扭力限制器

Torque Limiter

扭力限制器 Torque Limiter

防止设备损坏和杜绝停机浪费
Prevent Machine Damage and Eliminate Costly Down

◎ 扭力限制器是一种很好的过载保护装置,其功能是当突然负载、过载或停机引起扭矩超过预设值时,通过打滑来限制传动系统中的扭矩。当过载消除后,其能够自动回位,不用重新调试设定。沃孚限扭装置可以防止设备损坏和杜绝停机浪费。

◎ 扭力限制器是通过利用装在摩擦面上的弹簧来起作用,打滑扭矩可以通过调节螺母或螺栓来调节预设。

◎ 扭力限制器可以与其两个摩擦面间夹紧的中心元件: 链轮、齿轮、联轴器皮带轮或法兰盘配合使用。

◎ 扭力限制器的功能与最适宜的弹簧负荷和表面压力相一致结合, 保证了较长的打滑时间, 维持预定扭矩的回位, 提供长时间的持续保护。而与一次性补救的安全销系统相比, 最大的优势就在于此。

◎ Torque Limiter is a protective device that limits the torque transmitted in a drive system by slipping when the torque demand exceeds a preset value as a result of shock loads,overloads,or machine jams. It automatically reengages when the overload is removed. No resetting is required. Torque Limiters prevent machine damage and eliminate costly downtime.

◎ Torque Limiters utilize spring loaded friction surfaces for their operation and slip torque is preset by adjustment of the spring force using the adjustment nut or bolts.

◎ Torque Limiters can be used with a sprockets, gear, sheave, or flange plate as the center member clamped between two friction facings.

◎ Torque Limiter ratings are realistic and consistent with optimum spring loads and face pressures that permit longer slip time, maintain re-engagement at preset torque, and provide long lasting protection. This is an important advantage over the shear-pin mechanism that serves only as a one-shot remedy.

WFSC型钢球式扭矩限制联轴器

■ 结构特点:

WFSC型钢球式扭矩限制器能提供整个工作寿命期间无背隙地传递扭矩, 采用系列优化设计, 结构紧凑、调整方便。适用于需过载扭力控制及高动态的传动系统。其主要特点如下:

产 品 特 性	优　势	利　益
可靠的扭力调整设计	易安装、操作	初始操作节约时间
高效率	转动惯量低,结构紧凑	降低机械传动能损耗
无背隙扭矩传递	工作寿命长，磨损小	维护费用低
在驱动轴上过载的情况下,令人满意的扭矩路径	最优化尺寸	有效、高效的机械结构

WFSC型安全离合器以高精度、高动态和高安全性满足了现代电子驱动的要求，可以无背隙地传递扭矩。

■ 组成原理:

WFSC型钢球式扭矩限器制由外盖螺母、碟形弹簧、钢球、联接法兰、保持架等部件组成。本公司有标准型、带突出轮毂型、带钢制波纹管型、选配型和特殊型供选择。

WFSC钢球式扭矩限制器可在保证机械和设备利用率最高的同时,提供有经济效益的保护和可靠的运转。

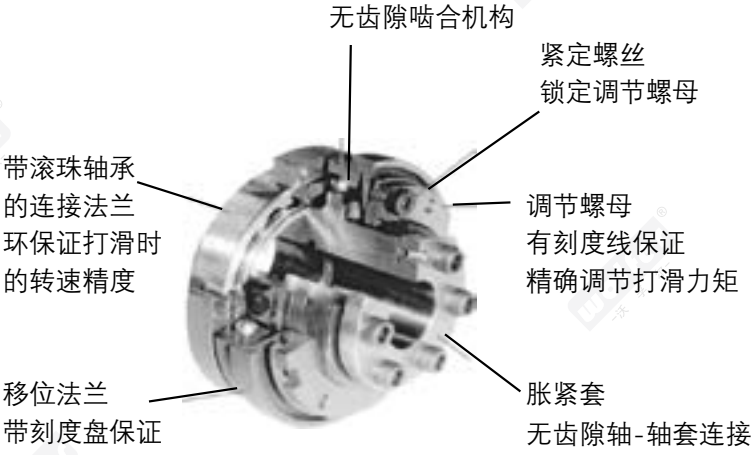
当设备驱动机械过载或传递力矩超过设定的打滑力矩时,钢球离开支承法兰的凹槽,离合器脱开,使主动端部件和从动端部件之间打滑,此时传递的力矩降低到很小,同时发讯环产生轴向位移,触动传感器的限位开关,使传感器的线路接通并输出信号,随之可用输出信号来控制操作或切断动力源,设备停止转动,起到保护设备的作用。

