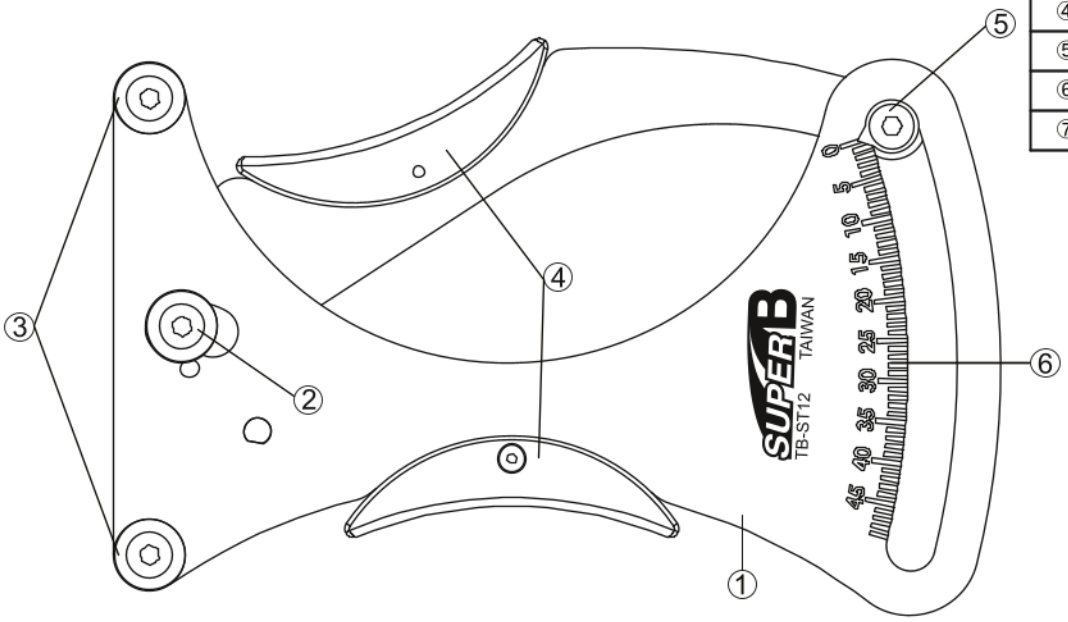
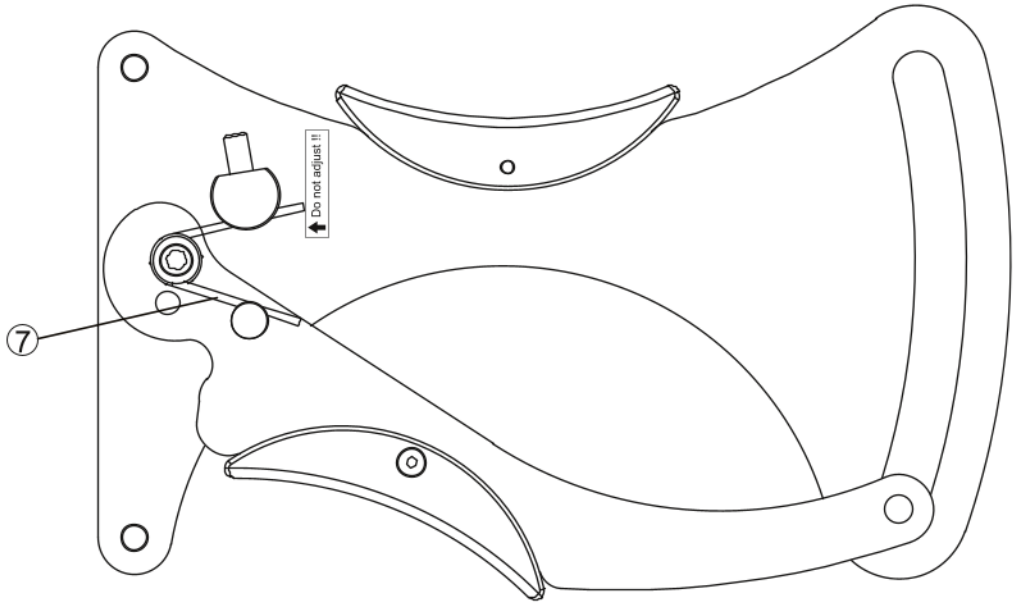
TB-ST12 Spoke tension meter

Instruction

1 Parts description

NO	PARTS
①	Body
②	Movable supporting stud
③	Fixed supporting stud
④	Handle grip
⑤	Pointer
⑥	Reading scale
⑦	Spring





2 Note

Note:

1. Please contact local distributor or dealer for any problem or calibration demand. Distributor will recalibrate and charge for a reasonable cost.
2. Do NOT disassemble the tool or adjust the spring, screw or any other parts.
3. The tension meter should be used and stored with care. To avoid damage, it's recommended to suspend on a bench hook and always keep the tool clean and dry.
4. TB-ST12 is warranted for one year from the date of purchase. Tools damaged due to accident, abuse, neqlect, modification, improper application or disassembled are not covered by the warranty.

