數位扭力計操作手冊
DIGITAL TORQUE METER INSTRUCTION MANUAL

KTM-15

KTM-150

KTM-50S

注意:
扭力計在長時間無使用狀態下，每三個月至少需定期活化電池一次，
預防電池續航力衰退。

Note:
To prevent battery life decline, for a long period of time without use torque meter, needs to activate the battery at least Every three months.

KILEWS JAPAN CO., LTD.
http://www.kilews.com.tw

Y2F143-004

1 安全注意事項

- 為了事前預防火災、觸電、受傷等等事故,請務必遵守下述「安全注意事項」。
- 使用前,請確實閱讀此「安全注意事項」後,依照指示正確使用。
- 閱讀後請保管在使用者可以隨時看到的地方。

⚠ 警 告

1. 請勿測試超過容許負載扭力。若測試超過容許負載扭力,檢測器會損壞且容易造成事故或受傷。
2. 測量高扭力時,請確實固定好,勿讓本體搖晃。
3. 工作場所請隨時保持乾淨。散亂的工作場所或工作台容易造成事故。
4. 注意工作場所周圍環境。
   - 請勿在高溫、潮濕、陽光直射的地方、垃圾或灰塵多的地方使用。
   - 最佳的工作場所溫度約 20℃,請盡量保持在這個溫度環境(約 20℃)下使用。
   - 工作場所需照明良好
   - 請勿在有可燃性液體或氣體的地方使用或充電。
5. 請勿讓孩童靠近。除作業人員以外其他人請勿靠近作業場所。
6. 請勿拉扯電線。從插座上插拔接頭時請勿用力拉扯電線。
7. 為了能夠安全且有效率的作業
   - 請定期檢查儀器本體、起子頭、測試座等等,請勿使用變形磨損的零部件。
   - 更換配件時請依操作手冊更換。
   - 請定期檢查電線及延長線,破損時請更換。

   以下狀況時請關掉儀器本體的開關並拔掉插頭。
   - 不使用、或是不充電時。
   - 維修時。
   - 其他可能引起危險時。
8. 請檢查有無損壞的地方。
   - 使用前請檢查有無損壞及確認能否正常動作或是既定的功能有無動作。
   - 請確認所有使用時會影響到的地方有無異常。
   - 零件更換請依使用說明書更換。
9. 請使用指定的配件或是適當的起子頭或測試座。請勿使用本操作手冊指示以外的配件或是非適當的起子頭或套筒。
10. 維修請委託經銷商。
    - 請勿任意改裝機台。
    - 需維修時請務必聯繫購買的經銷商。若是由非專業技術人員維修,除了無法充分發揮性能,也會引起事故或受傷。

11. 本產品為精密儀器，請勿拆解或是強烈撞擊、震動。

- 過強的撞擊或震動導致機器故障時，除了無法充分發揮性能，也會引起事故或受傷。

12. 請正確充電。

- 充電時請依照指示電壓進行充電。請勿使用直流供電機或發電機充電，會產生高熱而引發火災。
- 請在通風良好的地方充電。充電時請勿用布等等覆蓋住。

13. 請小心觸電。請勿以潮濕的手碰觸電源插頭以免觸電。

14. 請勿將電池(裝於儀器本體內)丟入火中。可能會產生爆裂或是有毒物質。

15. 本產品使用的是鎳氫電池。屬再利用資源。請交由原廠處理。

16. 連接外部機器時，請將全部機器的電源關掉後再連接，否則可能造成觸電或機器損壞。

17. 發生操作手冊內容以外的狀況時，請馬上停止使用並連絡經銷商。

⚠ 注 意

1. 不使用時請妥善保管。請保管於乾燥且孩童無法碰觸的地方，或是保管於可上鎖的地方。
   另外，運送時請用本產品原廠的包裝箱。

2. 請穿著整齊服裝使用機器。勿穿著太寬鬆的衣物或珠寶，以免操作工具時勾扯拉到。

3. 操作機器時請保持良好姿勢作業，請確實站好，保持平衡。

4. 謹慎操作。

- 操作時，應小心使用，注意操作方式及工作場所安全。
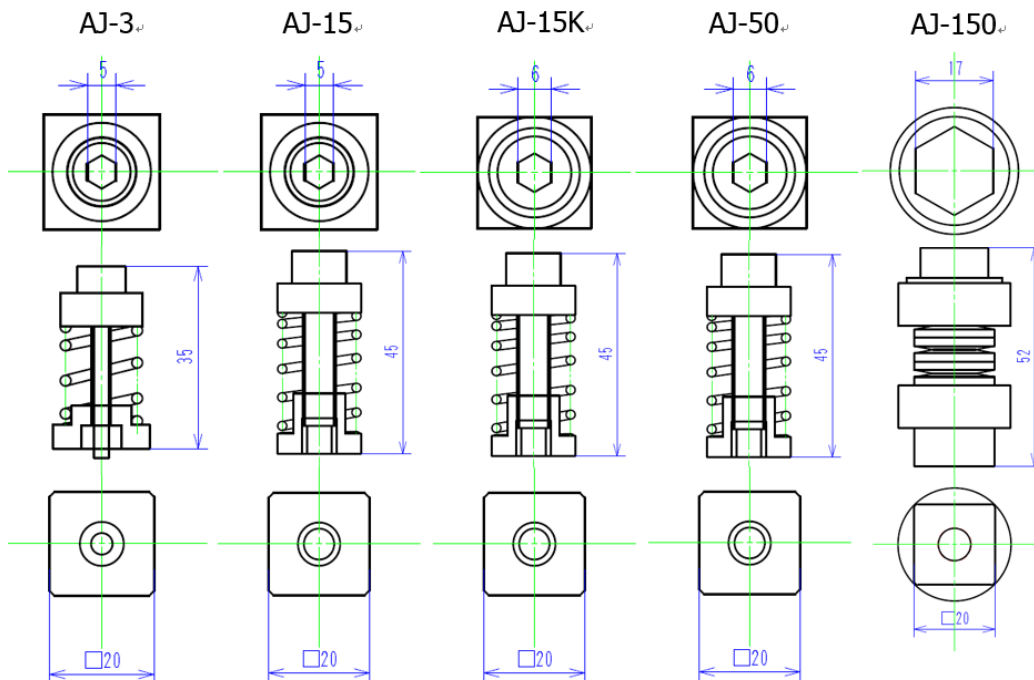- 疲累時請勿使用。

（此安全注意事項通用於我司全系列產品，因此依產品別不同，會有部分項目不適用）

2-1．KTM-15/KTM-150 外觀

①資料輸出埠（USB）	⑪測試底座
②電源開關	⑫功能設定鍵
③充電指示燈（LED 紅）	⑬測量單位切換鍵
④AC 充電孔	⑭上選鍵
⑤類比訊號輸出孔	⑮下選鍵
⑥歸零鍵（CLEAR）	⑯NG 燈
⑦固定用旋鈕	⑰GOOD 燈
⑧顯示記憶資料/資料輸出鍵	⑱液晶顯示器
⑨計數平均功能鍵	⑲系統重設鍵（RESET）
⑩測量模式選擇鍵	
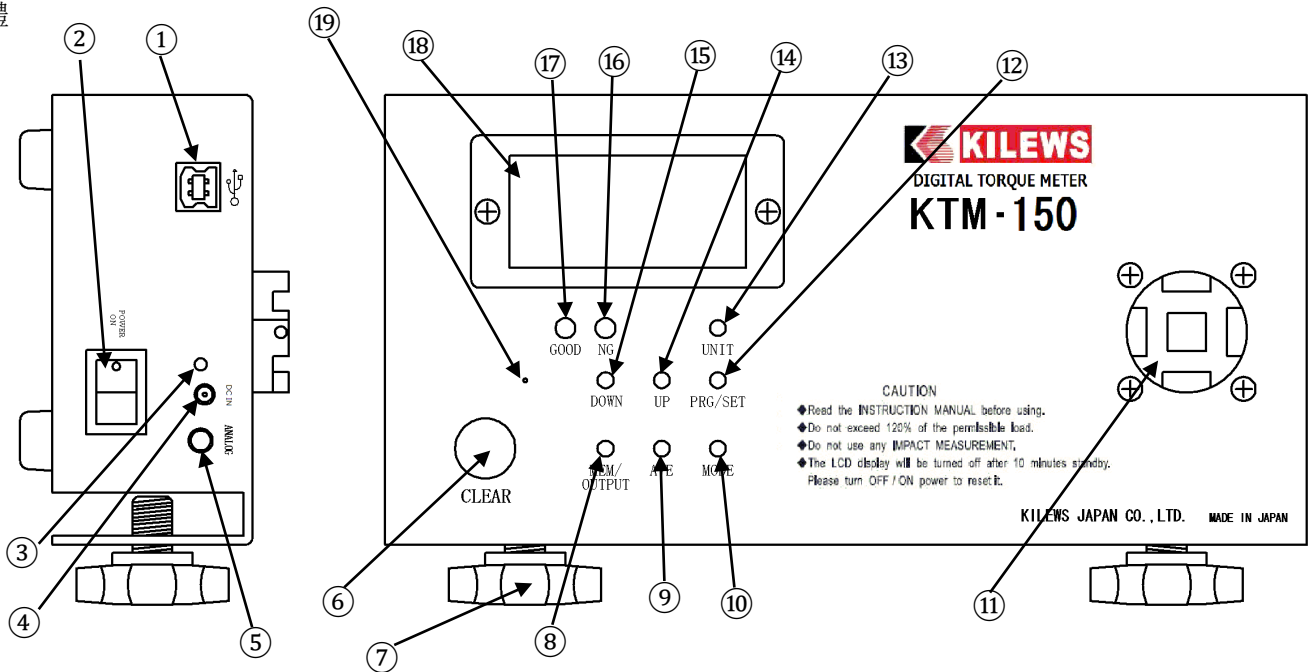
儀器本體