过载消除后,钢球在保持架旋转中转动一个角度,在下一个凹槽中自动复位,这样主动端和从动端部件在相互旋转一个角度后恢复正常转动。

■ 标记说明:

WFSC - XX X X - XX

- 孔径Φ (mm)
- 孔型 (锥套T、键槽ABC)
- 型号 (低L、中M、高H)
- 规格 (01、02、03……)
- 代号: 沃孚安全离合器



注:1、键槽型式参照GB/T3852规定。
2、型号规格见参数表。

标记示例:
扭矩为120N·m (查参数表为中扭矩M),
04锥套型, 孔径φ35mm的沃孚安全离合器。
标记为: WFSC-04MT-35

扭力限制器
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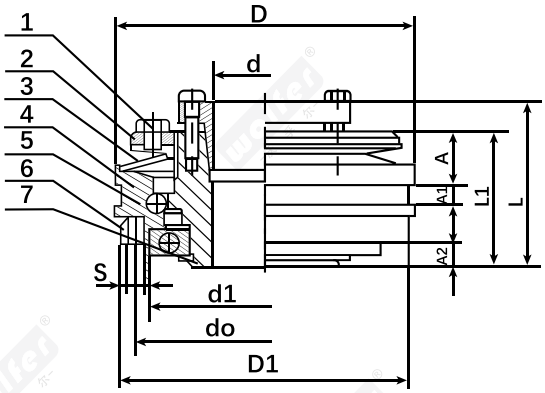
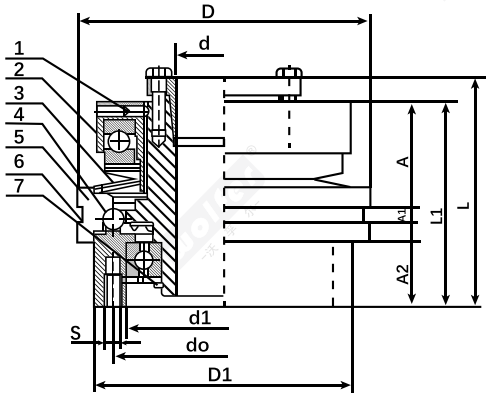


型号WFSC01~05



型号WFSC06~08

1—止动螺栓(螺钉)　2—外盖螺母　3-蝶形弹簧　4-发讯环　5-钢球　6—联接法兰　7-保持架

■ WFSC型　　主要尺寸和参数

● WFSC型　　参数表

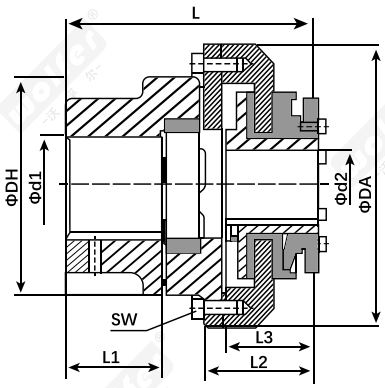
规格	过载限制扭矩N·m			最大转速 rpm	过载发生止推位移mm	转动惯量		锁紧螺栓Φd及拧紧扭矩		重量 kg
	L型	M型	H型			转毂端 kgm^2	法兰端 kgm^2	mm	Nm	
01	4-10	8-20	12-30	4000	1.2	0.00019	0.00006	4×M4	3	0.55
02	8-20	15-40	23-60	4000	1.5	0.00047	0.00018	6×M4	3	0.94
03	15-36	30-72	45-108	3000	1.8	0.00120	0.00039	6×M5	5	1.63
04	30-75	60-150	90-225	2500	2.0	0.00273	0.00077	6×M6	9.5	3.03
05	60-150	120-300	180-450	2000	2.2	0.00620	0.00173	8×M6	9.5	3.95
06	75-150	150-300	300-600	400	2.5	0.03211	0.01548	8×M8	20	10.3
07	150-300	300-600	600-1200	400	2.8	0.05325	0.03732	8×M10	40	17
08	300-600	600-1200	1200-2400	400	2.8	0.05325	0.03732	8×M10	40	21

