Keyless High Torque Timing Pulleys

S5M Type

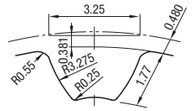
For High Torque Timing Belts, refer to **P.1436**, Open End Belts, refer to **P.1455**.

Keyless Timing Pulleys – S5M Type

Part Number			Material			Surface Treatment		
Belt Width 10 mm	Belt Width 15 mm	Belt Width 25 mm	Pulley	Flange	Bushing	Pulley	Flange	Bushing
A: 11 W: 16	A: 17 W: 22	A: 27 W: 32						
HTLA__S5M100	HTLA__S5M150	HTLA__S5M250	Ultra Duralumin-Based Aluminum Alloy	Aluminum Alloy	1045 Carbon Steel or Equivalent	Clear Anodize		—
HTLK__S5M100	HTLK__S5M150	HTLK__S5M250				Hard Clear Anodize*		—
HTLN__S5M100	HTLN__S5M150	HTLN__S5M250				Electroless Nickel Plating		—
HTPL__S5M100	HTPL__S5M150	HTPL__S5M250	1045 Carbon Steel or Equivalent	Low Carbon Steel	1045 Carbon Steel or Equivalent	Black Oxide		
HTLG__S5M100	HTLG__S5M150	HTLG__S5M250				Electroless Nickel Plating		

*Hard Anodize Treatment: Film Hardness 300 HV min.

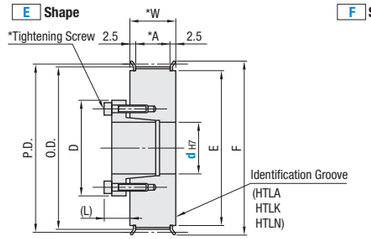
Standard Tooth Profile



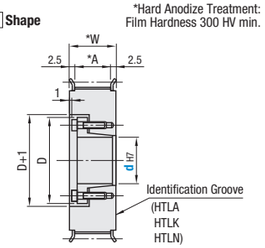
Tooth groove dimensions slightly change according to No. of teeth.
(Pitch: 5.0 mm)

- ! The shaft bore may not have surface treatment.
- ! Two types of bushings are available: Standard Type (ST Bushings) and Short Type (SH Bushings). Refer to **P.1388**.

Pulley Shape **E** Shape



F Shape



*For quantity and size of tightening screws with Flange attached, refer to **P.1388**.

Part Number			Pulley Shape	d_{H7} Range (Select Shaft Bore Dia. from Table 1)						P.D.	O.D.	F	E
				S5M100		S5M150		S5M250					
Type	Teeth	Type, Nominal Width		E Shape (ST Bushing)	F Shape (SH Bushing)	E Shape (ST Bushing)	F Shape (SH Bushing)	E Shape (ST Bushing)	F Shape (SH Bushing)				
	22			8	—	—	—	—	—	35.01	34.05	40	27
	24			8 10	8	10	8	10	8	38.20	37.24	45	30
	25			8 10	8	10	8	10	8	39.79	38.83		
	26			8 10-12	8	10–12	8 10-12	10 11 12	8 10-12	41.38	40.42	48	35
	28			8 10-12	8	10–12	8 10-12	10 11 12	8 10-12	44.56	43.60		
	30	S5M100		10-12 14 15		10-12 14 15	10–12	10-12 14 15	10–12	47.75	46.79	52	36
	32	*A: 11		10-12 14-17		10-12 14-17	10–12	10-12 14-17	10–12	50.93	49.97	55	40
HTLA	34	*W: 16		10-12 14-17		10-12 14-17	10–12	10-12 14-17	10-12 14-17	54.11	53.15	61	45
HTLK	36	S5M150	E	10-12 14-17		10-12 14-17	10–12	10-12 14-17	10-12 14-17	57.30	56.34		
HTLN	40	*A: 17		10-12 14-17		10-12 14-17	10–12	10-12 14-17	10–17	63.66	62.70	67	50
HTPL	44	*W: 22	F	12 14-20 22 24 25	—	12 14-20 22 24 25	12	12 14-20 22 24 25	12 14-20 22 24 25	70.03	69.07	74	58
HTLG	48	S5M250		12 14-20 22 24 25 28		12 14-20 22 24 25 28	12	12 14-20 22 24 25 28	12 14-20 22 24 25 28	76.39	75.43	83	63
	50	*A: 27		12 14-20 22 24 25 28 30 32		12 14-20 22 24 25 28 30 32	12	12 14-20 22 24 25 28 30 32	12 14-20 22 24 25 28 30 32	79.58	78.62	87	67
	60	*W: 32		12 14-20 22 24 25 28 30 32		12 14-20 22 24 25 28 30 32 35 38 40	12	12 14-20 22 24 25 28 30 32 35 38 40	12 14-20 22 24 25 28 30 32 35	95.49	94.53	99	80
	72			12 14-20 22 24 25 28 30 32		12 14-20 22 24 25 28 30 32 35 38 40 42	12	12 14-20 22 24 25 28 30 32 35 38 40 42	12 14-20 22 24 25 28 30 32 35	114.59	113.63	119	100

