Timing Pulley and Belt Overview

■Timing Pulleys

MISUMI timing pulleys are shaft bore machined and surface-treated. In addition to regular pulleys,
- wide variety of pulleys including significantly reduced backlash pulleys
- Keyless bushings with incorporated timing pulleys are available.

[Timing Pulleys, Idlers Types] **Printed in Red: Additional Specification**

Usage	Features	Type of Belt	Pitch	Timing Pulleys: Timing Pulleys	Timing Pulleys: Keyless Timing Pulleys	Timing Pulleys: Clamping Timing Pulleys	Idlers: Idlers with Teeth	Idlers: Idlers
								
				General purpose pulleys, surface treated and bores pre-machined.	MechaLock incorporated timing pulleys, easy phase matching.	Timing pulleys easily fastened to shafts with a single screw.	Surface-treated and bearing incorporated idlers with teeth.	Idlers without teeth used for tensioning on belt backsides.
Regular Torque	General purpose timing pulleys suitable for torque transmission and light load conveyance.	MXL	2.032mm (2/25inch)	P.1105	-	-	P.1159	P.1171
		XL	5.08mm (1/5inch)	P.1107	P.1138			
		L	9.525mm (3/8inch)	P.1109	P.1139-1140		P.1161	
		H	12.7mm (1/2inch)	P.1111	P.1141-1142			
High Torque	Timing pulleys for high torque transmission.	S2M	2.0mm	P.1113	-	-	P.1163	
		S3M	3.0mm	P.1115	P.1143-1144	P.1155		
		S5M	5.0mm	P.1117	P.1145-1146		P.1165	
		S8M	8.0mm	P.1119-1123	P.1147-1148			
		S14M	14.0mm	P.1121	-	-		
		P2M	2.0mm	P.1125	-	-	P.1167	
		P3M	3.0mm	P.1125	-			
		P5M	5.0mm	P.1127	P.1149			
		P8M	8.0mm	P.1129	P.1150			
High Accuracy Positioning	Timing pulleys with small backlash. Suitable for positioning.	2GT	2.0mm	P.1097	-	-	P.1167	
		3GT	3.0mm	P.1099				
		5GT	5.0mm	P.1101				
		8YU	8.0mm	P.1103				
Light Load Conveyance, Regular Torque	Trapezoidal toothed timing pulleys suitable for conveyance. Also usable for transmission.	T5	5.0mm	P.1131	P.1151-1152	-	P.1169	
		T10	10.0mm	P.1133	P.1153-1154			
Heavy Load Conveyance	Timing belts suitable for heavy load conveyance. Possesses 1.3 times larger allowable tension than T type.	AT5	5.0mm	P.1135	-	-	P.1169	
		AT10	10.0mm	P.1135				

Significantly reduced backlash timing pulley is available for S8M (**P.1123**). Special timing belts are not required.

■Timing Belts

MISUMI offers many kinds of timing belts for the customers.
Conventional Timing Belts for Transmission, Timing Belts with Attachments for Conveyance, Tooth Count Configurable Long Timing Belts, and Open End Belts are available. The GT series suitable for high accuracy positioning is newly added to the product lineup.

[Timing Belts Types] **Printed in Red: Additional Specification**

Usage	Type of Belt	Pitch	Timing Belts: Timing Belts		With attachment Timing Belts	Long Timing Belts No. of Teeth Configurable Type	Long Timing Belts No. of Teeth Configurable, Cloth Type	Open End Belts	
									
