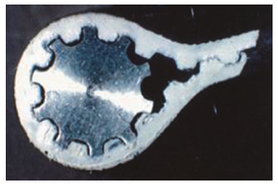
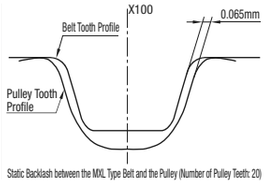
Timing Pulleys and Belts - Overview ②

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.

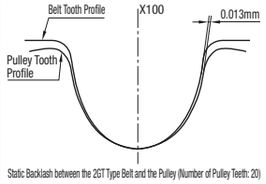
MXL (10 Toothed, Ø6.47mm)





Static Backlash between the MXL Type Belt and the Pulley (Number of Pulley Teeth: 20)

2GT (10 Toothed, Ø6.37mm)

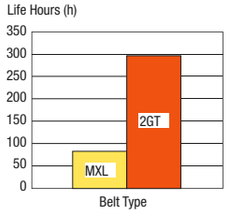


Static Backlash between the 2GT Type Belt and the Pulley (Number of Pulley Teeth: 20)

Performance Comparison between MXL and 2GT Belts

Reference①: Durability

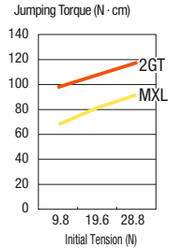
<Performance Conditions>
Number of belt teeth: 126
Belt Width: 9.5mm
Number of Pulley Teeth: 12 (2GT)
: 14 (MXL)
Speed: 7,900rpm
Load Torque: 24.3Nm



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

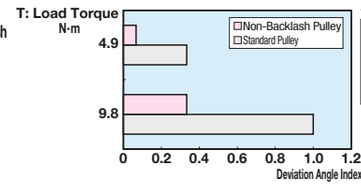
*Jumping Torque represents the max. torque when a jumping occurs.



Features of Non-backlash Pulleys (S8M)

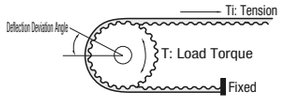
- Non-backlash pulley has reduced backlash compared to conventional type to work with high accuracy positioning mechanism.
- Backlash is significantly smaller than standard S8M pulleys. (The amount reduced depends on applications.)
- Use regular S8M timing belt.

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

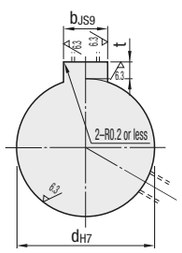


<Test Conditions>

Belt Type	:S8M
Belt Width	:25mm
Pulley Size	: 30 Toothed (P.D.76.39mm)
Tension Ti	:382N



Keyway Dimensions



N: New JIS (B1301) Keyway Dimensions

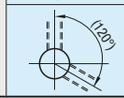
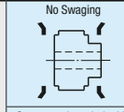
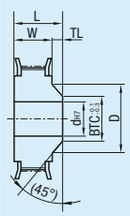
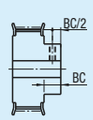
Nominal	dH7		bJS9		t Tolerance	
N 8	8	+0.015 0	3	±0.0125	1.4	+0.1 0
N10	10		4	±0.0150	1.8	
NK10	10					
N11	11					
N12	12					
N13	13	+0.018 0	5		2.3	
N14	14					
N15	15					
N16	16					
N17	17		6		2.8	
N18	18					
N19	19					
N20	20	+0.021 0	8	±0.0180	3.3	+0.2 0
N21	21					
N22	22					
N23	23					
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	±0.0260	4.3	
N60	60					
N61	61		18		4.4	
N62	62					
N63	63					
N64	64					
N65	65		20		4.9	
N66	66					
N67	67					
N68	68					
N69	69					
N70	70					

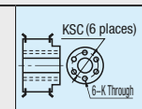
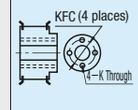
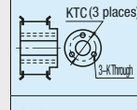
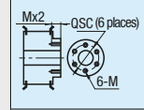
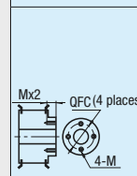
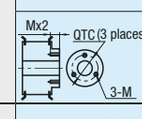
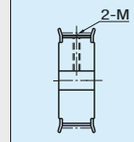
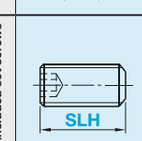
C: Old JIS Keyway Dimensions

DH7 Shaft Bore Dia. and Code	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	10		3.5	
C34				
C35				
C36				
C37				
C38				
C39				
C40				
C41	12	+0.034 +0.016		
C42				
C43				
C44				
C45				
C50	15		5	
C55				
C60				
C61	18		6	
C62				
C63				
C64				
C65				
C66				
C67				
C68				
C69				
C70				

For alterations for S14M Type, see the relevant product page (**P.1406**).