● WFSC型　　主要尺寸（单位：mm）

规格	d	D	D_1	d_I	d_0	L	L_1	A	A_1	A_2	S
01	9-16	65	60	47	53	41	33	–	–	–	6×M4
02	12-20	80	77	62	69	49	41	14.9	7.5	8	6×M5
03	15-25	95	90	68	80	56	47	17	7.5	10	6×M6
04	22-35	110	106	80	90	64	52	20	8	10	6×M6
05	32-45	130	125	100	112	72	59	23.5	9	10	6×M8
06	35-55	166	146	110	125	131	118	60	9	37.5	6×M10
07	42-65	196	176	130	155	147.5	130	64	9	42	6×M12
08	50-75	220	186	145	160	160	140	66	9	44	6×M12

扭力限制器
Torque Limiter

CTX型弹性安全联轴器 CTX Torque Limiter

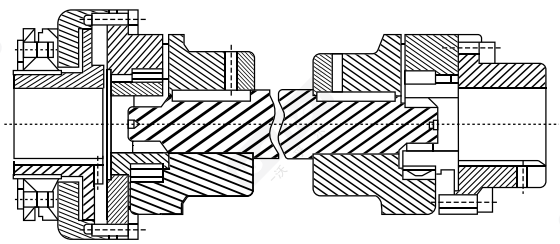


轴与轴连接
扭向弹性力矩限制器
轴向插入,安装方便
能补偿安装偏差
具有缓冲、减振效果
可装在设备上调节打滑力矩
成品孔径差按照ISO标准为H7,键槽宽公差按照标准为JS9

- ◆ shafts connected to each other
- ◆ lateral insertion,easy installation
- ◆ compensating for installation deviation
- ◆ cushion protection
- ◆ installing on the device for adjusting the impact force of slip
- ◆ The finished hole diameter tolerance for H7 according to the ISO, the keyway width tolerance for JS9 according to the standard

CTX型弹性安全联轴器尺寸表

型号	扭矩范围 (Nm)	最高转速 rpm	d1	d2	DA	DH	L	L1	L2	L3	SW
CTX200-101	2.9-9.8	3000	6-19	8-14	70	40	77	25	36	29	6-M4
CTX200-201	6.9-20										
CTX250-102	6.9-27	3000	8-24	10-22	87	55	106	30	58	48	6-M5
CTX250-202	14-54										
CTX350-103	20-74	3000	10-28	17-25	118	65	129	35	74	62	6-M6
CTX350-203	34-149										
CTX500-105	47-210	3000	14-42	20-42	158	95	166	50	90	76	8-M8
CTX500-205	88-420										
CTX700-108	116-569	1900	22-65	30-64	216	135	225	75	115	98	8-M10
CTX700-208	223-1080										



带中间轴联轴器
适合较大的轴间距离
可和钢膜片联轴器组装

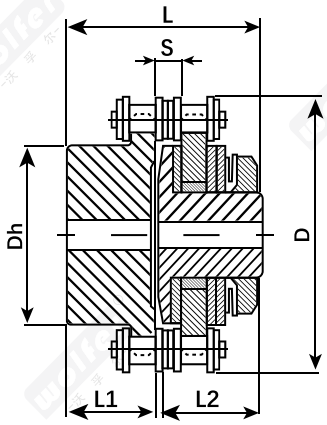
- ◆coupling with intermediate shaft
- ◆suitable for large distance between shafts
- ◆assembling diaphragm couplings

扭力限制器
Torque Limiter

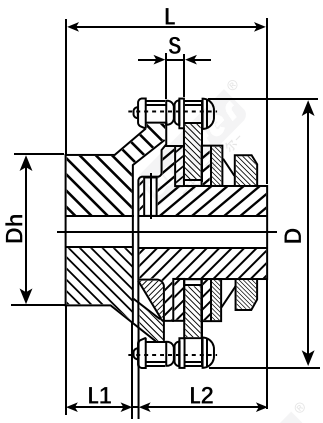
CTL链轮摩擦式安全联轴器 (CTL TORQUE LIMITER)

链轮摩擦式安全联轴器(扭力限制型联轴器),具超载后打滑之保护作用,同时也实现了轴--轴传动的可能。

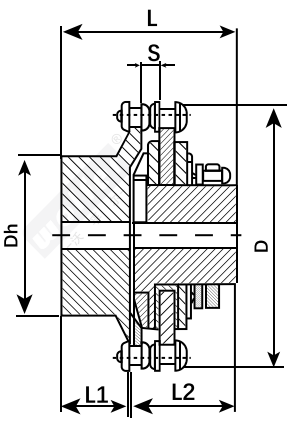
Torque limiter coupling can protect machine spontaneously after work overload of motor.It also realizes connection between shaft and shaft.