彈簧測試座

2-2. KTM-50S 外觀

①資料輸出埠（USB）	⑪測試底座
②電源開關	⑫功能設定鍵
③充電指示燈（LED 紅）	⑬測量單位切換鍵
④AC 充電孔	⑭上選鍵
⑤類比訊號輸出孔	⑮下選鍵
⑥歸零鍵（CLEAR）	⑯NG 燈
⑦固定用旋鈕	⑰GOOD 燈
⑧顯示記憶資料/資料輸出鍵	⑱液晶顯示器
⑨計數平均功能鍵	⑲系統重設鍵（RESET）
⑩測量模式選擇鍵	

儀器本體

彈簧測試座

AJ-50S

H6*HEX5 (J10128)

H6*HEX6.35 (J10129)

H6*Ø4 (J10126)

H6*Ø5 (J10127)
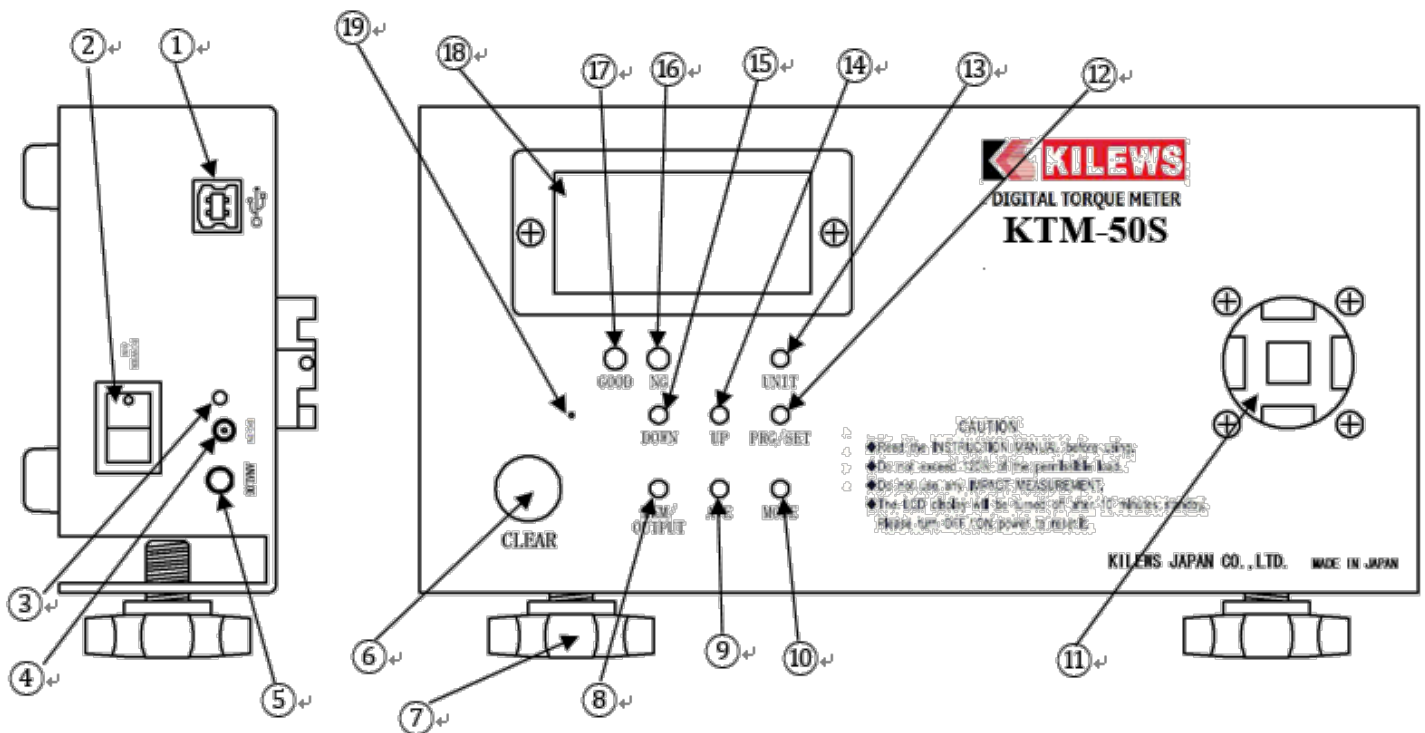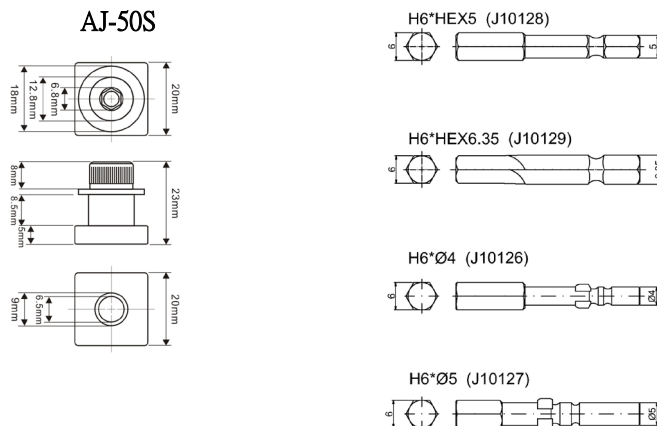
3-1．KTM-15/KTM-150 規格

型　　　　　　　　　號	**KTM-150**	**KTM-15**
測　　量　　範　　圍	1.5～130.0 lbf·in	0.15～13.00 lbf·in
	1.5～150.0 kgf·cm	0.15～15.00 kgf·cm
	0.15～15.00 N·m	0.015～1.500 N·m
精　　　　　　　　　度	±0.5%	
顯　　示　　方　　式	LCD　4 位數　數位顯示	
測　　試　　方　　向	CW-CCW（順時針・逆時針）	
測量模式　峰值模式(PP)	顯示負荷力最高值	
校正模式(TRACK)	顯示負荷力值的變化	
初值模式(PD)	顯示負荷力最初峰值	
電　　池　　配　　置	鎳氫電池 1.2V×4 電芯（1650mAh）	
測　　量　　單　　位	lbf·in/ kgf·cm/ N·m（可切換）	
充　　電　　時　　間	約 3 小時	
使　　用　　時　　間	連續約 12 小時	
電　　池　　壽　　命	可充電 300 次以上（但是依使用狀況而有不同）	
自　　動　　關　　機	閒置 10 分鐘後　電源 OFF	
數　　據　　輸　　出	ASCII 格式（速率 19200）	
專　　用　　充　　電　　器	輸入 AC100V～240V　50／60Hz　輸出 DC12V	
底　　座　　尺　　寸	□20mm　/　□9.5mm	
機　　體　　尺　　寸	230（W）×125（D）×65（H）mm	
重　　　　　　　　　量	約 1.8Kg	

配件

	彈簧測試座(請參考 P3 圖片)	測試桿(請參考 P4 圖片)
KTM-150	AJ-150　測量範圍：50.0～150.0　kgf·cm AJ-50　　測量範圍：15.0～50.0　kgf·cm AJ-15K　測量範圍：　3.0～15.0　kgf·cm	※H6×φ4　　※H6×HEX5 ※H6×φ5　　※H6×HEX6.35
KTM-15	AJ-15　　測量範圍：　3.0～15.0　kgf·cm AJ-3　　　測量範圍：0.15～3.0　　kgf·cm	※H5×φ4　　※H5×HEX5 ※H5×φ5　　※H5×HEX6.35

※請勿測量衝擊式工具。測試扭力請勿超過指定的扭力範圍。

檢查彈簧測試座

1.更換彈簧方法
請拆掉彈簧測試座的螺栓，更換彈簧。
2.彈簧測試座的推力軸承或螺栓的地方請定期上油，油不夠時會影響測量結果，且會減短彈簧測試座的壽命。
3.彈簧測試座的機械壽命約 2500 次。
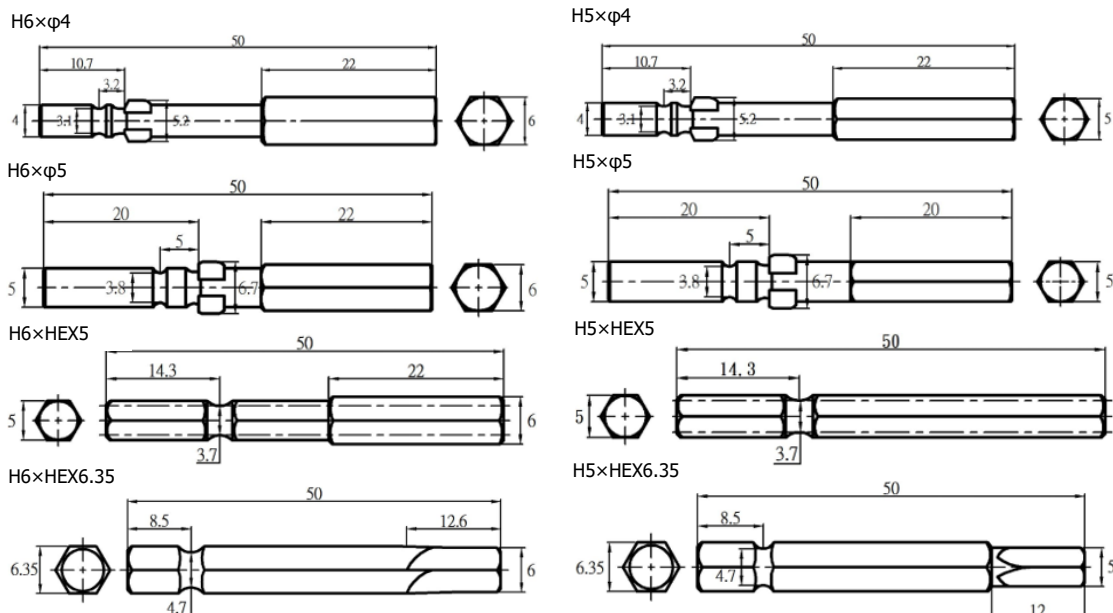
型　　　　　　　號	KTM-50S
測　量　範　圍	0.5 ~ 43.4 Lbf.in
	0.5 ~ 50.0 Kgf.cm
	0.05 ~ 4.90 N.m
精　　　　　　　度	±0.5%
顯　示　方　式	LCD　4 位數　數位顯示
測　試　方　向	CW-CCW（順時針・逆時針)
測量模式　峰值模式(PP)	顯示負荷力最高值
校　正　模　式 (TRACK)	顯示負荷力值的變化
初值模式(PD)	顯示負荷力最初峰值
電　池　配　置	鎳氫電池 1.2V×4 電芯（1650mAh）
測　量　單　位	lbf·in/ kgf·cm/ N·m（可切換）
充　電　時　間	約 3 小時
使　用　時　間	連續約 15 小時
電　池　壽　命	可充電 300 次以上（但是依使用狀況而有不同）
自　動　關　機	閒置 10 分鐘後　電源 OFF
數　據　輸　出	ASCII 格式（速率 19200）
專　用　充　電　器	輸入 AC100V～240V　50／60Hz　輸出 DC12V
底　座　尺　寸	□20mm　/□9.5mm
機　體　尺　寸	230（W）×123（D）×65（H）mm
重　　　　　　　量	約 1.8Kg