Alterations		Code	Spec. Description	Spec. Type-by-Type Condition Formula and Cautions	Ordering Code
Set Screw Angle		KC90	Changes an angle of set screw to 90.	For A-Shape pulley, the screw holes are set at around 90° to keep away from peaks.	KC90
		KC120	Changes angle layout of set screws to 120°.	For A-Shape pulley, the screw holes are set at around 120° to keep away from peaks. Not applicable to Shape K.	KC120
Flange Swaging	No Swaging 	NFC	Flange is not installed. (Flange 2 pcs. Included)	Not applicable to Shape K.	NFC
	Swages only on hub side 	RFC	Flange installed by swaging only on either hub side (RFC) or the opposite side (LFC) at the time of shipment. (Flange 1 pc. Included)	Not applicable to Shapes K and D.	RFC
	Swage only on side opposite to hub 	LFC	Flange installed by swaging only on either hub side (RFC) or the opposite side (LFC) at the time of shipment. (Flange 1 pc. Included)	Not applicable to Shapes K and D.	LFC
Flange Cut		FC	Lowers flange by cutting. FC≥(O. D.)+1 FC≤F-2 FC: 0.5mm Increment	No surface treatment is applied on flange circumference. Not available for Stainless Steel Type.	FC33
Adds taper for retaining bearing		BTC	Adds taper for retaining bearing inner ring. TL<L-W	Surface treatment may not be applied to shaft bores on the tapered area. Applicable to Shape A only. Applicable to Shaft Bore Specs. H and P only. Not available for □GT and □YU.	BTC4-TL1.5
Hub Shortening		BC	Cuts the hub length in 0.5mm increment. When the hub has no tapped hole: 3≤BC≤L-W (when specifying Shaft Bore Specs. H, V, F) When the hub has any tapped hole: M+3≤BC≤L-W (when specifying Shaft Bore Specs. P, N, C)	Applicable to Shape B only. Clear anodized products may not have surface treatment on machined hub surfaces. Not available for P2M, P3M	BC6.5

d (Shaft Bore Dia.)	BTC	TL 0.5mm Increment	Applicable Bearing
3	4	1.0–5.0	673ZZ, 693ZZ, 623ZZ
4	6		674ZZ, 694ZZ, 624ZZ
5	7		675ZZ, 695ZZ, 605ZZ, 625ZZ
6	8	1.0–8.0	676ZZ, 696ZZ, 606ZZ, 626ZZ
8	9		678ZZ
	10		6782ZZ, 6982ZZ, 6082ZZ, 6282ZZ
10	11	1.0–10.0	6700ZZ
	12		6800ZZ
	13		6900ZZ, 6000ZZ
	16	2.0–10.0	6200ZZ, 6300ZZ
12	14	1.0–10.0	6701ZZ, 6801ZZ
	15		6901ZZ, 6001ZZ
	17	2.0–10.0	6201ZZ, 6301ZZ
15	17		6702ZZ, 6802ZZ
	18		6902ZZ, 6002ZZ
	20		6202ZZ
	22		6302ZZ

Alterations		Code	Spec. Description	Spec. Type-by-Type Condition Formula and Cautions	Ordering Code
Side Hole Machining	KSC (6 places) 6-K Through 	KSC	Machines through hole on the side surface. Minimum Thickness: 2mm Shape A: d+K+4≤K□C≤E-(K+4) Shape B: d+K+4≤K□C≤D-(K+4) (Shape D: d+K+4≤K□C≤D-(K+4)) When the Shaft Bore Specs. is V, Z+K+4≤K□C≤D-(K+4) K□C : 1mm Increment Code K : 0.5mm Increment Select from K4.0–K13.0. For 2GT, select from K4.0–K8.0. Side through holes and tooth face tapped holes might interfere with each other. For details, see the relevant CAD data.	Applicable to Shaft Bore Specs. H and V only. Not available for P2M, P3M Not applicable to Shape K.	KSC20 -K5
	KFC (4 places) 4-K Through 	KFC		Specify KC90 when selecting KFC for Shaft Bore Specs. P, N and C. Not available for P2M, P3M Not applicable to Shape K. Not applicable to Shaft Bore Specs. F or Y.	KFC20 -K5
	KTC (3 places) 3-K Through 	KTC		Not available for P2M, P3M Not applicable to Shape K. Not applicable to Shaft Bore Specs. F or Y.	KTC20 -K5
	Mx2 QSC (6 places) 6-M 	QSC	Machines tapped hole on the side surface of hub side. Minimum Thickness: 2mm Shape A: d+M+4≤Q□C≤E-(M+4) Shape B: d+M+4≤Q□C≤D-(M+4) (Shape D: d+K+4≤K□C≤D-(K+4)) When the Shaft Bore Specs. is V, Z+K+4≤Q□C≤D-(K+4) Q□C : 1mm Increment MSelection : Select from M3, M4, M5, M6, M8. For P2M, P3M, select from M3, M4, M5. The pilot hole for tapping might go through, or side through holes and tooth face tapped holes might interfere with each other. For details, see the relevant CAD data.	Applicable to Shaft Bore Specs. H and V only. Not available for P2M, P3M Not applicable to Shape K. Combination with KC90 is not available.	QSC28 -M4
	Mx2 QFC (4 places) 4-M 	QFC		Specify KC90 when selecting QFC for Shaft Bore Specs. P, N and C. When QFC is selected for Shaft Bore Specs. P, N and C of P□M Type, KC120 is not available. Not applicable to Shape K. Not applicable to Shaft Bore Specs. F or Y.	QFC28 -M4
	Mx2 QTC (3 places) 3-M 	QTC		Not applicable to Shape K. Not applicable to Shaft Bore Specs. F or Y.	QTC28 -M4
Tapped Hole Dimensions	2-M 	TPC	Changes the tapped hole dimension.	Applicable to Shaft Bore Specs. P, N, C only. Not available for □GT, □YU, P2M, P3M Not applicable to MXL Type - Shape K.	TPC5
Changes the length of the included set screws	SLH 	SLH	Changes the length of the included set screws.	Applicable to Shaft Bore Specs. P, N, C only. Not available for □GT, □YU, P2M, P3M	SLH10

M	TPC
M3	M4
M4	M3, M5
M5	M4, M6
M6	M5, M8
M8	M6, M10
M10	M8

Set Screws	SLH
M3x3	6
M4x3	5, 8
M5x4	6, 10
M6x5	10
M8x6	10, 12
M10x8	12, 15

Timing Pulley Alteration - Overview