CTL200-C



CTL250-C, CTL350-C



CTL500-C, CTL700-C

链轮摩擦式安全联轴器尺寸表

型号	扭矩范围	最高转速	成型孔径		最大孔径		链轮	D	Dh	L	L1	L2	S	重量(KG)
			链轮	CTL	链轮	CTL								
CTL200-1C	2.9-9.8	1200	8	7	31	14	RS40-16T	76	50	55	24	29	7.5	1
CTL200-2C	6.9-20													
CTL250-1C	6.9-27	1000	13	10	38	22	RS40-22T	102	56	76	25	48	7.4	1.9
CTL250-2C	14-54													
CTL350-1C	20-74	800	13	17	45	25	RS50-24T	137	72	103	37	62	9.7	4.2
CTL350-2C	34-149													
CTL500-1C	47-210	500	18	20	65	42	RS60-28T	188	105	120	40	76	11.6	10
CTL500-2C	88-420													
CTL700-1C	116-569	400	23	30	90	64	RS80-28T	251	150	168	66	98	15.3	26
CTL700-2C	223-1080													

可和钢膜片联轴器组装；可适应较高的工作温度（可达280℃）；有不同长度的中间体适用不同的轴间距

- ◆ assembling the diaphragm coupling
- ◆ adapting to the high working temperature(reach 280 degrees)
- ◆ intermediates of different length for different shaft spacing

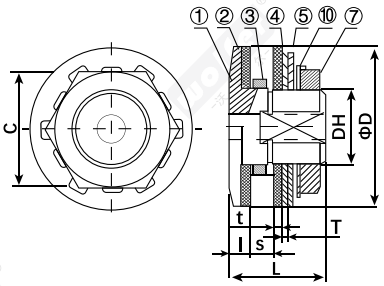
扭力限制器
Torque Limiter

RTL摩擦片式扭矩限制器 RTL Torque Limiter

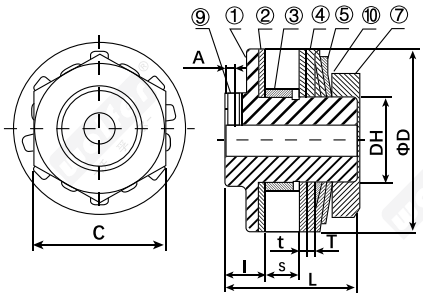
RTL50-1 RTL50-2
◎ 单螺母调节
◎ 止退垫片,防止螺母松动
◎ Single Nut Adjustment
◎ Lock Washer to prevent the nut from

RTL65-1 RTL65-2
RTL89-1 RTL89-2
◎ 单螺母调节
◎ 止退垫片,防止螺母松动
◎ Single Nut Adjustment
◎ Lock Washer to prevent the nut from loosening

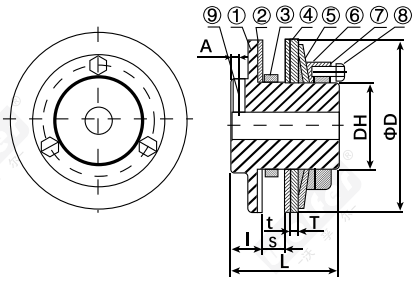
RTL127-1 RTL127-2
RTL178-1 RTL178-2
◎ 3个螺栓调节
◎ 3个螺栓设定扭矩,调节螺母固定导向压板
◎ Three Bolts Adjustment
◎ Torque preset by the three bolts (an adjustment nut to fix a pilot plate in place)



RTL50



RTL65 RTL89



RTL127 RTL178

零件名称：

①Hub主体
②Friction Facing摩擦片
③Bushing衬环
④Pressure Plate压板
⑤Disc Spring碟型弹簧
⑥Pilot Plate导向压板
⑦Adjustment Nut调节螺母
⑧Adjustment Bolt调节螺栓
⑨Set Screw锁紧螺钉
⑩Lock Washer止退垫片

Name of parts:

①Hub
②Friction Facing
③Bushing
④Pressure Plate
⑤Disc Spring
⑥Pilot Plate
⑦Adjustment Nut
⑧Adjustment Bolt
⑨Set Screw
⑩Lock Washer

扭力限制器
Torque Limiter

RTL摩擦片式扭矩限制器 RTL Torque Limiter

RTL50至RTL178的尺寸表 Dimensions and Capacity for RTL50 to RTL178

规格	扭矩范围 (N·m)	内孔	最大孔径	衬环长度	衬环外径		中心元件配合孔径		D	DH	L	l	T	t	S (Max)	A	c	调节螺母	调节螺栓	锁紧螺钉	重量 (Kg)
Size	Torque Range	plain Bore	Max. Bore	Bush Length	OD.of Bush		Bore for Center Member		D	DH	L	l	T	t	s	A	c	Adjust Nut	Adjust Bolt	Set Screw	weight
RTL50-1	2.94~9.80	8	15	3.8 4.5 6.0	30	-0.020 -0.041	30	+0.033 0	50	M24	29	6.5	1.6	2.5	7	-	36	M24 P1.0	-	-	0.248
RTL50-2	6.86~19.60																				0.256
RTL65-1	6.86~27.44	10	22	4.5 6.0 8.0	41	-0.025 -0.050	41	+0.039 0	65	M35	48	16.0	4.0	3.2	9	4.0	50	M35 P1.5	-	M5	0.721
RTL65-2	13.72~53.90																				0.739
RTL89-1	19.60~74.48	17	28	6.0 8.0 9.5 14.5	49	-0.025 -0.050	49	+0.039 0	89	M42	62	19.0	4.0	3.2	16	5.0	65	M42 P1.5	-	M6	2.417
RTL89-2	34.30~148.96																				2.477
RTL127-1	46.08~209.72	20	45	6.0 8.0 8.5 9.5 14.5	74	-0.030 -0.060	74	+0.046 0	127	M65	76	22.0	6.0	3.2	16	6.0	-	M65 P1.5	M8 P1.0 3PCS	M8	3.692
RTL127-2	88.20~420.42																				3.858
RTL178-1	115.64~569.38	30	65	8.0 9.5 12.0 14.5 17.0 22.0	105	-0.036 -0.071	105	+0.054 0	178	M95	98	24.0	7.0	3.2	29	6.5	-	M95 P1.5	M10 P1.0 3PCS	M10	9.033
RTL178-2	223.44~1087.80																				9.436

选型 Selection

◎ 依据负载条件或设备本身的力的大小来决定所需打滑扭矩。如果设备负载条件不清楚,请将打滑扭矩设为马达产生在承载限扭装置的轴上扭矩的1.5~2倍。
◎ 选用限扭装置时,应选择有足够大的扭矩范围和孔径范围。
◎ 根据两个摩擦片中间夹的中心元件的厚度来决定选择最合适的衬环宽度。
◎ Determine the required slip torque from the loading conditions or from the design strength of the machine. If the loading conditions of the machine are unknown,set the required slip torque of the torque limiter to 1.5~2 times the torque that the motor produces on the shaft where the torque limiter is mounted.
◎ Select a torque limiter that has enough torque range and bore range.
◎ Determine the proper bushing length from the thickness of the center member to be inserted between the friction facings. Always choose the largest bushing which does not exceed the width of the center member is shown as "S max."in the dimension table.

中心元件 Center Member

◎ 中心元件的摩擦表面应加工,以保证额定转矩,以及平面度、平行度、与孔一致和防锈、防油污。推荐表面粗糙度为Ra1.6。如果中心元件不能满足以上技术要求,打滑扭矩将不稳定。
◎ 请按下表来加工中心元件的孔,和选择最小链轮齿数和衬环宽度。
◎ The center member should be machined on its rubbing surface to obtain the rated torque and be flat, parallel, square with bore, and free from rust, scale, and oil. Surface finish recommended is Ra1.6. If the center member is not in accordance with these specifications, the slip torque will be erratic.
◎ Bore of the center member to be machined is shown in the table below. Also, min. numbers of sprockets teeth to be used and bushing length to be chosen are listed