3 Spoke tension

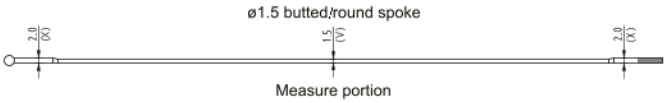
Correct spoke tension is essential in order for a wheel to be reliable and durable. A wheel with an optimally high spoke tension is more stable than a wheel with lower spoke tension. Too low spoke tension has a negative influence on the lifespan of the spokes. But too high tension can result in deforming and/ or cracks near the nipple holes of the rim.

There is no reference value for spoke tension on wheels, as the spoke tension depends on the rim, the spoke type and the number of spokes. The recommended tension for spokes in bicycle wheels is between 80 to 130 kilograms force [kgf]. As a rule of thumb, it is best to set tension as high as necessary to prevent spoke slackness in use. However, to obtain a spoke tension recommendation for a specific wheel, it is best to contact the rim manufacturer.

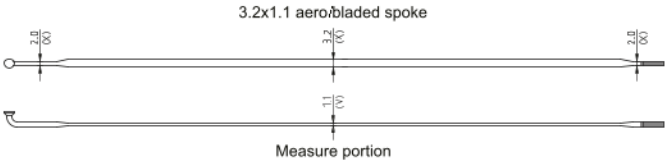
Relative tension is the tension of a spoke in comparison to the tension of one or more other spokes. The spokes on one side of a wheel may be tensioned differently than the spokes on the opposite side as the wheel is build to install with other components, such as break disc or freewheel. Therefore, it is also important for all tension of spokes in the same side of the wheel approximately the same relative tension. it is important to only compare the tension of a spoke relative to spokes on the same side of the wheel.

4 Measure portion of spoke

1. With butted/round spokes, ex:ø1.5

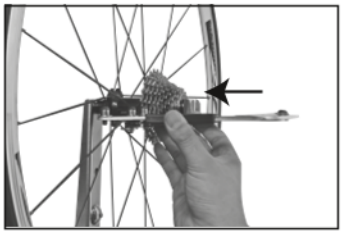


2. With aero/bladed spokes, ex:ø3.2x1.1

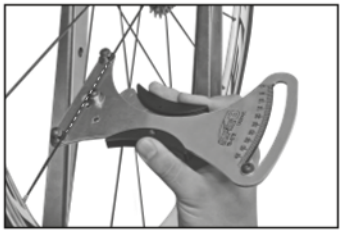


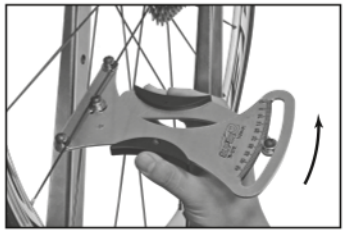
5 Measurement of spoke tension

1. To determine absolute tension of spoke
   a. Hold spoke tension meter horizontally(see picture 1).
   b. Compress at the handle grips (see picture 2).
   c. Put the spoke between two fixed supporting studs ③ and the movable supporting stud ② (see picture 3).
   d. Release the handle grips ④ gently and get pointed number from the reading scale ⑥ (see picture 4).
   e. Get spoke tension from the intersection of spoke size and measured reading on attached convertible table, the tensions listed are in kilograms force [kgf].


(picture 1)


(picture 2)


(picture 3)


(picture 4)

2. To determine relative tension of spoke
   A wheel with spokes that are within plus or minus 20% of the wheel's average spoke tension is generally considered to have acceptable relative tension.
   a. Determine the average tension of the spokes on the right side of the wheel.
      i. Repeat above instruction 1-a to 1-d to get the readings of all spokes on the right side of the wheel and record these numbers.
      ii. Sum all numbers and divide the qty of measured spokes to get the average number.
      iii. Get the average spoke tension as instruction 1-e.
   b. The acceptable relative tension range would be between average tension x 0.8 and x1.2.
   c. Use the spoke tension meter to check if the individual spoke tension measurements falls within the acceptable relative tension range.
   d. If the spokes are not within the acceptable range of relative tension, adjustments will be necessary to be made to the tension of the spokes.
   e. Repeat above instruction 2-a to 2-d to determine relative spoke tension on the left side of the wheel.