使用範圍(Kgf-cm)	扭力計	彈簧座	備註
0.5~50S	KTM-50S	AJ-50S	最大可測 50Kgf-cm 半自動起子專用

4 測量準備及測量方法

4.1 安裝

(4.1.1)測量大扭力時，檢測儀器可能會搖晃。請用固定旋鈕等器材確實固定住。

(4.1.2)KTM-50S 只能測試本公司產品半自動型號，不需要鬆開彈簧座，測試方式以直接打擊為主。

例如：SK-205LS；SK-215LS；SK-2125LS；SK-2135LS；SK-2145LS；SK-2205LS；SK2215LS；SK-2225LS；SK-2235LS
   SK-2245LS
   TKS-1300LS；TKS-1500LS；TKS-2500LS；TKS-3500LS；TKS-4500LS；TKS-2500LSF
   BSD-1000LS；BSD-1200LS；BSD-101；BSD-102

(4.1.3)KTM-15；KTM-150 皆可以測試電動起子全自動型號的扭力；但是必需慎選測試彈簧座(AJ)

4.2 MODE 模式選擇設定

更改測量模式時長按「MODE」鍵約 1 秒。

(為避免測量中誤動作去切換到測量單位，在做設定時秒數較長，此為正常現象。)

液晶螢幕顯示會切換到測量模式設定。

再按壓「MODE」鍵會照順序切換顯示的測量模式，請選擇要使用的測量模式。

峰值模式(PP)→初值模式(PD)→即時輸出模式(C)→校正模式(無顯示)

持續按壓此鍵，會照順序切換顯示的模式。

測量模式	顯示	內容
峰值模式	液晶螢幕下方「PP」 `0.000` PP N·m	最常使用在測量電動起子的最高數值，若後面比前面數值來的高則顯示最高數值。 (建議測試電動起子使用此模式)。
初值模式	液晶螢幕下方「PD」 `0.000` PD N·m	測試時只顯示第一次打擊數的扭力值，第二次後的扭力皆不顯示。
即時輸出模式	液晶螢幕下方 「C」 `0.000` C N·m	約每 1/180 秒就輸出一次負載扭力值資料。 適用於製作扭力曲線或是螺絲鎖附測試。 (可切換成每 1/12 秒就輸出資料一次)
校正模式	液晶螢幕下方 □ □ `0.000` N·m	偵測即時反應的數值，會直接顯示出檢測器受到的負載扭力。 主要使用於校正等等。

4.3 測量單位選擇設定

長按「UNIT」鍵約 1 秒。

(為避免測量中誤動作去切換到測量單位，在做設定時秒數較長，此為正常現象。)

液晶螢幕上會切換到測量單位設定。每按一次「UNIT」鍵單位顯示就會切換，請選擇要使用的單位。

4.4 選擇測量用的測試座

此機種附有測量電動起子時使用的「測量用測試座」。測量電動起子時請務必使用適合的測試座。

4.5 關於電源

此機種使用「鎳氫充電電池」。電池電量顯示於螢幕的左上方。

請使用專用的 AC 充電器充電，並將電源開關切換至 OFF 的狀態下再進行充電。

電量顯示

液晶螢幕顯示	內容
	電量充足，可以不用充電 電量尚有100％
	電量尚有50％。
	電量10％，建議不要使用且進行緊急充電。否則隨時會斷電的可能
	電量 0％，無法開機，所以液晶螢幕無法顯示

充電時，請使用原廠專用充電器。
若 10 分鐘內沒有按鍵操作，電源會自動轉為 OFF 狀態。(自動關機)
※有時候一連接充電器就顯示滿格，充電燈亮期間請持續充電。

4.6 歸零調整

此機種在以下狀況時，會自動歸零調整。
①啟動電源時
②切換測量模式時
在進行以上動作時，若在測試底座施加扭力的話，由於當下狀態設定為「零」，所以無法正常測量。

請確認啟動電源或是切換測量模式時沒有施加扭力在測試底座。

另外，測量時按清除鍵卻不會回到「零」時，可能是歸零跑掉。
此時請以下列方式調整歸零。

①確認沒有施加扭力在測試底座。
②按測量模式選擇鍵，將測量模式設為「TRACK」。
③按「CLEAR 鍵」，將顯示設 0。
即可調整歸零。

4.7 測量電動起子

①將彈簧測試座放在測試底座。

②按電源開關開機。此時會進行歸零調整，請確認測試底座有無施加扭力。

③確認測量模式是否為「PP」峰值模式。(液晶螢幕顯示為「PP」)
液晶螢幕未顯示「PP」時，請將測量模式改為「PP」。

④將電動起子的起子頭裝入彈簧測試座，並啟動電動起子鎖附。
此時請確認測試座的彈簧有無放鬆。若無放鬆，請務必放鬆後再開始測量。

⑤鎖緊動作結束後，確認螢幕的扭力值。

⑥反轉啟動電動起子，放鬆測試座的彈簧。

⑦按壓「CLEAR」鍵即清除數值，並回到可再次測量的狀態。

5 功能設定

5.1 設定方法

請依以下方法設定數值。
使用 PRG/SET、UP 及 DOWN 鍵設定。

DOWN 更改要改的地方

```
0.000    PRG/SET 確認數值
```
UP 增加數值

①切換到設定模式及設定上限值

PRG/SET 鍵持續按壓一秒，綠色 LED 燈(GOOD 燈)亮起，

顯示 　　　 之後，會顯示上限值。

用 UP 及 DOWN 鍵設定扭力測量值的上限值。

首先，按 DOWN 鍵後，第 4 位數就會閃爍，按 UP 鍵選擇數值。

每按一次 UP 鍵，數值就增加 1。

設定好第四位數的數值後，再按 DOWN 鍵。第三位數會閃爍，同樣設定數

值。

請同樣設定第二位數及第一位數。按 UP 鍵增加數值。按 DOWN 鍵到下一

位數。設定完第一位數後再按 DOWN 鍵，即會顯示全部的位數。請確認設

定值。

要修改時再按一次 DOWN 鍵，從第四位數開始設定。

設定完上限值後，再按一次 PRG/SET 鍵。

※在設定任何一位數時按 PRG/SET 鍵，會顯示到按 PRG/SET 鍵之前設定好

的數值，便移到下個項目。

②設定下限值

顯示 　　　 之後，會顯示下限值。

測量的下限值和上限值一樣，按 UP 鍵和 DOWN 鍵設定。

設定的下限值比上限值大的話，不會判斷是否合格。

設定完下限值後，再按一次 PRG/SET 鍵。

持續按壓 PRG/SET 鍵一秒，綠色 LED 燈(GOOD 燈)亮起

H I → 0.000
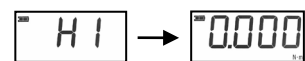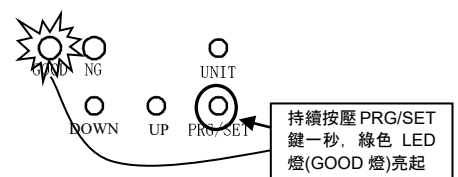
假設上限值設定為 0.650 時

按 2 次 DOWN 鍵

0.000 第 3 位數閃爍

按 6 次 UP 鍵

0.600 第 3 位數□6□閃爍

按 DOWN 鍵

0.600 第 2 位數閃爍

按 5 次 UP 鍵

0.650 第 3 位數□5□閃爍

按 PRG/SET 鍵

L O → 0.000
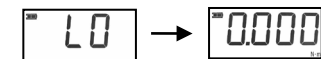
假設下限值設定為 0.500 時
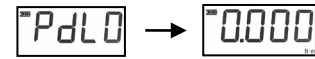
按 2 次 DOWN 鍵

0.000 第 3 位數閃爍

按 5 次 UP 鍵

0.500 第 3 位數□5□閃爍

按 PRG/SET 鍵

③設定初值模式的起始值

顯示 PdLO 之後,會顯示初值模式的起始值 。

初值模式的起始值跟上限值一樣,按 UP 鍵及 DOWN 鍵來設定。

(超過設定值且扭力降低時,初值模式會動作(顯示))
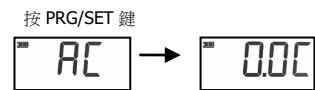
設定完數值後,再按一次 PRG/SET 鍵。