			General purpose timing belts for transmission.		Belts with attachments for conveyors.	Number of teeth specifiable type. Can be specified up to 10m.	Timing belts with low friction cloth. Most suitable for accumulation conveyance and noise reduction.	Most suitable for reciprocal motion. Various metal joints are available.	
			Rubber	Polyurethane	Polyurethane (for joint process)	Polyurethane (for joint process)	Polyurethane (for joint process)	Rubber	Polyurethane
Regular Torque	MXL	2.032mm (2/25inch)	P.1177	P.1177	-	-	-	-	-
	XL	5.08mm (1/5inch)						P.1188	P.1188
	L	9.525mm (3/8inch)				P.1187	P.1187		
	H	12.7mm (1/2inch)		-					
High Torque	S2M	2.0mm	P.1179	P.1179	-	-	-	-	-
	S3M	3.0mm				P.1187		P.1188	P.1188
	S5M	5.0mm		-					
	S8M	8.0mm				-		P.1188	
	S14M	14.0mm						-	-
	P2M	2.0mm	P.1181	-	-	-	-	-	-
	P3M	3.0mm						P.1188	
	P5M	5.0mm							
	P8M	8.0mm							
High Accuracy Positioning	2GT	2.0mm	P.1173	-	-	-	-	-	-
	3GT	3.0mm							
	EV5GT	5.0mm	P.1175						
	EV8YU	8.0mm							
	MA3	3.0mm	-						
	MA5	5.0mm							
	MA8	8.0mm							
Super High Torque	MTS8M	8.0mm	P.1183	-	-	-	-	-	-
	UP5M	5.0mm							
	UP8M	8.0mm							
Light Load Conveyance, Regular Torque	T5	5.0mm	-	P.1184	P.1185	P.1187	P.1187	-	P.1188
	T10	10.0mm							
Heavy Load Conveyance	AT5	5.0mm	-	-	-		-		
	AT10	10.0mm							

MTS8M belts are applicable to S8M timing pulleys and idlers. UP5M, UP8M belts are compatible with S5M, S8M timing pulleys and idlers.
EV5GT belts are applicable to 5GT and EV8YU belts are applicable to 8YU timing pulleys and idlers.
Pulleys compatible with MA_ belts are available on our website.

For Design Data, refer to **P.3513**

■Cautions

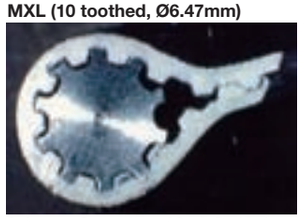
- Do not bend belts too hard.
- When core wire is steel cord, avoid giving tension from the backside.
- Avoid using and storing the products in an environment of extremely high or low temperature (beyond the operating temperature) and humid.
- Avoid direct contact with water, solvent, oil, acid, alkali, ultra-violet light, ozone, etc. If the belt swells its service life will be considerably shortened.
- Make sure to shut down the machine and confirm the complete stop of its behavior before starting installation or maintenance check.
- Timing pulleys and belts (MXL, XL, L, H) for general use are compliant with JIS and ISO Standards.
  Timing Pulleys: JIS B 1856 (ISO5294)
  Timing Belts: JIS K6372 (ISO5296-1), JIS-K6373(ISO5296-2)
- S Type (S_M) timing pulleys and belts are compatible with S_M Type from Mitsuboshi Belting Ltd. as well as Bando Chemical Industries Ltd.
- MTS Type (MTS8M) belts are compatible with MTS8M from Mitsuboshi Belting Ltd.
- P Type (P_M) timing pulleys and belts are compatible with P_M Type from Tsubakimoto Chain Co.
- UP Type (UP_M) timing belts are compatible with UP_M-HC Type from Tsubakimoto Chain Co.
- MA Type timing pulleys are compatible with MA_ Type from NOK Corporation.
- GT Type (_GT) and EV Type (EV5GT, EV8YU) timing pulleys and belts are compatible with _GT, EV5GT, EV8YU Types from Gates Unitta Asia Company.

■Features of GT Belts

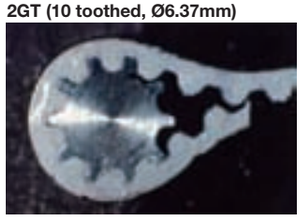
- The tooth engagements occur based on involute motion that closely assimilates the profiles of both teeth, thus minimizing backlash and making the scheme suitable for high accuracy positioning applications.

*Backlash means the clearances between the belt tooth surface and the pulley tooth surface when engaged.