Table 1: Select Shaft Bore Diameter

d_{H7}	Max. Allowable Torque Nm		D		(L)
	ST Bushing	SH Bushing	ST Bushing	SH Bushing	
8	16	8.5	25.5	24.5	8.5
10	39	18	30	29	10.5
11	43	20	31	30	
12	48	23	32	31	
14	73	37	35	36	12
15	78	39	36	37	
16	83	42	37	38	13
17	88	45	38	39	
18	154	48	43	40	14
19	163	49	45	42	
20	171	97	46	46	
22	186	110	48	47	
24	206	121	50	49	
25	216	124	52	51	
28	353	141	54	53	15.5
30	382	149	57	56	
32	412	163	59	58	16.5
35	451	173	63	61	
38	686	—	70	—	19
40	725		71		
42	757		74		20

! Electroless nickel plated bushing decreases maximum allowable torque and allowable thrust load by 20–30%

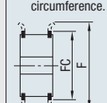
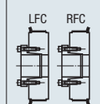
Part Number Example

Part Number	-	Pulley Shape	-	Shaft Bore Dia.
HTPL60S5M100	-	E	-	32

Part Number Alterations

Part Number	-	Pulley Shape	-	Shaft Bore Dia.	-	(BMC / BMR / FC / NFC / LFC / RFC)
HTLA44S5M150	-	F	-	12	-	FC72

! If alterations for HTLA / HTPL ("E" shape) are specified, 5th Day Shipping will be applied for this product.

Alterations	Flange Cut	Flange Not Swaged	Flange Swaged on One Side	Surface Treatment
Code	FC	NFC	RFC / LFC	BMC / BMR
Spec.	Lowers flange by cutting. FC: 0.5 mm Increment ! No surface treatment applied on flange circumference.  ! FC≥(O.D.)+2 ! FC≤F-2 **Ordering Code:** FC35	Flange is not Installed. (Flange included) 	Flange installed on the hub side (LFC) or the opposite side (RFC) only prior to shipping. 	Applies electroless nickel plating on a bushing. (Anti-rusting treatment applied to screws). ! Electroless nickel plated bushing decreases allowable torque by 20–30%. BMC: Non-RoHS-compliant (Screw: Dacrotized treatment applied 4137 Alloy Steel) BMR: RoHS-compliant (Screw: GeoMet coating applied 4137 Alloy Steel)

Teeth	Available Types											
	HTLA (x1.0) HTLK (x1.1) HTLN (x1.2)						HTPL (x1.0) HTLG (x1.1)					
	S5M100		S5M150		S5M250		S5M100		S5M150		S5M250	
	E Shape	F Shape	E Shape	F Shape	E Shape	F Shape	E Shape	F Shape	E Shape	F Shape	E Shape	F Shape
22	•	—	—	—	—	—	•	—	—	—	—	—
24	•	•	•	•	•	•	•	•	•	•	•	•
25	•	•	•	•	•	•	•	•	•	•	•	•
26	•	•	•	•	•	•	•	•	•	•	•	•
28	•	•	•	•	•	•	•	•	•	•	•	•
30	•		•	•	•	•	•		•	•	•	•
32	•		•	•	•	•	•		•	•	•	•
34	•		•	•	•	•	•		•	•	•	•
36	•		•	•	•	•	•		•	•	•	•
40	•	—	•	•	•	•	•	—	•	•	•	•
44	•		•	•	•	•	•		•	•	•	•
48	•		•	•	•	•	•		•	•	•	•
50	•		•	•	•	•	•		•	•	•	•
60	•		•	•	•	•	•		•	•	•	•
72	•		•	•	•	•	•		•	•	•	•

Keyless High Torque Timing Pulleys

S5M Type – Keyless Bushing with Centering Function

HHAA, Aluminum Bushing Incorporated Type, is approx. 45% lighter than 1045 Carbon Steel Bushing, and thus, is applicable for high speed rotation-based operations.