④設定即時輸出起始值

顯示 CLO 之後,會顯示即時輸出起始值。

此值也會是設為即時輸出模式時,開始輸出的值。

將此值設為 0 時,在即時輸出模式時會持續輸出資料。

設定完數值後,再按一次 PRG/SET 鍵。

⑤自動歸零設定

顯示 AC 之後,會進入自動歸零的時間設定。

按 UP 鍵或是 DOWN 鍵設定顯示數值的歸零時間。(0.1〜3.0 秒

之間能以 0.5 為單位設定)按 UP 鍵增加時間,按 DOWN 鍵減少

時間。

設定時間選擇

0.0C⇔0.1C⇔0.5C⇔1.0C⇔1.5C⇔2.0C⇔2.5C⇔3.0C⇔0.0C

設定 0.0C 的話,變成手動歸 0。

※設定 **0.0C** 以外數值,在設定的時間未到達前,按清除鍵也不會歸零。

設定完數值後,再按 PRG/SET 鍵。

⑥設定蜂鳴器

顯示 bP 之後,會顯示蜂鳴器的 ON・OFF・FF 設定。

按 UP 鍵和 DOWN 鍵設定蜂鳴器的模式。

(On :全部都響 OFF :都不響

FF :只有不良情況下有聲響)

設定完之後,再按 PRG/SET 鍵。
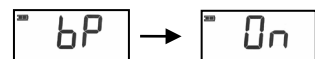
⑦設定結束

顯示 -S- 之後,設定結束。綠色 LED 燈(GOOD 燈)熄滅。

(設定模式時綠色 LED 燈(GOOD 燈)會亮)

※中途結束設定時,按 CLEAR 鍵。

顯示 -S- 之後,轉為可測試的狀態。綠色 LED 燈(GOOD 燈)熄滅。

※要確認現在設定的數值是什麼的數值的話,請按「PRG/SET 鍵」。液晶螢幕上就會顯示現在設

定的數值的項目(HI 、 LO 、 PdLO 、 CLO 、 AC 、 bP)。

PdLO → 0.000

假設初值模式起始直設為 0.300 時

按 2 次 DOWN 鍵   第 3 位數閃爍

0.000

按 3 次 UP 鍵   第 3 位數閃爍

0.300

CLO → 0.030

假設即時輸出起始值設定為 0.010 時

按 3 次 DOWN   第 2 位數閃滅

0.030

按 8 次 UP 鍵   第 2 位數□1□閃爍

0.010

按 PRG/SET 鍵

AC → 0.0C

假設自動歸零時間設為 1 秒時

按 3 次 UP 鍵

1.0C

按 PRG/SET 鍵

bP → On

要設定讓蜂鳴器響時

按 PRG/SET 鍵

-S- → 0.000

5.2 蜂鳴器及訊號燈顯示的判斷方法

5.2.1 判斷是否合格

判斷測量結果在標準內或標準外，以燈號或蜂鳴器提示。

①設定「上限值」「下限值」，作為標準。

②確認測量模式是不是「PP」模式。(判斷是否合格只有在「PP」測量模式下有效)

③測量值在上下限值以內時，GOOD 燈會亮燈。

測量值未達下限值或是超過上限值時，NG 燈會閃爍且蜂鳴器會鳴叫。

④測量完後，按 CLEAR 鍵將顯示歸 0。

此時，判斷是否合格的燈號及蜂鳴器會熄滅。

合格判斷只有在測量模式為「PP(峰值模式)」時才會實行。

PD(初值模式)時檢出初值時，綠色燈(GOOD)燈會亮燈告知。(測量值 10digit 以上)

合格判斷	※低於下限值	上下限值以內	超過上限值	超出扭力計的扭力
燈號	紅色(NG)閃爍	綠色(GOOD)亮燈	紅色(NG)閃爍	紅色(NG)亮燈
蜂鳴器	斷續音 (慢)	連續音	斷續音(快)	連續音

※低於下限值：測量時的負載未達下限值，且幾乎沒有負載時判斷。

(扭力值未達 10digit 時不會判斷)

5.2.2 最大值、最小值、平均值
針對數次測量值可以顯示並確認其最大值、最小值、平均值等等。

①確認測量模式是否為「PP」或是「PD」。

②按平均計算鍵(AVE)。(液晶螢幕下面會閃爍顯示「AVE」)

③測量數次。

※測量值的左側顯示nOO□和測量次數。

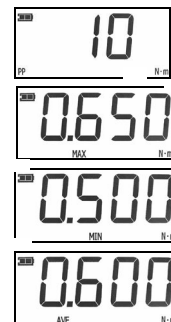※計算平均次數最多 30 次，30 次以上時會加上"+"顯示為"＋n001"

※請注意，再測量 30 次的話，會回到"＋n001"。

※測量 30 次以上時("＋n001"以上)會從舊資料開始刪除。

④按 AVE 鍵。

⑤「AVE」閃爍時測量的數據依以下順序顯示。

1.　資料數 ... 個數(1〜30) ... 液晶螢幕下面無顯示

2.　最大值 ... 扭力值 ... 液晶螢幕下面顯示 「MAX」

3.　最小值 ... 扭力值 ... 液晶螢幕下面顯示 「MIN」

4.　平均值 ... 扭力值 ... 液晶螢幕下面顯示 「AVE」

※若要結束循環數據狀態，**回到測試狀態主頁面時，須按"CLEAR"鍵一次**

5.2.3 自動清除數值

重複測量時，不須每次測量結束後按清除鍵也能自動清除數值。

①設定「自動清除數值」功能。

②測量結束後，從拿掉測試底座上的負載後開始計算時間，過了設定的時間後就會清除。

※已設定自動清除時間時，在設定時間未到達前，就算按「CLEAR 鍵」也不會清除數值。

5.2.4 即時資料輸出

施加的負載可每 1/180 秒輸出一次資料。(即時輸出模式)
(可切換成每 1/12 秒輸出一次。切換方法請參照 6.4 更改儲存資料的輸出速度)

    1.將測量模式設定為「即時輸出」模式。
    2.若扭力負載超過預先設定的 `[L0` 數值(即時輸出起始值)，約每 1/180 秒就輸出負載扭力資料一次。
    3.若扭力負載未達 `[L0` 數值，則停止輸出資料。

    ※即時資料輸出時，由於螢幕的扭力顯示跳動速度很快，所以很難看到。
    ※依 `[L0` 的設定而沒有輸出資料時，即使有施加扭力，扭力顯示也是維持「0」。
    ※將 `[L0` 設定為「0」時，即時輸出模式時資料會持續輸出。

    另外，測量範圍外的資料，請當參考值使用。
    有時候「0」附近的數據在無負載時也會變動，此非資料處理上的故障。

6 資料儲存、顯示及輸出

測量資料可儲存於儀器本體內，並可顯示及輸出。

每次清除數字(按 CLEAR 鍵或是啟動自動清除)，將資料記憶在記憶體的同時，也會輸出訊號到輸出端子。

統計資料會在顯示資料的同時，也會輸出資料到輸出端子。

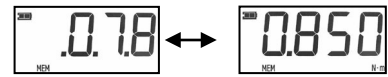### 6.1 測量資料

6.1.1 儲存測量資料

每次清除數值時(按 CLEAR 鍵或是設有自動清除)，會儲存資料到記憶體。若要記憶大量資料時，建議在使用前刪除資料。

※記憶體資料會從資料號碼 001 開始。如已有記憶資料，則從下一個記憶號碼開始儲存。

最多可以儲存 800 組資料，若超過 800 組資料，則從 001 號開始覆蓋紀錄。由於之前的資料會消失，所以超過 800 組資料時，請儲存於電腦等可儲存的地方。

6.1.2 顯示及刪除儲存的測量資料

①按 MEM/OUTPUT 鍵，液晶螢幕下面顯示「MEM」，最後會交替顯示儲存的資料號碼和測量值。

②按 UP 鍵或 DOWN 鍵，更改記憶組別以搜尋資料。不操作按鍵閒置 6 秒後，「MEM」字體會消失，轉為測量模式。

※刪除單筆資料

③交替顯示記憶組別及扭力值時按 CLEAR 鍵， `CLA` 會閃爍。

④閃爍時再按一次 CLEAR 鍵，顯示 `----` 並刪除選擇的資料。
(後面的資料會往前遞補)

⑤ `CLA` 閃爍時閒置不動，則轉為可測量的狀態。(資料不會被刪除)
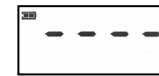
※刪除指定範圍的記憶體資料

③按 UP 鍵或是 DOWN 鍵，顯示想刪除的資料的第一筆資料。
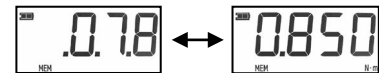
④交替顯示記憶組別和扭力值時按 CLEAR 鍵， `CLA` 會閃爍。

⑤按 UP 鍵增加資料組別以選取想刪除的範圍的最後一筆資料。

⑥交替顯示記憶組別和扭力值時按 CLEAR 鍵，顯示 `----` 並刪除選擇的範圍的資料。
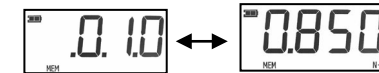
此時若不按任何按鍵， `CLA` 會閃爍，請確認要不要刪除。要刪除的話 `CLA` 閃爍時按 CLEAR 鍵。不要刪除的話，閒置不動即會回到扭力顯示，資料不會被刪除。

※若刪除記憶體資料，後面的資料會往前遞補到此資料組別。

6.1.3 輸出儲存的量測資料

①按 MEM/OUTPUT 鍵，會交替顯示最後一筆資料組別與數值。

②顯示資料組別和數值時，再按一次 MEM/OUTPUT 鍵。
(準備輸出資料)

③顯示 `FA` (起始位置)後，會顯示資料組別，按 UP 鍵或 DOWN 鍵選擇要輸出的第一筆資料組別。選完後按 MEM/OUTPUT 鍵。

④顯示 `LA` (結束位置)後，會顯示資料組別，按 UP 鍵或 DOWN 鍵選擇要輸出的最後一筆資料組別。選完後按 MEM/OUTPUT 鍵。

右側圖示：

.0.7.8 ↔ 0.850

.0.7.8 ↔ 0.850
按 CLEAR 鍵

CLR　CLR 閃爍
按 CLEAR 鍵

----　刪除資料

.0.7.8 ↔ 0.850

要刪掉資料號碼 005~010 時
.0.0.5 ↔ 0.600

CLR　CLR 閃爍
按 UP 鍵

.0.1.0 ↔ 0.850
按 CLEAR 鍵

----　刪除資料

按 MEM/OUTPUT 鍵
.0.7.8 ↔ 0.850

輸出資料號碼 005~070 時
按 MEM/OUTPUT 鍵
FA → .0.0.1
按 UP/DOWN 鍵

.0.0.5　輸出的第一筆資料號碼
按 MEM/OUTPUT 鍵

LA → .0.7.8
按 UP/DOWN 鍵
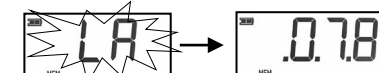
.0.7.0　輸出的最後一筆資料號碼