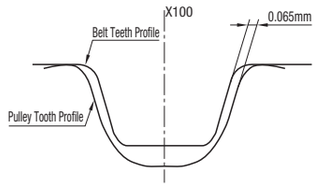
MXL (10 toothed, Ø6.47mm)



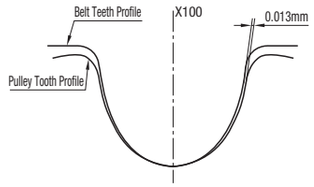
2GT (10 toothed, Ø6.37mm)



Reference: Comparison of Static Backlashes



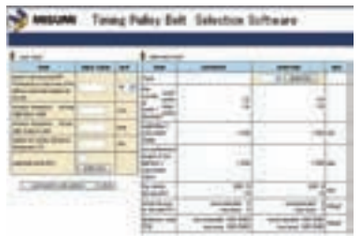
Static backlash between the MXL Type belt and the pulley (No. of Pulley Teeth: 20)



Static backlash between the 2GT Type belt and the pulley (No. of Pulley Teeth: 20)

For the durability and tooth jumping torque performance, see refer to **P.1098**

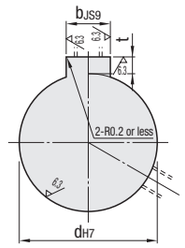
■Automatic Selection Tool for Timing Pulleys and Belts



Easy selection of pulley and belt by inputting power and revolution frequency.
Selection outcome is shown as a Part Number and can be ordered directly online.

http://fawos.misumi.jp/FA_WEB/pulley_us/

■Metric Keyway Dimension



N: New JIS (B1301) Keyway Dimensions

Nominal	dH7		bJS9		t Tolerance	
N 8	8	+0.015 0	3	±0.0125	1.4	+0.1 0
N10	10					
NK10	10		4	±0.0150	1.8	
N11	11	+0.018 0				
N12	12					
N13	13		5		2.3	
N14	14					
N15	15					
N16	16		6		2.8	
N17	17					
N18	18					
N19	19	+0.021 0	8	±0.0180	3.3	+0.2 0
N20	20					
N21	21					
N22	22					
N23	23					
N24	24					
N25	25					
N26	26					
N27	27					
N28	28					
N29	29					
N30	30					
N31	31	+0.025 0	10			
N32	32					
N33	33					
N34	34					
N35	35					
N36	36					
N37	37					
N38	38					

Nominal	dH7		bJS9		t Tolerance	
N39	39	+0.025 0	12	±0.0215	3.3	+0.2 0
N40	40					
N41	41					
N42	42					
N43	43					
N44	44					
N45	45		14		3.8	
N46	46					
N47	47					
N48	48					
N49	49					
N50	50					
N55	55	+0.030 0	16		4.3	
N60	60					
N61	61		18		4.4	
N62	62					
N63	63					
N64	64					
N65	65					
N66	66					
N67	67					
N68	68		20	±0.0260	4.9	
N69	69					
N70	70					

C: Old JIS Keyway Dimension

dH7 Shaft bore diameters and codes	bF7		t Tolerance	
C10	4	+0.022 +0.010	1.5	+0.1 0
C12				
C15	5		2	
C16				
C18				
C19				
C20				
C30	7	+0.028 +0.013	3	
C33				
C34				
C35	10		3.5	
C36				
C37				
C38				
C39				
C40				
C41	12	+0.034 +0.016	5	
C42				
C43				
C44				
C45				
C50				
C55	15			
C60				
C61	18		6	
C62				
C63				
C64				
C65				
C66				
C67				
C68				
C69				
C70				

■Inch Key Groove Dimension

Keyed Bore (ANSI B17.1–1989)

d	b			t			Applicable Square Key Size*
	Width	Tolerance		Height	Tolerance		
0.31	3/32	0.094	0.096	0.352	0.352	0.362	3/32
0.38	3/32	0.094	0.096	0.416	0.416	0.426	3/32
0.50	1/8	0.125	0.127	0.560	0.560	0.570	1/8
0.63	3/16	0.188	0.190	0.709	0.709	0.719	3/16
0.75	3/16	0.188	0.190	0.837	0.837	0.847	3/16
0.88	3/16	0.188	0.190	0.964	0.964	0.974	3/16
1.00	1/4	0.250	0.252	1.114	1.114	1.124	1/4
1.25	1/4	0.250	0.252	1.367	1.367	1.377	1/4
1.38	5/16	0.313	0.315	1.518	1.518	1.528	5/16
1.50	3/8	0.375	0.377	1.669	1.669	1.679	3/8
1.63	3/8	0.375	0.377	1.796	1.796	1.806	3/8
1.75	3/8	0.375	0.377	1.922	1.922	1.932	3/8
1.88	1/2	0.500	0.502	2.096	2.096	2.106	1/2
2.00	1/2	0.500	0.502	2.223	2.223	2.233	1/2

*ANSI B17.1–1989