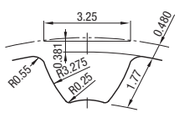
Keyless Timing Pulleys – S5M Type – Keyless Bushing with Centering Function

RoHS 10

Part Number			Material			Surface Treatment		
Belt Width 10 mm	Belt Width 15 mm	Belt Width 25 mm	Pulley	Flange	Bushing	Pulley	Flange	Bushing
A: 11 W: 16	A: 17 W: 22 Y: 14	A: 27 W: 32 Y: 14 (22, 23.5)						
HHAA__S5M100	HHAA__S5M150	HHAA__S5M250	2017 Aluminum Alloy	Aluminum Alloy	A2014	Clear Anodize		
HHTA__S5M100	HHTA__S5M150	HHTA__S5M250	Ultra Duralumin-Based Aluminum Alloy		1045 Carbon Steel or Equivalent	Clear Anodize		—
HHTK__S5M100	HHTK__S5M150	HHTK__S5M250				Hard Clear Anodize*		—
HHTN__S5M100	HHTN__S5M150	HHTN__S5M250				Electroless Nickel Plating		—
HHTT__S5M100	HHTT__S5M150	HHTT__S5M250	1045 Carbon Steel or Equivalent	Low Carbon Steel	1045 Carbon Steel or Equivalent	—		
HHTM__S5M100	HHTM__S5M150	HHTM__S5M250				Black Oxide		
HHTP__S5M100	HHTP__S5M150	HHTP__S5M250				Electroless Nickel Plating		

*Hard Anodize Treatment: Film Hardness 300 HV min.

Standard Tooth Profile



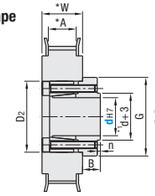
Tooth groove dimensions slightly change according to No. of teeth.
(Pitch: 5.0 mm)

- ! The shaft bore may not have surface treatment.

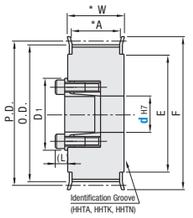
Pulley Shape

E Shape

HHAA

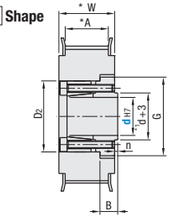


HHT_

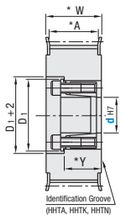


F Shape

HHAA



HHT_



*Hard Anodize Treatment: Film Hardness 300 HV min.

- ! Flange attached
- ! For installation, refer to **P.1452**, for details of Keyless Bushing refer to **P.1456**.
- ! Y dimensions in ( ) require the shaft bore diameter of 12 and above.

Part Number			Pulley Shape	d_{H7} Range (Select Shaft Bore Dia. from Table 1)				P.D.	O.D.	F	E
				HHAA		HHTA, HHTK, HHTN, HHTT, HHTM, HHTP					
				S5M100	S5M150	S5M100	S5M150	S5M250			
Type	Teeth	Type, Nom. Width		E Shape	F Shape	E Shape	E Shape	F Shape	E Shape	F Shape				
	20	S5M100		6		—	—	—	—	—	31.83	30.87	36	24
	22	*A: 11		8	—						35.01	34.05	40	27
	24	*W: 16		8 10		8	8	8	8	8	38.20	37.24	45	30
	25			8 10		8	8	8	8	8	39.79	38.83		
	26	S5M150		8 10	8 10	8 10	8 10	8 10	8 10	8 10	41.38	40.42	48	35
HHAA	28	*A: 17		8 10	8 10	8 10	8 10	8 10	8 10	8 10	44.56	43.60		
HHTA	30	*W: 22		10 12	10 12	10	10	10	10	10	47.75	46.79	52	36
HHTK	32	*Y: 14	E	10 12 14 15	10 12 14 15	10 12 14	10 12 14	10	10 12 14	10 12 14	50.93	49.97	55	40
HHTN	34	S5M250	F	10 12 14-16	10 12 14-16	10 12 14	10 12 14-16	10	10 12 14-16	10 12 14-16	54.11	53.15	61	45
HHTT	36	*A: 27		10 12 14-16	10 12 14-16	10 12 14	10 12 14-16	10	10 12 14-16	10 12 14-16	57.30	56.34		
HHTM	40	*W: 32		10 12 14-16	10 12 14-16	10 12 14	10 12 14-19	10	10 12 14-19	10 12 14-19	63.66	62.70	67	50
HHTP	44	*Y: 14		—	—	12 14	10 12-14 22		12 14-20 22	12 14-20 22	70.03	69.07	74	58
	48	(d12–22: Y=22)				12 14	10 12-14 22		12 14-20 22 24	12 14-20 22 24	76.39	75.43	83	63
	50	(d24–: Y=23.5)				12 14	10 12-14 22		12 14-20 22 24 25 28	12 14-20 22 24 25 28	79.58	78.62	87	67
	60					12 14	10 12-14 22		12 14-20 22 24 25 28 30	12 14-20 22 24 25 28 30	95.49	94.53	99	80
	72					12 14	10 12-14 22		12 14-20 22 24 25 28 30	12 14-20 22 24 25 28 30	114.59	113.63	119	100