⑤顯示 ⌈ -P- ⌉ 並輸出。輸出結束後回到測量狀態。

※輸出中要停止輸出時，按壓 CLEAR 鍵約一秒。
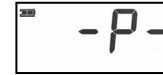
6.2 資料輸出

資料以 USB 線輸出，格式為 ASCII 格式。

讀取資料需要另外安裝軟體驅動程式。

請參考 FTDI Chips **Virtual COM Port Drivers** http://www.ftdichip.com/Drivers/VCP.htm

資料輸出的規格

資料位元長度	1 個啟動位元+8 個資料位元+2 個停止位元+無校驗位元		
速率	19200bps	插頭類型	USB(B TYPE)

6.3 一次刪除全部已儲存資料

①要一次刪除全部的資料的話，長按 CLEAR 鍵直到顯示 ⌈ ALL ⌉。(約 4 秒)

②⌈ ALL ⌉閃爍時再按一次 CLEAR 鍵，會閃爍顯示⌈ CLA ⌉。

③若確定要刪除全部資料，再按一次 CLEAR 鍵，會顯示 ⌈ ---- ⌉ 並刪除全部的資料。

(各功能的設定數值不會被清除)

※ ⌈ ALL ⌉ · ⌈ CLA ⌉ 閃爍時不操作的話，約 3 秒後為可測試的狀態。(不會清除記憶體)

6.4 更改已儲存資料的輸出速度

可以更改輸出已儲存資料時的輸出速度。

①資料輸出裝置用(慢速)...設定「00」　②電腦輸出用(快速)...設定「01」

此設定可用於切換即時輸出模式的輸出時間點。

①慢速(約每 1/12 秒)...設定「00」　　②快速(約每 1/180 秒)...設定「01」

(預設值為「01」。)

切換設定:

①在電源 OFF 的狀態下，邊按 PRG 鍵邊按 ON/OFF 鍵開機。

②放開 PRG 鍵後會顯示「01」或是「00」。按 UP 鍵切換選擇設定。

③再按一次 PRG 鍵，顯示⌈ -5- ⌉後回到扭力顯示，即為可測量的狀態。

7 系統設定

當鎳氫電池完全放電時(長期未使用)，充電後，即使開機扭力計內的 CPU 也不會啟動的狀況。

發生此狀況時請按一次系統重設鍵(RESET)。

使用系統重設時，請勿在下列狀況以外時使用。

* 長期未使用的狀態下，接上 AC 充電器後即使開機也不會顯示數字在 LCD 上時。

* 其他狀態，扭力計無動作時。

執行系統重設時，會刪除所有的記憶內容，所以請重新設定一次。

8 點檢及校正

8.1 定期校正

為管理扭力計精度，因此需要定期校正。本司校正符合國家標準具高可靠性，為了能維持扭力計的精度，

建議一年校正一次。

(定期校正需另付費用。附校正證明書及追溯系統圖)

8.2 保固

本產品製造品管相當嚴謹，若是購買後一年內因本司生產、運輸過程等等原因發生故障，

將免費提供調整及維修服務。

若為以下狀況，**即使在保固期間內**，調整及維修仍須另外付費。

因不當使用、自行維修、改造而導致故障損壞

因天然災害、環境汙染、異常電壓而導致故障損壞

如有任何疑問，請與經銷商聯繫。	![KILEWS] KILEWS JAPAN CO.,LTD. キリウスジャパン株式会社

我司保留對技術參數更新的權利

Operation Manual for Digital Torque Meter
Model: KTM-150/KTM-15

1 Caution for safety

◆ Keep work area always clean.
Cluttered areas and benches may cause injuries.

◆ Consider work area environment.
Do not use torque meter in the rain or in the damp or wet place. Use the product at a place left at constant temperature (about 24℃). Keep workplace well lighted.
Do not use or charge the product in presence of flammable liquids or gases.

◆ Keep children away.
Keep any person other than the operator(s) away from work area.

◆ Dress properly.
Do not wear loose clothing or jewelry, which may be caught in moving parts.

◆ Work with the most care.
When using the product, carefully work, with consideration to how to handle, how to work, work environment, etc.

◆ Fix main body firmly.
When operated for measuring a large torque, use clamps or vises, etc. It is not only more safe than holding by hand but also makes it possible to grip the screwdriver by both hands.

◆ Do not apply a torque exceeding the permissible load.
If applied beyond the permissible load, it may cause damage to the sensor, resulting in accident or injury.

◆ Do not disassembly, shock and vibrate this product.
Avoid disassembling the product that is a precise instrument. If the torque meter is damaged by excessive shock or vibration, the product may not only show the full performance but also result in accident or injury.
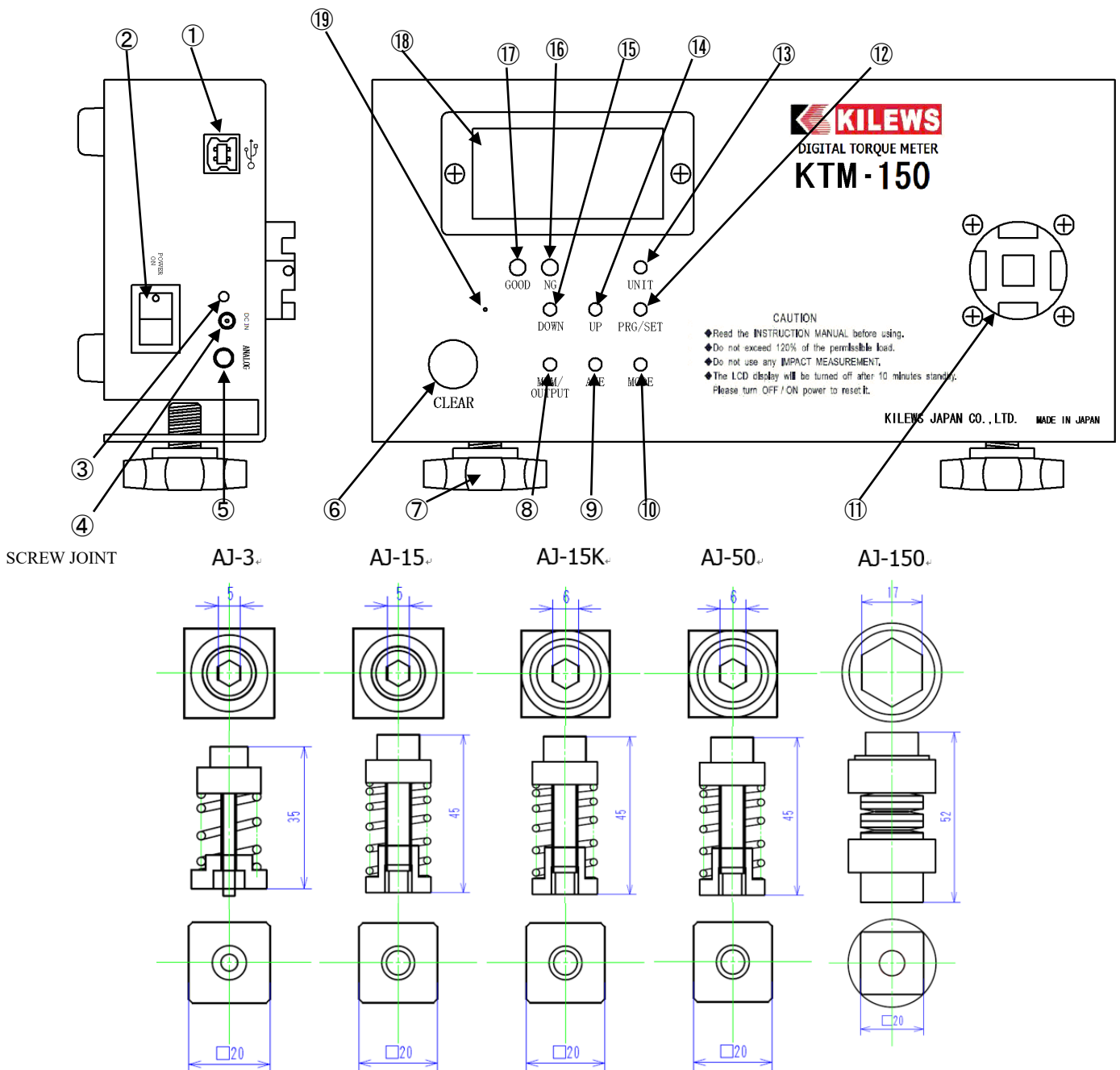
◆ Caution to electric shock.
Do not touch power plug by wet hand. It may cause electric shock.

◆ For charging the battery be sure to use only exclusive charger.
Using an original charger other than compatible may cause fire or injury.

◆ Charge properly.
Charge on the indicated voltage. Do not use DC power or engine generator. It may cause abnormal heat, resulting in a fire. Keep the charging time not longer than 8 hours.
Overcharge may burst, overheat and liquid leakage, resulting in a fire or injury.
Charge in a well-ventilated place. While being charged, do not cover with cloth.

◆ Never throw the battery (built-in the torque meter) into fire.
It may cause burst or give off toxic substance. (The procedure for scrapping the battery shall be followed in accordance with local or regional law on waste disposal. If there is no local or regional law on waste disposal, be sure to dispose of the battery at a recycling shop.)

◆ In the following cases, turn off the main switch and disconnect the plug from outlet. When not used or charged; When repaired, When any other danger is expected.