扭力限制器
Torque Limiter

最小链轮齿数和衬环宽度 Minimum Sprocket Teeth and Bushing Length

链轮节距和齿数 Sprocket Pitch and Number of Teeth															
中心元件		9.525-06B		12.7-08B		15.875-10B		19.05-12B		25.4-16B		31.75-20B		38.1-24B	
规格	孔径 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)	链轮最小齿数	衬环宽度 (mm)
Size	Bore of Center Member (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)	Sprocket MinTeeth	Bush Length (mm)
RTL50	30	20	3.8	16	6	-	-	-	-	-	-	-	-	-	-
RTL65	41	-	-	20	6	17	8	-	-	-	-	-	-	-	-
RTL89	49	-	-	26	6	21	8	18	9.5	15	14.5	-	-	-	-
RTL127	74	-	-	35	6	29	8	25	9.5	19	14.5	-	-	-	-
RTL178	105	-	-	-	-	39	8	33	9.5	26	14.5	21	17	18	22

扭矩的设定 Torque Setting

◎ 限扭装置扭矩的设定是依靠上紧和松开调节螺栓和/或调节螺母来实现的。针对RTL50到RTL89,依靠调节螺母;针对RTL127和RTL178, 依靠调节螺栓。

◎ 扭矩的设定可以在将限扭装置安装在轴上后进行,过程是:

◎ RTL50到RTL89的规格,
首先,用手旋转上紧调节螺母,以至固定碟型弹簧和压板; 然后,试着用扳手将螺母上紧,约60度。

◎ RTL127到RTL178的规格
首先,旋转螺母,固定碟型弹簧和压板,再上紧每一个调节螺栓,约60度。
然后,如果限扭装置在正常负载条件下能够打滑,请逐渐上紧螺母(RTL50到RTL89)或螺栓(RTL127到RTL178),直到限扭装置停止打滑。请务必保证均匀上紧(或松开)每个螺栓。
通过这样的几次测试,来找到适合设备的扭矩设定。下表显示有效旋转角度和扭矩设定的关系,供参考。

为了精确扭矩设定,推荐试运行一次限扭装置,比如,在当转速50~60rpm, 500转时,旋转调节螺母或螺栓45度。

扭力限制器
Torque Limiter

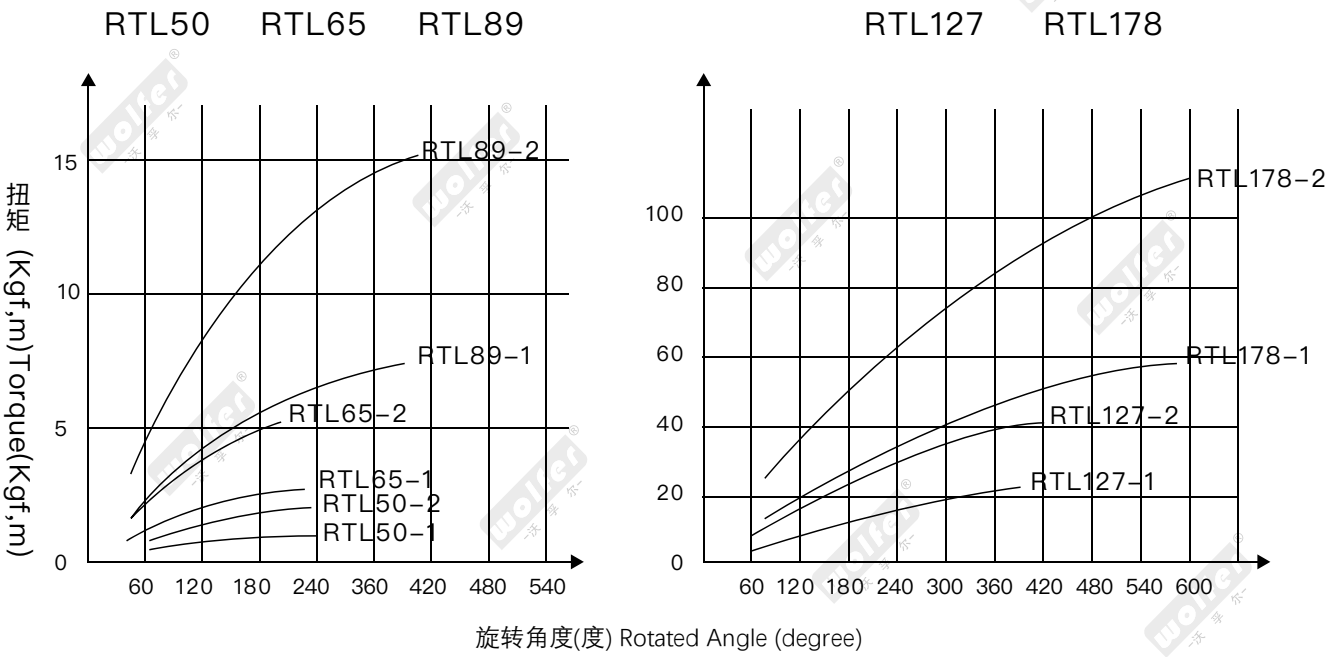
RTL (Torque Limiter)