6 Convertible Table

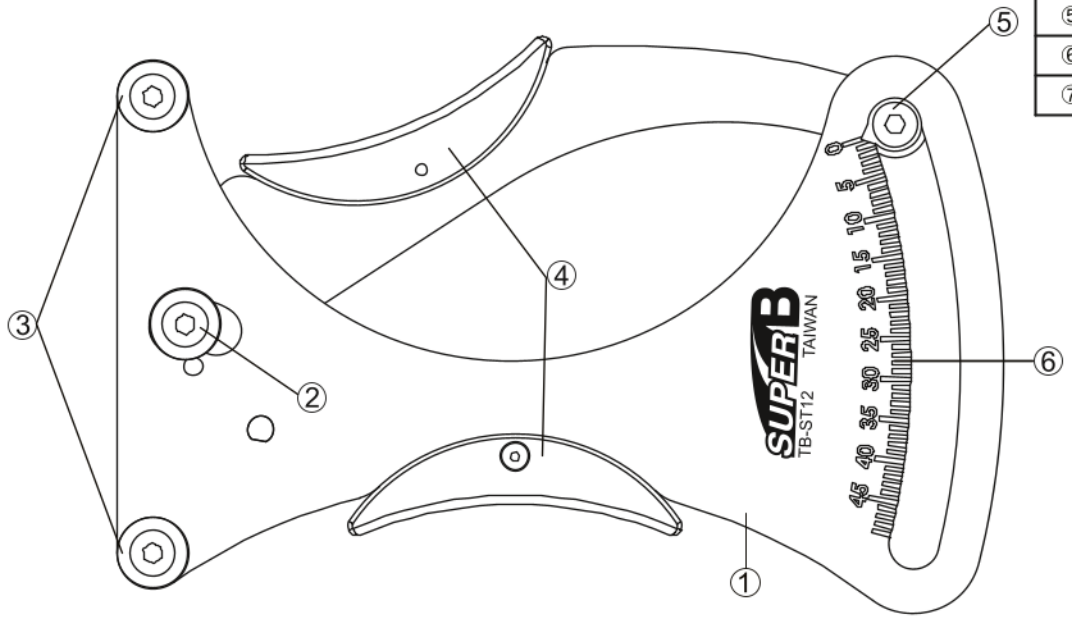
Convertible Table

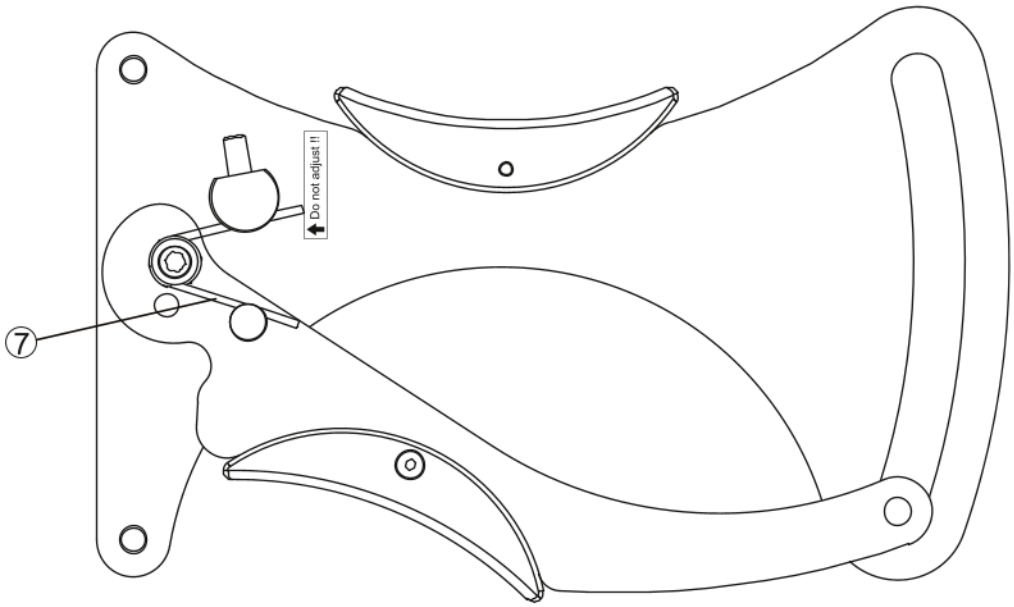
spoke Tension [kgf] (※1kgf=9.8Nm=2.2lb)