- ◆ Maintain torque meter with care.
  For better and safer performance, check screw joints regularly and use ones whose tips are free from deformation and wear down. For replacement of accessories follow the instruction manual.
  Inspect cords and extension cords periodically and if damaged, replace them.
- ◆ Do not handle cord violently.
  Do not carry the product hanging by cord or draw out socket from outlet by pulling cord.
  Do not put cord near to a hot, oily or edgy part.
- ◆ Check for absence of damaged parts.
  Before further use of the product, carefully check for no damage, normal operation, or intended functions. Check whether or not any other components that may affect its operation are normal.
  Replace parts according to the instruction manual.
- ◆ Have the product repaired by the authorized dealer. Do not modify this product.
  Repair should be made always by the dealer where you purchased the product. If repaired by any person with no knowledge or skills of repair, it may not only show the full performance but also may cause any accident or injury.
- ◆ Use only the original accessories and attachments.
  Do not use any accessories and attachments other than ones specified in this instruction manual.
- ◆ Store properly when not in use.
  Store the torque meter in a dry place and in a height out of children's reach, or secured area.
  To transport the product, reuse the packing case with which this product was delivered.
- ◆ AJ screw joint need be lubricated by attached lubrication. Torque test will become unstable if lubrication is neglected quite awhile.

2.1.1 Appearance KTM-15/KTM-150

①	USB	⑪	SOCKET
②	POWER SWITCH	⑫	PRG/SET
③	AC ADAPTOR LED	⑬	UNIT
④	AC ADAPTOR TERMINAL	⑭	UP
⑤	ANALOG OUTPUT TERMINAL	⑮	DOWN
⑥	CLEAR SWITCH	⑯	NG LED
⑦	KNOB	⑰	GOOD LED
⑧	MEM/OUTPUT	⑱	DISPLAY FRAME
⑨	AVE	⑲	RESET **Please press "RESET" button after charging the device at the first time which allows the device restore to original setting.**
⑩	MODE		

SCREW JOINT   AJ-3   AJ-15   AJ-15K   AJ-50   AJ-150

2.1.2 Appearance KTM-50S

①	USB	⑪	SOCKET
②	POWER SWITCH	⑫	PRG/SET
③	AC ADAPTOR LED	⑬	UNIT
④	AC ADAPTOR TERMINAL	⑭	UP
⑤	ANALOG OUTPUT TERMINAL	⑮	DOWN
⑥	CLEAR SWITCH	⑯	NG LED
⑦	KNOB	⑰	GOOD LED
⑧	MEM/OUTPUT	⑱	DISPLAY FRAME
⑨	AVE	⑲	RESET **Please press "RESET" button after charging the device at the first time which allows the device restore to original setting.**
⑩	MODE		

SCREW JOINT

AJ-50S

3.1.1 Specifications
KTM-15/ KTM-150

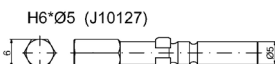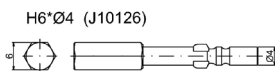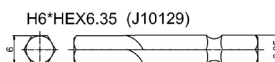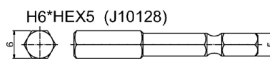| MODEL		KTM-150	KTM-15
Measuring range		1.5～130.0 lbf.in	0.15～13.00 lbf.in
		1.5～150.0 kgf.cm	0.15～15.00 kgf.cm
		0.15～15.00 N.m	0.015～1.500 N.m
Accuracy		+/- 0.5□　(Full Scale)	
Display		4 figures of LCD	
Measuring direction		CW・CCW	
Measurement mode	P-P (peak)	Peak load value hold.	
	TRACK	Indication of real time torque value.	
	P-D (peak	Indication peak down point and hold.	
Data transfer		USB 1.0 　　(Baud rate：19200)	
Power supply		4.8 VDC (Ni-MH chargeable battery 1.2V×4 cells 1650mAh)	
Measuring unit		Lbf.in/kgf.cm/N.m (selectable)	
Charging time		From empty –3 hours	
Continuous working time		About 12 hours	
Battery life		Chargeable for 300 times or more. However, it varies depending on operating conditions.	
Exclusive charger		INPUT□ 100V~240V 　　50/60Hz 　　　　OUTPUT□ DC 12V	
Socket size		20 mm square and 9.5 mm square	
Size		230(W) × 125(D) × 65(H) mm	
Weight		About 1.8 kg	

※**Do not use for measurement of impact tool. Do not apply more than the specified torque.**

3.1.2 Specifications
KTM-50S

MODEL		KTM-50S
Measuring range		0.5～43.4 lbf.in
		0.5～50.0 kgf.cm
		0.05～4.90 N.m
Accuracy		+/- 0.5□　(Full Scale)
Display		4 figures of LCD
Measuring direction		CW・CCW
Measurement mode	P-P (peak)	Peak load value hold.
	TRACK	Indication of real time torque value.
	P-D (peak	Indication peak down point and hold.
Data transfer		USB 1.0 　　(Baud rate：19200)
Power supply		4.8 VDC (Ni-MH chargeable battery 1.2V×4 cells 1650mAh)
Measuring unit		Lbf.in/kgf.cm/N.m (selectable)
Charging time		From empty –3 hours
Continuous working time		About 15 hours
Battery life		Chargeable for 300 times or more. However, it varies depending on operating conditions.
Exclusive charger		INPUT□ 100V~240V 　　50/60Hz 　　　　OUTPUT□ DC 12V
Socket size		20 mm square and 9.5 mm square
Size		230(W) × 123(D) × 65(H) mm
Weight		About 1.8 kg

Torque Range(Kgf-cm)	Torque Meter	Spring Joint	Remark
0.5~50S	KTM-50S	AJ-50S	Max measurable 50Kgf-cm Semi-Automatic tools

4□ Setting and measuring mode for KTM-150/KTM-15

4.1 Mode setting

Press the MODE key over one second.

It means getting into setting mode when the words PP----PD shown on the below left on LCD screen.

Please press the MODE key if needing to change measuring mode:

maximum value (PP)----only indicating the first peak value (PD)----real-time value (C)----for calibration (TRACK).

Measurement mode	Display	Contents
P-P (Peak to peak)	Display section □PP□ `0.000` N·m	The maximum under measurement is always displayed. Load holds more than 10 digits*. Usually, this mode is used.
P-D (Peak-down)	Display section □PD□ `0.000` N·m	A value when a load torque value changes from a rise to descent is displayed. It carries out, once it pushes a clear button, when applying re-load. Load operates more than 10 digits*. It is suitable for measurement of a torque wrench etc.
C (Real-time Output)	Display section □C□ `0.000` N·m	The data output of the load torque value is carried out every about 1 / 180 seconds. (A change whole 1 / 12 seconds is possible) It is suitable for torque curve creation or a screw bundle examination.
TRACK	There is no display `0.000` N·m	It is mainly used at the time of calibration etc. The value of the load torque concerning a sensor is displayed as it is. (There is no display.)

* Digit–10 digits is 0.10 N.m. (1.0 kgf.cm/1.0 lbf.in)

4.2 Test unit selection

Press UNIT key over one second, the system will get into setting mode. The unit will change whenever user press UNIT key.

lbf.in-------------kgf.cm-------------N.m-------------(cycle)

4.3 Power capacity indication

Displaying on LCD	Contents
▮▮	Sufficient power capacity, no need to recharge, the power capacity is around 100% left.
▮	The power capacity is around 50% left.
▯	It is not allowed to use, needs to urgent charge when the power capacity is 10% left. Because the power will be shut off anytime.
	The power cannot be on when the power capacity is 0% left. LCD will be not working also.

Please use original charger and turn off the power when charging. (Input: 100V~ 240V; Output: 12V 500mA)

5□ The operation of functional setting key:

The operation of functional setting key should collocate with UP key and DOWN key to operate the function except its own function.

```
DOWN○    A place is changed.
         →  →  →  →
         0.000
PP              N·m
         ↑  ↑  ↑  ↑
UP○      A numerical value is increased.
```

A numerical value is determined.
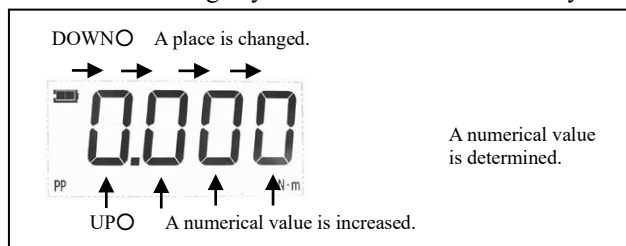
Setting proper value range of torque

First of all, setting the torque value both minimum limit and maximum limit, so that user can judge the difference of torque value.

For example: We need to test 5 kgf.cm torque. We can set a tolerated range 0.5 kgf.cm, so we can set minimum limit with 4.5 kgf.cm; maximum limit with 5.5 kgf.cm.

If the testing value is less than 4.5 kgf.cm or higher than 5.5 kgf.cm, the NG light will be on. On the other hand, the GOOD light will be on if the testing value is within the range.

5.1 Setting procedure:

『1』 press PRG/SET key approximately one second, green LED light will be on and getting into set screen. LCD monitor will display " ☐ H1 ☐ " and jump to 0.0.

