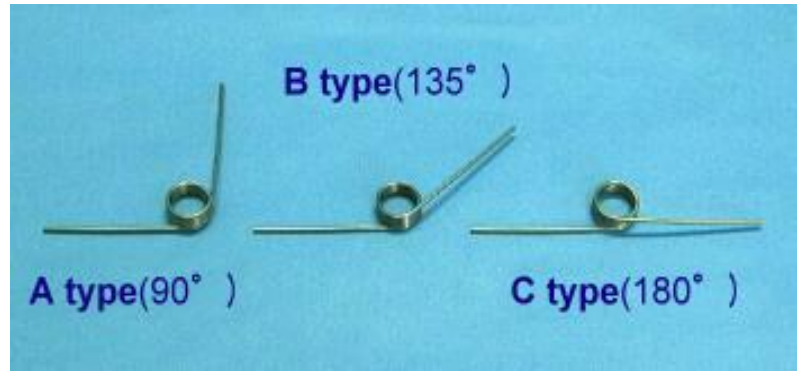
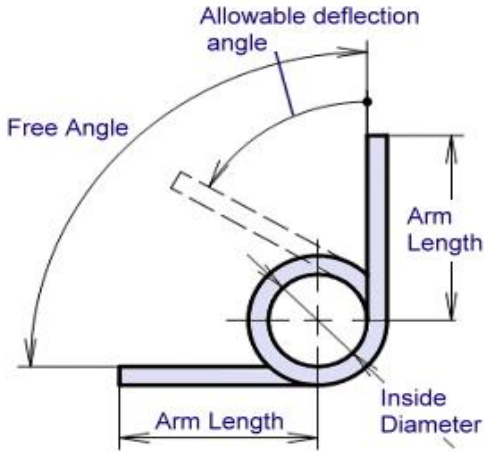


UltraSpring™ Torsion spring

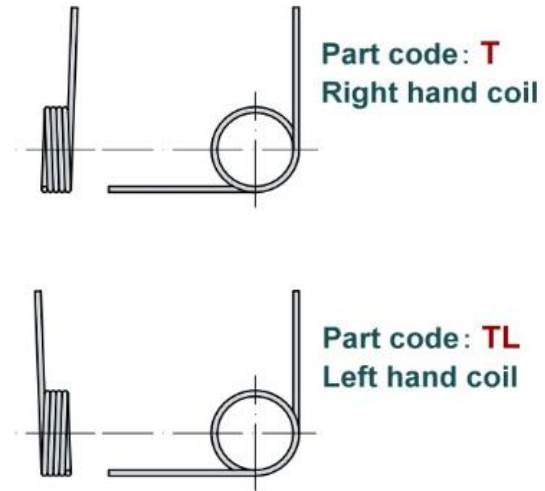
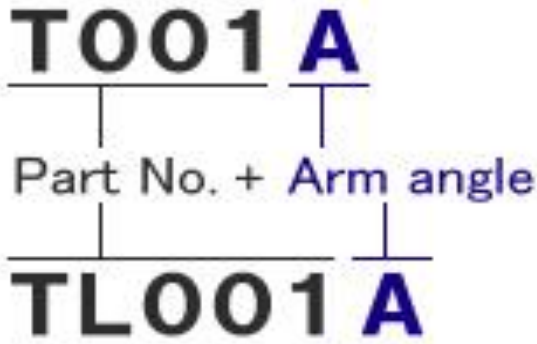
ウルトラスプリング・トーションばね

Material : SUS304-WPB

The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)
アーム角度はA,B,Cの3種類あります。



Please specify Part No. and Direction of helix and Arm degree.
製品番号とコイル巻方向とアーム角度を指定してください。



The usage where deflect direction follows coil winding direction is recommended.

トーションばねの使用は、ばねを巻き込むように使うのが正しい方向です。

Generally, diameter of inner guide shaft (mandrel) shall be 90% of diameter where maximum load works because inner coil diameter decreases when torsion springs deflect.