SPOKE SIZE		Butted Spokes							Bladed Spokes												
		2.3	2	1.8	1.7	1.6	1.65	1.5	3.0*1.1	3.2*1.1	2.1*0.95	4.5*1.0	2.0*0.9	1.7*0.9	2.8*1.3	2.2*0.9	2.3*0.9	2.3*1.25	3.3*1.1	2.3*1.2	2.25*1.2
Measured Reading	6																				
	7																				
	8																				
	9																				
	10																				
	11																				
	12										48		47			46	46				
	13										52		52	48		50	50				
	14										56		57	53		55	57				
	15								47		61		62	58		60	64				
	16								51	46	66	48	68	64		65	71		47		
	17								57	51	71	55	74	71		71	78	55	51	49	
	18							46	63	56	78	62	81	79		77	85	60	57	56	47
	19					45		51	69	61	86	70	88	87		85	92	65	64	64	53
	20				46	50	53	57	76	68	98	78	95	95	49	94	99	71	71	72	62
	21				50	55	59	63	85	76	110	86	105	103	56	105	110	78	78	80	70
	22			48	55	60	65.5	69	96	85	122	96	120	115	63	118	128	86	88	88	78
	23			53	60	65	72	76	109	96	141	111	135	132	71	133	144	96	99	96	86
	24			59	68	73	78	85	122	107	162	127	155	150	80	150	160	110	111	111	94
	25		49	65	79	83	85	95	138	122		145		170	90	170		124	127	129	109
	26		56	75	90	94	92	108	154	142		163			105			140	147	147	127
	27		63	85	102	105	100	122		162					120			160	170	167	145
	28		70	96	114	119	114	136							140						165
	29		80	110	131	138	129	156							160						
	30	42	90	125	150	157	145														
	31	50	100	141	169		160														
	32	57	120	160			178.5														
	33	64	140																		
	34	77	160																		
	35	95																			
	36	110																			
	37	134																			
	38	157																			
	39																				
	40-45																				

1 零件名稱及數量

編號	名稱
①	主體
②	可移動鋼絲頂柱
③	固定鋼絲頂柱
④	握把
⑤	刻度指針
⑥	刻度
⑦	彈簧





2 注意事項

1.若有任何問題或校正的需求，請聯絡當地代理商或經銷商，
代理商會重新校正並收取合理費用。
2.請勿拆解本產品或調整張力計彈簧、螺絲或其他任何零件。
3.本張力計應小心使用及存放，建議將張力計懸掛於工具架架上，
避免壓傷損壞,並保持清潔與乾燥。
4.本產品保固期限爲1年(自購買日期起算)，若因意外、濫用、人爲疏忽
、自行修改、不當操作或拆解，則非屬保固範圍內。

3 幅條張力

正確幅條張力對於可靠與耐用的輪組很重要，高幅條張力輪組比低幅條張力的輪組還要穩固，過低的幅條張力會對幅條的壽命有負面的影響，但是若幅條張力太高則會導致輪框上的銅頭孔變形或損壞。

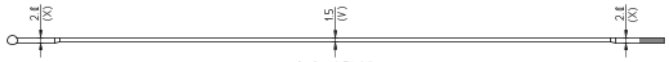
輪組上的幅條張力並沒有絕對的參考值，因爲輪框、幅條種類及幅條數量皆會影響輪組的幅條張力。自行車輪組幅條的建議張力是介於80kgf~130kgf之間。整體而言，盡可能將幅條張力設定於使用後不會鬆弛的狀態(較大值)，然而，若需取得特定輪組的幅條張力，最好是聯絡輪組製造商。

相對張力是指輪組上某幅條的張力相對於其他幅條的張力，輪組一側的幅條張力測量的結果可能不同於另一側的幅條張力，因爲此輪組可能需組裝其他零配件，例如碟盤或飛輪。因此，同側的幅條間有大約相同的相對張力是非常重要的。

4 幅條量測部位

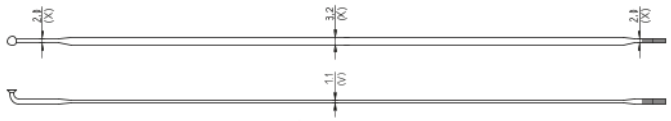
(以幅條長度中心點爲量測位置)

