> <li>Avoid shocks</li> <li>Provide a belt cover</li> <li>Lower environment temperature</li> </ul>
<b>Cracks on Backing Rubber</b>	<ul style="list-style-type: none"> <li>Usage in low temperature</li> <li>Pulley diameter too small</li> </ul>	<ul style="list-style-type: none"> <li>Raise environment temp.</li> <li>Increase pulley diameter</li> </ul>
<b>Heat Degradation of Rubber</b>	<ul style="list-style-type: none"> <li>Rubber degradation due to high environment temperature</li> </ul>	<ul style="list-style-type: none"> <li>Lower environment temperature</li> </ul>
<b>Rubber Swelling</b>	<ul style="list-style-type: none"> <li>Contact with oils</li> <li>Contact with water</li> </ul>	<ul style="list-style-type: none"> <li>Avoid oil from contacting</li> <li>Avoid water from contacting</li> </ul>
<b>Abnormal Wear of Pulley Teeth</b>	<ul style="list-style-type: none"> <li>Overload</li> <li>Belt tension too high</li> <li>Pulley material too soft</li> </ul>	<ul style="list-style-type: none"> <li>Redesign</li> <li>Adjust initial belt tension</li> <li>Apply surface hardening treatment on pulley or change pulley material</li> </ul>
<b>Pulley Circumference Wear</b>	<ul style="list-style-type: none"> <li>Pulley service life has been reached</li> <li>Belt tension too high (core wire visible on belt back side)</li> </ul>	<ul style="list-style-type: none"> <li>Replace with a new pulley</li> <li>Replace with new pulley and belt, and use lower belt tension</li> </ul>
<b>Abnormal Sound</b>	<ul style="list-style-type: none"> <li>Belt tension too high</li> <li>Overload</li> <li>Pulley diameter too small</li> <li>Pulley tooth shape incorrect</li> </ul>	<ul style="list-style-type: none"> <li>Realign</li> <li>Adjust initial belt tension</li> <li>Redesign</li> <li>Correct pulley tooth geometry</li> </ul>
<b>Apparent Belt Stretch</b>	<ul style="list-style-type: none"> <li>Shaft center distance too small</li> <li>Loose machine base</li> </ul>	<ul style="list-style-type: none"> <li>Adjust to correct shaft distance</li> <li>Reinforce machine base</li> </ul>

## About Pulley Alignments

Misaligned pulleys may cause early belt failure and flange damages. Align as show below



### •MXL/XL/L/H/S\_M/MTS\_M/T Series

Belt width (mm)	10	20	30≤
tanθ	5/1000	3/1000	2/1000

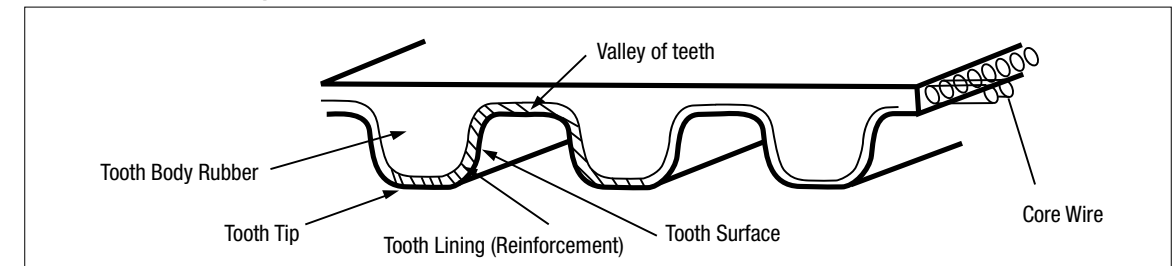
### •P\_M/UP\_M

Belt width (mm)	≤30
tanθ	5/1000

### •\_GT/EV5GT/EV8YU

Belt width (mm)	≤20	20<40
tanθ	6/1000	3/1000

## Names of Belt Components



## Examples of Belt Replacement Signs

Examples	Condition
1. When belt tooth reinforcement fabric is worn and rubber/core wire are exposed When tooth surface/grooves are worn and rubber/core wire are exposed	
2. When the backing rubber shows cracks due to hardening	
3. When cracks reaching the rubber are seen at tooth base	
4. Belt side faces are damaged due to wear	
5. When missing tooth can be seen	
6. When excessive wear can be seen on belt back side	
7. When belt or core wire are broken	

These are belt replacement timing guides. Early or periodical replacements are recommended even the signs shown above are not yet visible.