◎Torque setting of th torque limiter is achieved by tightening or loosening the adjustment bolts and/or the adjustment nut. For torque adjustment of RTL50 through RTL89, an adjustment nut is provided, and for RTL127 through RTL178,adjustment bolts are provided. The torque setting can be made after mounting the torque limiter on the shaft. The process is:

◎ For RTL50 through RTL89,
First, rotate the adjustment nut tightly by hand so that the disk spring fits the plate.Then tentatively tighten the nut by about 60 degrees with a wrench.

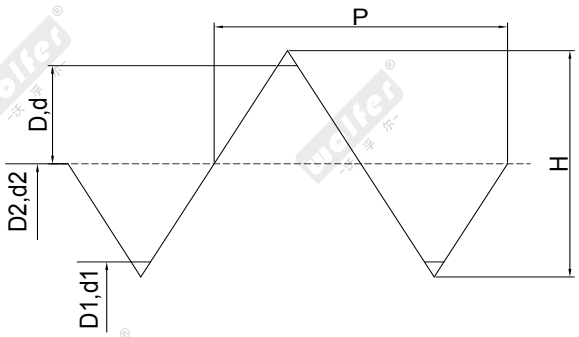
◎ For RTL127 through RTL178,
First, rotate the nut for fixing the disk spring to the plate, and then tighten each adjustment bolt by about 60 degrees. Then, if the torque limiter slips under normal loading conditions,tighten the nut (for RTL50~RTL89) or the bolts (for RTL127~RTL178) gradually until the torque limiter stops slipping. Always tighten (or loosen) the bolts equally. Try this adjustment several times to find the proper torque setting for the machine. For your guidance, thebelow chart shows the relation between the effective rotated angle and preset torque.For precise torque setting, run-in of the torque limiter is recommended, for example, 500 revolution at 50~ 60 rpm with a rotated angle of 45 degrees of the adjustment nut or the bolts.

旋转角度和扭矩设定
Rotated Angle and Setting Torque



普通螺纹 / 内螺纹直径表
Ordinary Thread/Internal Thread Diameter Table

普通螺纹 内螺纹直径



旋合精度:中等;旋合长度:普通;公差带:6H
基准尺寸

公称直径=外螺纹外径	螺距	内螺纹直径		
d	p	基准值D1	最大	最小
M1.6	0.35	1.221	1.321	1.221
(M1.8)	0.35	1.421	1.521	1.421
M2	0.40	1.567	1.679	1.567
(M2.2)	0.45	1.713	1.838	1.713
(M2.5)	0.45	2.013	2.138	2.013
M3	0.50	2.459	2.599	2.459
(M3.5)	0.60	2.851	3.011	2.850
M4	0.70	3.242	3.422	3.242
(M4.5)	0.75	3.688	3.878	3.688
M5	0.80	4.134	4.334	4.134
M6	1.00	4.918	5.154	4.917
(M7)	1.00	5.918	6.154	5.917
M8	1.25	6.647	6.912	6.647
M10	1.50	8.376	8.676	8.376
M12	1.75	10.106	10.441	10.106
(M14)	2.00	11.835	12.210	11.835
M16	2.00	13.835	14.210	13.835
(M18)	2.50	15.294	15.744	15.294
M20	2.50	17.294	17.744	17.294
(M22)	2.50	19.294	19.744	19.294
M24	3.00	20.753	21.253	20.752
(M27)	3.00	23.753	24.253	23.752
M30	3.50	26.211	26.771	26.211

d:外螺纹外径的基准尺寸(公称直径)
p:螺距
D1:内螺纹内径的基准尺寸
D1=D-1.0825p
D:内螺纹牙底直径的基准尺寸(公称直径)