Press DOWN key, then the value of fourth digit can be set. The change of value is only allowed to increase. If needing increase, press UP key. If changing second digit, please press DOWN key shown as following the drawing: ⚡0.000

Press about one second, LED will be on.
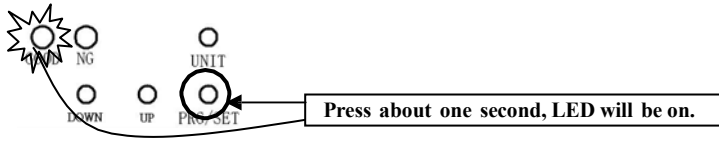
FOR EXAMPLE

Setting maximum limit as 0650：

| H1 | → | 0.000 | → | ⚡0.000 | → | ⚡0.600 | → | 0.600 | → | ⚡0.650 | → | 0.650 |

DOWN　　DOWN　　UP 6 Times　　DOWN　　UP 5 Times　　DOWN

『2』 press PRG/SET once again, setting minimum torque value limit, LCD will display " ☐ LO ☐ " and jump to 0.0 again, press again DOWN key 0.000

Setting minimum limit as 0500：

| LO | → | ⚡0.000 | → | ⚡0.000 | → | ⚡0.500 | → | ⚡0.500 | → | ⚡0.500 |

DOWN　　DOWN　　UP 5 Times　　DOWN　　DOWN
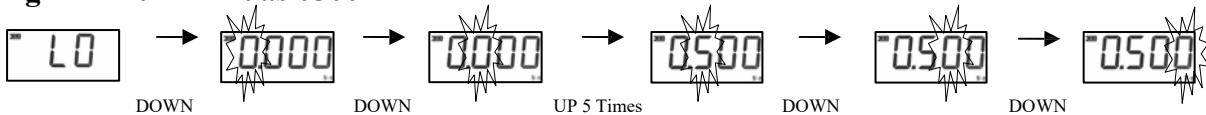
『3』 press PRG/SET once again, set the initial value of PD, if the initial value is less than set value, the value will not be recorded. (It is only applying to PD mode)

Setting the PD mode initial value as 0300：

| PdLO | → | 0.000 | → | 0.000 | → | ⚡0.300 | → | 0.300 | → | 0.300 |

DOWN　　DOWN　　UP 3 Times　　DOWN　　DOWN
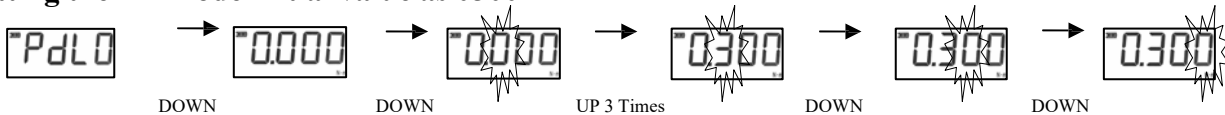
『4』 press PRG/SET once again. After displaying CLO, a real-time output start value is displayed. A value is set up similarly. When this value is set to 0, the inside of real-time output mode continues outputting data.

Setting the real-time output start value as 0.010：

| CLO | → | 0.030 | → | 0.030 | → | 0.010 |

Press DOWN 3 times. The second figures blink.　　Press UP 8 times. The second figures blink by "1".
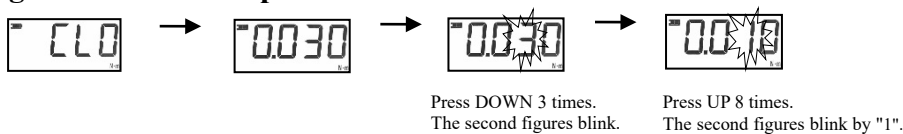
『5』 press PRG/SET once again, set clear switch with " ☐ AC ☐ " and press UP/DOWN to set the time for auto clear. Setting the time for auto clear (0.0C⇔0.1C⇔0.5C⇔1.0C⇔1.5C⇔2.0C⇔2.5C⇔3.0C⇔0.0C), but if the time be set to 0.0C needs to press CLEAR to clean the value.

Setting clear with one second：

| AC | → | 0.0C | → | 1.0C |

UP / DOWN

『6』 press PRG/SET once again, setting buzzer, UP/DOWN setting.
(ON: normal sound, OFF: no sound, FF: sound comes only under abnormal situation)

Setup of Buzzer：

` bP`	→	` On`	→	`OFF`	→	`FF`	→	` -5-`	※SETTING OK
	UP		UP						

After displaying `bP` an ON-OFF-FF setup of a buzzer is displayed. How to sound a buzzer is set up by UP/DOWN.
(`On` □Sound altogether. `OFF` □No sounds. `FF` □Only NG sounds.)
If a setup is completed, the PRG/SET key will be pressed again.

5.2 After setting
PRG/ SET

Alarm	Less than minimum value	Between minimum value and maximum value	Over maximum value	Excess torque
LED	Red blink (Slow)	Green light (Good)	Red blink (Quick)	Red light (NG)
BUZZER	Interrupted sound (Slow)	Continuous sound	Interrupted sound (Quick)	Continuous sound

※Maximum Value, minimum value, average value
We can take advantage of the AVE key to test maximum value, minimum value and average value. (you can test at most 30 datum).
1. Be sure the test mode is 『PP』 or 『PD』, not TRACK.
2. Press AVE key to make re-testing, the 『AVE』 will blink on the LCD.
3. After several tests. (at most 30 numbers)
4. Press AVE again, the LCD will automatically display the counting numbers —MAX—MIN—AVE.

The counting numbers (at most 30 numbers), there is no display on the LCD ● —— `10`
MAX   Max, 0.650, will be shown on the LCD● —— `0.650`
MIN   Min, 0.500, will be shown on the LCD● —— `0.500`
AVE   Ave, 0.600, will be shown on the LCD● —— `0.600`
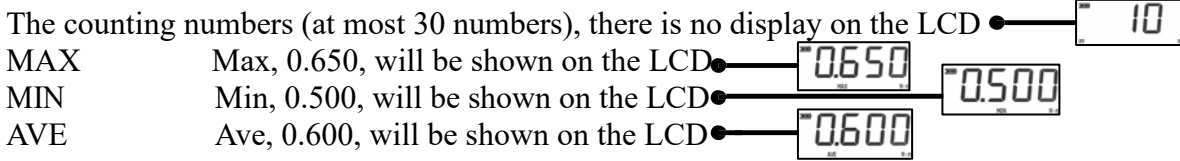
※If operator wants to end the cycle state and return to the main test   page, operator must press the "CLEAR" key once.

※If measurement over 30 times. Can be displayed [n+001], [n+002]……
When measuring more than 30 times, it's eliminated from old data.

□Example□   [n+001] (The 31st times) Total 30 times, it's calculated from the 2nd to the 31st.

6□ Data saving, display, output
Whenever pressing, CLEAR key will automatically clear and save memory.
At the same time signal will automatically output if USB is used.

6.1 Data saving

Whenever press CLEAR key, the system will automatically clear the data, meanwhile, the data will be saved in the memory according to serial number. The serial number is from 001 ~ 800 (no more than 800 datum) and the first data will be automatically covered as new data is over 800[th.]

6.1.1 Deleting the single data

Torque value can be deleted. The value of following will move ahead.

SITE	VALUE	Remark
001	10.9	
002	11.1	
003	13.0	Press "clear" to remove this value
004	11.1	
005	11.2	

「1」 Several tests later, datum will be kept in memory.
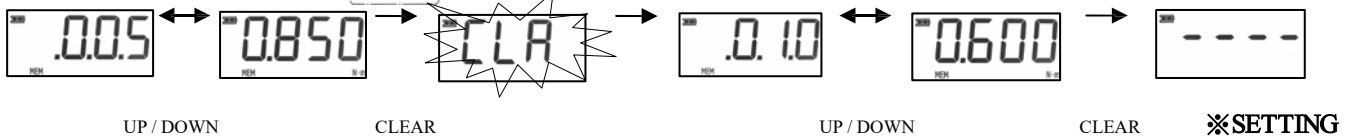
「2」 Please press the MEM/OUTPUT key when deleting the data is necessary. The「MEM」will appear on the LCD.

「3」 Taking advantage of UP/DOWN key searching for site, LCD will display "site" and "value", the torque value will be「13.0」(blinking around 6 seconds) when choosing「003」.

「4」 Press「CLEAR」key, " ☆CLA☆ " will be shown on the LCD, press CLEAR ┌----┐ key again, delete is completed. The following value will move ahead.

SITE	VALUE	Remark
001	10.9	
002	11.1	
003	11.1	The following value will move ahead
004	11.2	The following value will move ahead
005	———	

6.1.2 Delete the data range

「1」 Several tests later, datum will be kept in memory.

「2」 Please press the MEM/OUTPUT key when deleting the data is necessary. The「MEM」will appear on the LCD.

「3」 Taking advantage of UP/DOWN key searching for site, LCD will display "site" and "value", the torque value will be「11.1」(blinking around 6 seconds) when choosing「003」.

「4」 Press「CLEAR」key, " ☆CLA☆ " will be shown on the LCD.

「5」 Taking advantage of UP/DOWN key searching for site, LCD will display "site" and "value", the torque value will be「11.2」(blinking around 6 seconds) when choosing「004」.

「6」 Press the「CLEAR」key again ┌----┐ , delete is completed. The following value will move ahead.


```
.0.0.5  ↔  0.850  →  ☆CLA☆  →  .0.1.0  ↔  0.600  →  ----
UP / DOWN      CLEAR                    UP / DOWN      CLEAR    ※SETTING
```

OK

6.1.3 Data output

「1」 Press MEM/OUTPUT first, LCD will display "MEM" and the last data is shown also.

「2」Press MEM/OUTPUT again, LCD screen will display " ☆FA☆ ", choosing the initial site of output data. For example, the 005 data, press UP/DOWN key to choose「005」.

「3」 Press MEM/OUTPUT again, LCD screen will display " ☆LA☆ ", choosing the ending site of output data. For example, the 070 data, press UP/DOWN key to choose「070」.