! Select Shaft Bore Dia. from Table 1.

Table 1: Select Shaft Bore Diameter

d_{H7}	HHAA					HHTA HHTK HHTN HHTT HHTM	HHTP	D_1	(L)
	Max. Allowable Torque (N*m)	D_2	B	G	n	Max. Allowable Torque (N*m)			
6	4	17	4	20	0.5	—	—	—	—
8	6	19	5	22	0.5	19.6	16.6	23.5	6
10	8	21	5	24	0.5	27.5	19.6	25.5	
12	12	24	6	27	1.0	44.1	36.2	28.5	6.5
14	18	26	6	29	1.0	63.7	50.9	30.5	
15	25	28	7	31	1.2	80.4	54.8	31.5	
16	26	29	7	32	1.2	83.3	58.8	33.0	
17						92.2	76.4	33.5	
18						95.1	80.3	34.5	
19						98.1	85.2	35.5	
20						216	183	42	8
22						255	201	44	
24	—	—	—	—	—	363	252	46	
25						392	264	47	
28						441	295	50	8.5
30						500	396	52	
32						530	423	54	
35						883	548	62	10

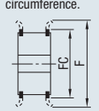
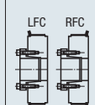
Teeth	Available Types								
	HHAA (x1.0)		HHTA (x1.0) HHTK (x1.1) HHTN (x1.2)			HHTT (x1.0) HHTM (x1.1) HHTP (x1.2)			
	S5M100	S5M150	S5M100	S5M150	S5M250	S5M100	S5M150	S5M250	
20	•		—	—	—	—	—	—	
22	•		—	—	—	—	—	—	
24	•	—	•	•	•	•	•	•	
25	•		•	•	•	•	•	•	
26	•	•	•	•	•	•	•	•	
28	•	•	•	•	•	•	•	•	
30	•	•	•	•	•	•	•	•	
32	•	•	•	•	•	•	•	•	
34	•	•	•	•	•	•	•	•	
36	•	•	•	•	•	•	•	•	
40	•	•	•	•	•	•	•	•	
44			•	•	•	•	•	•	
48			•	•	•	•	•	•	
50	—	—	•	•	•	•	•	•	
60			•	•	•	•	•	•	
72			•	•	•	•	•	•	

Part Number Example

Part Number	-	Pulley Shape	-	Shaft Bore Dia.
HHTA60S5M250	-	F	-	30

Part Number Alterations

Part Number	-	Pulley Shape	-	Shaft Bore Dia.	-	(BMC / BMR / FC / NFC / LFC / RFC)
HHTA60S5M250	-	E	-	25	-	BMC

Alterations	Flange Cut	Flange Not Swaged	Flange Swaged on One Side	Surface Treatment
Code	FC	NFC	RFC / LFC	BMC / BMR
Spec.	Lowers flange by cutting. FC: 0.5 mm Increment ! No surface treatment applied on flange circumference.  ! FC≥(O.D.)+2 ! FC≤F-2 **Ordering Code:** FC35	Flange is not Installed. (Flange included) 	Flange installed on the hub side (LFC) or the opposite side (RFC) only prior to shipping. 	Applies electroless nickel plating on a bushing. (Anti-rusting treatment applied to screws). ! Electroless nickel plated bushing decreases allowable torque by 20–30%. BMC: Non-RoHS-compliant (Screw: Dacrotized treatment applied 4137 Alloy Steel) BMR: RoHS-compliant (Screw: GeoMet coating applied 4137 Alloy Steel) ⊗ HHAA is not applicable.