# Timing Pulleys and Belts - Overview ②

■ 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)

Belt Tooth Profile
Pulley Tooth Profile
X100 0.065mm
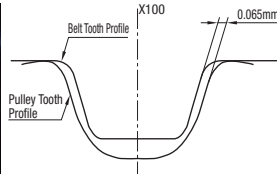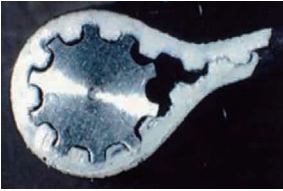
Static Backlash between the MXL Type Belt and the Pulley (Number of Pulley Teeth: 20)

2GT (10 Toothed, Ø6.37mm)

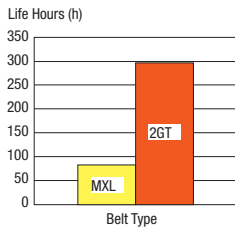Belt Tooth Profile
Pulley Tooth Profile
X100 0.013mm
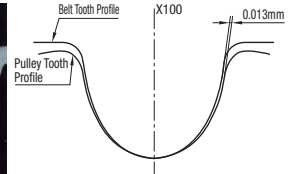
Static Backlash between the 2GT Type Belt and the Pulley (Number of Pulley Teeth: 20)

## ■ Performance Comparison between MXL and 2GT Belts

Reference①: Durability

<Performance Conditions>
Number of belt teeth: 126
Belt Width: 9.5mm
Number of Pulley Teeth: 12 (2GT)
: 14 (MXL)
Speed: 7,900rpm
Load Torque: 24.3Nm

Life Hours (h) — Belt Type (MXL, 2GT)

Reference②: Jumping Torque Capability

<Performance Conditions>
Number of belt teeth: 126
Belt Width: 4.8mm
Number of Pulley Teeth: 20 (2GT)
: 20 (MXL)
Speed: 1,130rpm
Tooth Height
MXL: 0.51mm   2GT: 0.75mm

*Jumping Torque represents the max. torque when a jumping occurs.

Jumping Torque (N·cm) — Initial Tension (N)
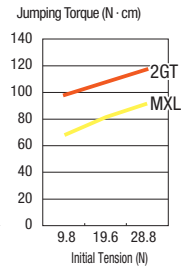
■ Features of Non-backlash Pulleys (S8M)

- Non-backlash pulley has reduced backlash compared to conventional type to work with high accuracy positioning mechanism.
- Backlash is significantly smaller than standard S8M pulleys. (The amount reduced depends on applications.)
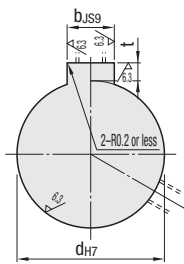- Use regular S8M timing belt.

Reference: Comparison of Deviation Angles between Non-Backlash Pulleys and Standard Pulleys

T: Load Torque N·m — Deviation Angle Index (Non-Backlash Pulley / Standard Pulley)
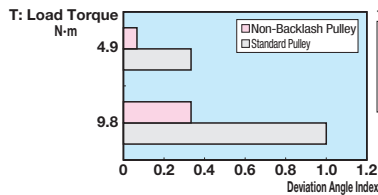
<Test Conditions>
Belt Type   : S8M
Belt Width   : 25mm
Pulley Size : 30 Toothed (P.D.76.39mm)
Tension Ti   : 382N

Ti: Tension, Deflection Deviation Angle, T: Load Torque, Fixed
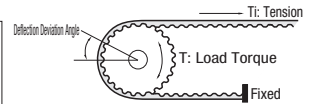
■ Keyway Dimensions

2–R0.2 or less

N: New JIS (B1301) Keyway Dimensions

Nominal	d$_{H7}$	b$_{JS9}$		t Tolerance		Nominal	d$_{H7}$	b$_{JS9}$		t Tolerance	
N 8	8	+0.015 / 0	3	±0.0125	1.4	N39	39		12		3.3
N10	10					N40	40				
NK10	10					N41	41				
N11	11		4		1.8	N42	42				
N12	12					N43	43	+0.025 / 0			
N13	13					N44	44				
N14	14	+0.018 / 0			2.3	N45	45			±0.0215	
N15	15		5			N46	46		14		3.8
N16	16			±0.0150		N47	47				
N17	17					N48	48				+0.2 / 0
N18	18					N49	49				
N19	19					N50	50				
N20	20		6		2.8	N55	55		16		4.3
N21	21					N60	60				
N22	22					N61	61				
N23	23	+0.021 / 0				N62	62		18		4.4
N24	24					N63	63	+0.030 / 0			
N25	25		8			N64	64				
N26	26					N65	65				
N27	27					N66	66				
N28	28					N67	67				
N29	29					N68	68		20	±0.0260	4.9
N30	30			±0.0180	3.3	N69	69				
N31	31				+0.2 / 0	N70	70				
N32	32										
N33	33										
N34	34	+0.025 / 0	10								
N35	35										
N36	36										
N37	37										
N38	38										

C: Old JIS Keyway Dimensions

DH7 Shaft Bore Dia. and Code	b$_{F7}$		t Tolerance	
C10	4	+0.022 / +0.010	1.5	
C12				
C15	5		2	
C16				
C18				
C19				
C20				
C30	7		3	
C33				
C34	10	+0.028 / +0.013		
C35				
C36				
C37				
C38				
C39			3.5	
C40				
C41	12			+0.1 / 0
C42				
C43				
C44				
C45				
C50				
C55	15	+0.034 / +0.016	5	
C60				
C61				
C62				
C63				
C64				
C65	18		6	
C66				
C67				
C68				
C69				
C70				