ばねを巻き込む方向にねじるとコイル径が減少するため、案内棒（ばねの倒れ止め棒）は最大負荷時の約90%に取るのが一般的です。

The spring rate shown in the table is determined as loading at the half point of arm and having 135 degrees of free angle. The allowable deflection angle is determined by allowable static stress.

この規格のばね定数は、アーム長1/2、自由角度B (135°) で計算し、許容変位量は静荷重の応力を前提にしてあります。

The spring rate can be reference values, for the load of torsion springs are influenced by the other mating parts.

トーションばねは相手部材により荷重が異なるため、ばね定数は参考値としてください。

$$kTd = \frac{Ed^4}{3667Dn + 389(a_1 + a_2)}$$

Basic formulas for torsion springs

トーションばねの基本計算式

$$\sigma = \frac{Ed\phi d}{360Dn}$$

d: Wire diameter (線径) D: Mean coil diameter (中心径) n: Number of coils (巻数)

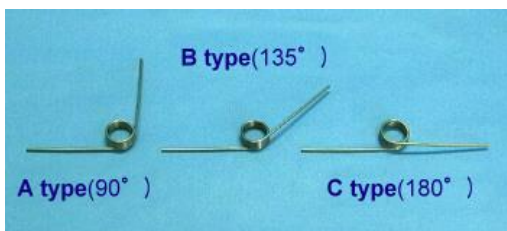
a: Arm length (アーム長) σ : Bending stress (曲げ応力) kTd: Spring rate (ばね定数)

E: Young's modulus [SUS 186 × 10³ N/mm²] (縦弾性係数) ϕd : Angle [deg] (角度)

UltraSpring™ Torsion spring

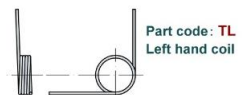
ウルトラスプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity
T001	3	0.3	12	R	2	0.05	56	20
TL001				L				
T002				R	3	0.04	82	20
TL002				L				
T003				R	4	0.03	108	20
TL003				L				
T004	R	5	0.02	135	20			
TL004	L							
T005	3	0.4	12	R	2	0.15	43	20
TL005				L				
T006				R	3	0.11	63	20
TL006				L				
T007				R	4	0.09	84	20
TL007				L				
T008	R	5	0.07	104	20			
TL008	L							
T009	3	0.5	12	R	2	0.36	36	20
TL009				L				
T010				R	3	0.26	52	20
TL010				L				
T011				R	4	0.2	69	20
TL011				L				
T012	R	5	0.17	86	20			
TL012	L							
T013	4	0.4	16	R	2	0.12	56	20
TL013				L				
T014				R	3	0.08	82	20
TL014				L				
T015				R	4	0.07	108	20
TL015				L				
T016	R	5	0.05	135	20			
TL016	L							
T017	4	0.5	16	R	2	0.28	44	20
TL017				L				
T018				R	3	0.2	64	20
TL018				L				
T019				R	4	0.16	84	20
TL019				L				
T020	R	5	0.13	105	20			
TL020	L							



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A

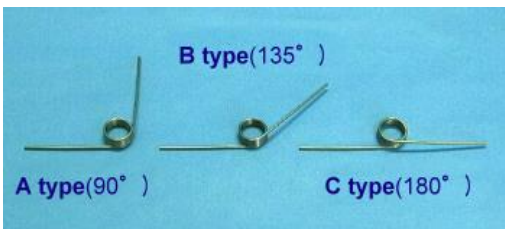


The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)

UltraSpring™ Torsion spring

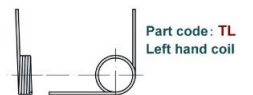
ウルトラスプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity
T021	4	0.6	16	R	2	0.57	37	20
TL021				L				
T022				R	3	0.41	55	20
TL022				L				
T023				R	4	0.32	72	20
TL023				L				
T024				R	5	0.26	89	20
TL024				L				
T025	5	0.5	20	R	2	0.23	53	20
TL025				L				
T026				R	3	0.16	78	20
TL026				L				
T027				R	4	0.13	103	20
TL027				L				
T028				R	5	0.1	128	20
TL028				L				
T029	5	0.6	20	R	2	0.47	45	20
TL029				L				
T030				R	3	0.34	66	20
TL030				L				
T031				R	4	0.26	88	20
TL031				L				
T032				R	5	0.21	109	20
TL032				L				
T033	5	0.8	20	R	2	1.44	33	20
TL033				L				
T034				R	3	1.03	49	20
TL034				L				
T035				R	4	0.8	65	20
TL035				L				
T036				R	5	0.65	80	20
TL036				L				
T037	6	0.6	24	R	2	0.4	53	10
TL037				L				
T038				R	3	0.28	78	10
TL038				L				
T039				R	4	0.22	103	10
TL039				L				
T040				R	5	0.18	128	10
TL040				L				