「4」 Press MEM/OUTPUT again, LCD will display " ┌-P-┐ ", means sites 005~070 have been output to USB.


```
.0.7.8  →  0.850  →  ☆FA☆  →  .0.0.1  ↔  .0.0.5
MEM/OUTPUT   MEM/OUTPUT                      UP / DOWN

         ☆LA☆  →  .0.7.8  →  .0.7.0  →  -P-
MEM/OUTPUT            UP / DOWN            ※PROCESSING
```
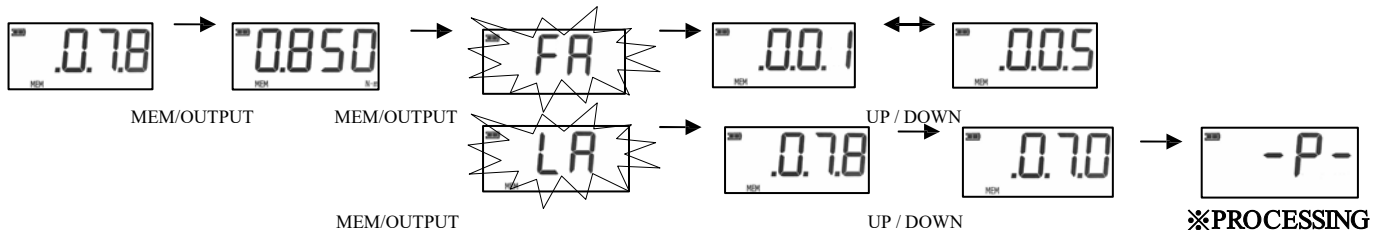
6.2 Date transfer

6.2.1 Data format

Output data are outputted in the ASCII format with a USB cable.

In addition, in order to take in data, driver software needs to be installed separately.

About installation of driver software, please refer to http://www.ftdichip.com/Drivers/VCP.htm

Data Format

Data bit length	start bit 1 + data bit 8 + stop bit 2 + no parity		
Baud rate	19200bps	Connector form	USB (B type)

6.3 All Elimination of Saved Data

1. When carrying out package elimination of all the data, it continues pressing CLEAR until it displays as ⌐ ALL ⌐.
   (About 4 seconds)
2. If the CLEAR key is again pressed during ⌐ ALL ⌐ blink, it will be indicated by blink with ⌐ CLA ⌐.
3. If the CLEAR key is pressed again, it will be displayed as ⌐ - - - - ⌐ and all data will be eliminated.
(The setting numerical value of each function is not cleared)
※When operation is left during ⌐ ALL ⌐ / ⌐ CLA ⌐ blink, it will be in the state which can be measured.
(Memory is not cleared)

Change of Output Speed of Data
The speed of the output at the time of outputting the data saved can be changed.
A. For Printer Output (Low Speed) -- Setup "00"
B. For Personal Computer Output (High Speed) -- Setup "01"

This setup is adapted also for the change of the output timing of real-time output mode.
A. Low Speed (Every about 1 / 12 Seconds) -- Setup "00"
B. High Speed (Every about 1 / 180 Seconds) -- Setup "01"
(It is set as "01" at the time of purchase.)

The change of a setup is performed by the following methods.
1. In the state of a power source OFF, pressing the PRG key, press the ON/OFF key and switch on a power source.
2. If the PRG key is released, it will be displayed as "01" or "00."
   Since it will change if UP key is pressed, a setup is chosen.
3. If the PRG key is pressed again, after displaying it as ⌐ -S- ⌐, it returns to a torque display, and will be in the state which can be measured.

7□ Preparation and the measuring method

Installation
A measuring instrument may be brandished at the time of measurement of a large torque. Surely, a measuring instrument should use a fixed knob etc. and fix it firmly.

A setup in the measurement mode
The 3 following modes can be chosen with the setting to meet user's testing requirement.
① PP (peak measurement): The maximum under measurement is always displayed.
② TRACK (track measurement): The value of the load torque concerning the detection machine is displayed as it is.
③ PD (peak down measurement) : Value when load torque value changes from a rise to descent is displayed.
  Carry out after pressing a CLEAR button at once when applying re-load.
  ※PD and PP measurement operates from 10 or more numerical values.

Measuring method
④ Check that the display part is zero at the time of power ON. If display is not show as zero, set a measurement mode select switch to TRACK, press CLEAR button, and set it as back PP which performed zero adjustment.
⑤ The bit of screwdriver to measure among the screw part of screw joint is set firmly, and screwdriver is started.
⑥ It checks that operation of screwdriver has been completed normally, the measurement torque value of a display part is read, and it becomes a measurement end.
⑦ After a measurement end, if CLEAR button is pushed, a display will be cleared by zero.
  When continuing measurement, it repeats from ① again.
⑧ Choose the TRACK mode, if real time torque value wants to be measured.

8□ Power supply

If this measuring instrument is left 10 minutes or more or battery capacity stops being sufficient, a power supply is turned off automatically. If battery capacity decreases, since LOBAT will be displayed, charge by inserting the connector of an exclusive charger in an AC ADAPTOR terminal.
The fully charge is in the state which turned OFF the power switch and takes about 8 hours.
(Do not perform charge of 8 hours or more. It may become the cause of the fire by a burst of a battery, generation of heat, and liquid leak, or an injury by fault charge.)
Moreover, when turning off a power supply, a power supply SW is pushed about 1 second.

9□ System Reset

CPU in the tester might not start even if the battery charges it with electricity complete discharged.
(When not using it for a long time.)
In that case, an AC/DC adaptor is connected, and a system reset button is pushed.
It will be in an initial state (all the contents of memory are eliminated).
Do not use Reset except the following conditions.
※When the display doesn't appear even if this machine is not used for a long time and charged.
※Additionally, when the tester doesn't work.

Since all the contents of memory are eliminated when system reset is performed, redo a setup once again.

10□ Guarantee

It is allowed to fix gratuitously, if the fault which will originate in manufacture, transportation, etc. of our company within one year after a purchase should occur, although product was manufactured under sufficient quality control.
In the following case, it becomes the charge also within a guaranteed term.
Failure by the error, and unjust repair and unjust reconstruction and damage on use Failure by fall etc. and damage after a purchase.
Failure by the natural disaster, pollution, and unusual voltage, and damage.

11□ Calibration trust service

Periodical calibration is required in order to manage the accuracy of torque meter.
By our company, the calibration with the high reliability traced to the national standard is performed, and in order to use it within accuracy, I recommend you calibration of one year. I offer a result of calibration document, a certification on calibration, and a traceability system figure by demand. (Periodical calibration is a charge.)

Documents appended at the time of product purchase.
Result of calibration document.
Certification on calibration document.
Traceability system figure.

The cautions on use
※Please do not apply the load more than the measurement range by any means.
※Attached grease is attached to the bolt or the bearing part, please check before use.
※Where a spring is loosened, please be sure to keep loose after use.

When the following condition comes out, please stop using, and change to new joint.
When there is bend and wear of a screw thread.
When there is sound etc.

※CAUTION※

The new model KTM-15/KTM-150 itself has temporary memory. The memory will be cleared automatically once the machine is not used for a long time. Moreover it is necessary to press "Reset" button after full-charged, then it can be on normally. The user should pay attention to the battery status or save data periodically for keeping memory from losing.

12□ Electric Screwdriver & Torque Meter

1、Torque adjustment for Electric Screwdriver
A. Turn the Torque Adjusting Ring to increase or decrease the torque output. Adjust clockwise to higher scale means torque increase: anti-clockwise to lower scale means torque decrease.
B. Operate electric screwdriver should be step by step in proper sequence, first run with a small torque to fasten the screw, if feel not enough torque, then adjust to higher torque gradually.
C. The mutual relation between torque output and scale, please refer to the "Torque Range Chart" on the instruction. The correct torque adjustment of fastening screws in subject to screws type, material, size and the object material of being screwed.
D. When object has been done screw-fastening, see if it meets the standard of quality, then measure the right torque value by Torque Meter, if the screw fastening situation is not yet to reach standard, adjust the torque from electric screwdriver until meets the standard.
E. Record the torque value with Torque Meter for electric screwdriver, and turn open the front clamping ring of electric screwdriver's housing, then exchange Torque Fixing Ring to prevent from exceptional torque change.

2、Torque Meter Operating Method (Tools: Torque Meter, Automatic Electric Screwdriver)

A. Choose a proper electric screwdriver type in accordance with the required torque of screw-fastening. Please consult with electric screwdriver catalogue or vector chart of electric screwdriver

B. Choose a proper Torque Meter: KTM-15 can be measured torque at maximum 15 kgf.cm ; KTM-150 can be measured torque at maximum 150 kgf.cm; KTM-250 can be measured torque at maximum 250 kgf.cm select the Screw Joint (According to the basis of requiring torque measurement which can be parted with 6 items as following tables:

Torque Range (kgf.cm)	Torque Meter	Screw Joint	Remark
Under 3.0	KTM-15	AJ-3	Max measurable 3 kgf.cm
3.0~15.0	KTM-15	AJ-15	Max measurable 15 kgf.cm
	KTM-150	AJ-15K	
10.0~50.0	KTM-150	AJ-50	Max measurable 50 kgf.cm
50~150	KTM-150	AJ-150	Max measurable 150 kgf.cm
50~250	KTM-250	AJ-250	Max measurable 250 kgf.cm

**The lifetime of screw joint is about 2500 times.

C. **Test procedures:**
  1.Switch on the power
  2.Set measure mode (MODE) to "TRACK"
  3.Unit switch sets to required measurement of unit. (lbf.in ; kgf.cm ; N.m)

D. Reset adjustment: Check the value on LCD display if is at zero status, if not then press CLEAR to display 0.0.

E. Set measure mode (MODE) to "PEAK".

F. Cover with connecting pole of Screw Joint on the electric screwdriver, put another end of connecting pole in the head terminal of Screw Joint, power on the electric screwdriver and start to measure output torque of the electric screwdriver.

G. When torque value has been indicated, it means functional measurement for electric screwdriver is normal and accomplished; the value indicates on LCD display is the output torque value of electric screwdriver.

H. After finishing the measurement of electric screwdriver, reverse to lose Screw Joint for keeping from springiness fatigue.

I. Use the same electric screwdriver on different brands of Torque Meters (or Screw Joint) could result in different torque value inaccuracy, such inaccuracy comes mostly from different spring character of Screw Joint. If there are two sets or more Torque Meters using on the work site, responsible department should examine Torque Meters periodically and check the gap of spring character among those Screw Joint whether too large, if the answer is yes, then need to change a new spring or the whole set of Screw Joint.

J. Please note while using Torque Meter, don't charge the battery at the same time in order to avoid affecting the accuracy of test data.

For any inquiry, please contact your dealer!

Our company reserves the right to modify the product without prior notice.