1.圓形幅條 ex:ø1.5



量測點

2.扁形幅條 ex:ø3.2x1.1



量測點

5 測量幅條張力

1.測量幅條的絕對張力

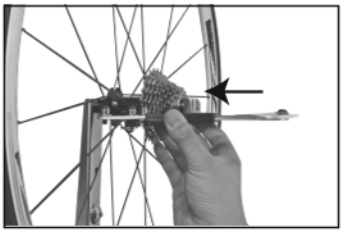
a.將張力計水平握持(如圖一)。

b.握壓張力計握柄(如圖二)。

c.將幅條置於張力計上(可移動鋼絲頂柱與固定鋼絲頂柱之間)(如圖三)。

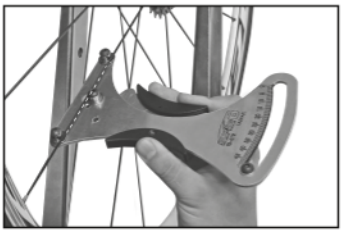
d.輕輕地放開張力計，於刻度上取得量測值 (如圖四)。

e.於隨附的對照表上，從幅條尺寸與量測的數值交叉欄位取得量測後的張力值。

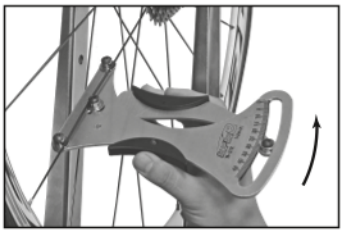


(圖一)

(圖二)



(圖三)



(圖四)

2.測量相對張力：

幅條張力介於幅條平均張力值±20%的輪組一般被視爲可接受的相對張力範圍。

a.量測輪組右側的幅條平均張力

i.重複以上說明1-a至1-d取得右側幅條的量測數值，並紀錄之。

ii.加總所有的數值，並除以所測量的幅條數量，以取得平均數值

iii.依使用說明1-e取得幅條平均張力

b.可接受的相對張力範圍介於平均張力值乘以0.8及乘以1.2之間。

c.使用張力計檢查每條幅條的張力是否落在可接受的相對張力範圍內。

d.若幅條張力沒有落在可接受的範圍內，則需調整幅條張力直到範圍內。

e.重複上述說明2-a至2-d，量測輪組左測幅條的相對張力。

6 對照表

對 照 表

幅條張力 [公斤力](※1公斤=9.8牛頓=2.2磅)

SPOKE SIZE		圓形幅條							扁形幅條												
		2.3	2	1.8	1.7	1.6	1.65	1.5	3.0*1.1	3.2*1.1	2.1*0.95	4.5*1.0	2.0*0.9	1.7*0.9	2.8*1.3	2.2*0.9	2.3*0.9	2.3*1.25	3.3*1.1	2.3*1.2	2.25*1.2
量測數值	6																				
	7																				
	8																				
	9																				
	10																				
	11																				
	12										48		47			46	46				
	13										52		52	48		50	50				
	14										56		57	53		55	57				
	15								47		61		62	58		60	64				
	16								51	46	66	48	68	64		65	71		47		
	17								57	51	71	55	74	71		71	78	55	51	49	
	18							46	63	56	78	62	81	79		77	85	60	57	56	47
	19					45		51	69	61	86	70	88	87		85	92	65	64	64	53
	20				46	50	53	57	76	68	98	78	95	95	49	94	99	71	71	72	62
	21				50	55	59	63	85	76	110	86	105	103	56	105	110	78	78	80	70
	22			48	55	60	65.5	69	96	85	122	96	120	115	63	118	128	86	88	88	78
	23			53	60	65	72	76	109	96	141	111	135	132	71	133	144	96	99	96	86
	24			59	68	73	78	85	122	107	162	127	155	150	80	150	160	110	111	111	94
	25		49	65	79	83	85	95	138	122		145		170	90	170		124	127	129	109
	26		56	75	90	94	92	108	154	142		163			105			140	147	147	127
	27		63	85	102	105	100	122		162					120			160	170	167	145
	28		70	96	114	119	114	136							140						165
	29		80	110	131	138	129	156							160						
	30	42	90	125	150	157	145														
	31	50	100	141	169		160														
	32	57	120	160			178.5														
	33	64	140																		
	34	77	160																		
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	37	134																			
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