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A

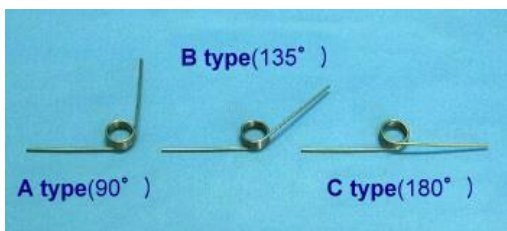


The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)

UltraSpring™ Torsion spring

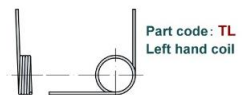
ウルトラスプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity
T041	6	0.8	24	R	2	1.23	39	10
TL041				L				
T042				R	3	0.87	57	10
TL042				L				
T043				R	4	0.68	76	10
TL043				L				
T044				R	5	0.56	94	10
TL044				L				
T045				6	1	24	R	2
TL045	L							
T046	R	3	2.08				47	10
TL046	L							
T047	R	4	1.62				62	10
TL047	L							
T048	R	5	1.32				78	10
TL048	L							
T049	7	0.7	28				R	2
TL049				L				
T050				R	3	0.45	74	10
TL050				L				
T051				R	4	0.35	98	10
TL051				L				
T052				R	5	0.29	122	10
TL052				L				
T053				7	0.9	28	R	2
TL053	L							
T054	R	3	1.21				59	10
TL054	L							
T055	R	4	0.94				78	10
TL055	L							
T056	R	5	0.77				97	10
TL056	L							
T057	7	1.2	28				R	2
TL057				L				
T058				R	3	3.69	44	10
TL058				L				
T059				R	4	2.86	58	10
TL059				L				
T060				R	5	2.34	72	10
TL060				L				



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A

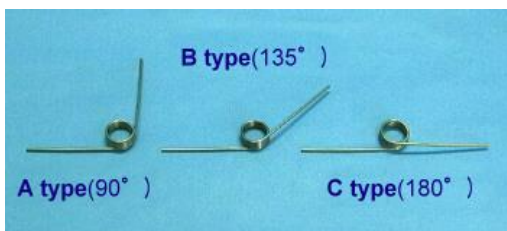


The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)

UltraSpring™ Torsion spring

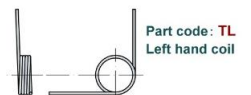
ウルTRASプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity
T061	8	0.8	32	R	2	0.94	51	10
TL061				L				
T062				R	3	0.67	74	10
TL062				L				
T063				R	4	0.52	98	10
TL063				L				
T064				R	5	0.43	122	10
TL064				L				
T065	8	0.9	32	R	2	1.49	45	10
TL065				L				
T066				R	3	1.07	67	10
TL066				L				
T067				R	4	0.83	88	10
TL067				L				
T068				R	5	0.68	110	10
TL068				L				
T069	8	1.2	32	R	2	4.59	33	10
TL069				L				
T070				R	3	3.28	49	10
TL070				L				
T071				R	4	2.55	65	10
TL071				L				
T072				R	5	2.09	80	10
TL072				L				
T073	9	0.9	36	R	2	1.34	51	5
TL073				L				
T074				R	3	0.96	74	5
TL074				L				
T075				R	4	0.75	98	5
TL075				L				
T076				R	5	0.61	122	5
TL076				L				
T077	9	1.2	36	R	2	4.13	37	5
TL077				L				
T078				R	3	2.95	54	5
TL078				L				
T079				R	4	2.29	72	5
TL079				L				
T080				R	5	1.88	89	5
TL080				L				



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A

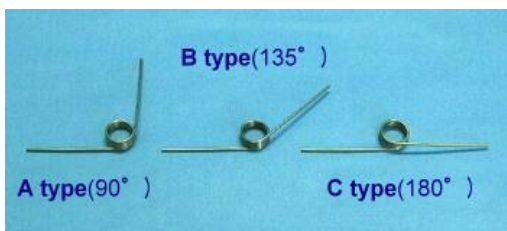


The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)

UltraSpring™ Torsion spring

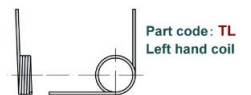
ウルトラスプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity			
T081	9	1.4	36	R	2	7.53	32	5			
TL081				L							
T082				R	3				5.37		
TL082				L							
T083				R	4					4.18	
TL083				L							
T084				R	5						3.42
TL084				L							
T085	10	1	40	R	2	1.84	51	5			
TL085				L							
T086				R	3				1.31		
TL086				L							
T087				R	4					1.02	
TL087				L							
T088				R	5						0.84
TL088				L							
T089	10	1.4	40	R	2	6.85	35	5			
TL089				L							
T090				R	3				4.89		
TL090				L							
T091				R	4					3.8	
TL091				L							
T092				R	5						3.12
TL092				L							
T093	10	1.6	40	R	2	11.52	30	5			
TL093				L							
T094				R	3				8.23		
TL094				L							
T095				R	4					6.39	
TL095				L							
T096				R	5						5.23
TL096				L							
T097	12	1.2	48	R	2	3.18	48	2			
TL097				L							
T098				R	3				2.28		
TL098				L							
T099				R	4					1.77	
TL099				L							
T100				R	5						1.45
TL100				L							



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A

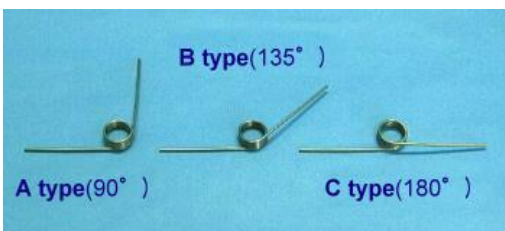


The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)

UltraSpring™ Torsion spring

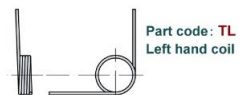
ウルトラスプリング・トーションばね

Part No.	Inside diameter (ID) mm	Wire diameter (d) mm	Arm length (a) mm	Direction of helix	Number of coils (n)	Spring rate (N·mm/deg)	Allowable deflection Angle (deg)	Packing quantity
T101	12	1.6	48	R	2	9.8	35	2
TL101				L				
T102				R	3	7	51	2
TL102				L				
T103				R	4	5.44	68	2
TL103				L				
T104				R	5	4.45	84	2
TL104				L				
T105	12	1.8	48	R	2	15.49	32	2
TL105				L				
T106				R	3	11.06	46	2
TL106				L				
T107				R	4	8.6	61	2
TL107				L				
T108				R	5	7.03	76	2
TL108				L				
T109	14	1.4	56	R	2	5.05	48	2
TL109				L				
T110				R	3	3.61	70	2
TL110				L				
T111				R	4	2.81	93	2
TL111				L				
T112				R	5	2.3	115	2
TL112				L				
T113	14	1.8	56	R	2	13.5	36	2
TL113				L				
T114				R	3	9.64	53	2
TL114				L				
T115				R	4	7.5	70	2
TL115				L				
T116				R	5	6.14	87	2
TL116				L				
T117	14	2	56	R	2	20.36	33	2
TL117				L				
T118				R	3	14.53	48	2
TL118				L				
T119				R	4	11.3	64	2
TL119				L				
T120				R	5	9.25	79	2
TL120				L				



Please specify Part No. and Direction of helix and Arm degree.

T001 A
 Part No. + Arm angle
TL001 A



The arm's angle has 3 degrees as A (90°) B (135°) and C (180°)