DIGITAL TORQUE & ANGLE WRENCH
Production type

Model  CTA-P & CTAE-P

OPERATING MANUAL

To use this product correctly and safely, please read this manual carefully before use. If you have any question about the product, contact your distributor or TOHNICHI MFG. CO., LTD.
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To CUSTOMER

In order to use the Digital Torque Wrench, read this manual before operation. If there are any questions, please contact Tohnichi distributor or Tohnichi. Keep this operating manual for future use.

WARNING

1. Use only Tohnichi charger and battery.
   Never attempt to use any other charger or battery.

2. Recharge battery properly.
   Use the battery charger with the required voltage indicated on the specification label.
   Use of other voltage may result in overheating and/or fire.
   Charge the battery within a temperature range of 0 to 40 C degree.
   Temperature over 40 C degree may result in bursting and/or fire.
   Recharge the battery where the ventilation is good.
   Do not cover the charger or battery with clothes.
   May result in bursting and/or fire.
   When it is not in use, disconnect the plug from the power source.
   Keeping plugged may result in electric shock and/or fire.

3. Pay attention around your work place.
   Do not use the charger or battery in the rain or in very humid or wet conditions.
   Use of the product in wet and damp places may result in electric shock and/or fuming.
   Keep work place properly lighted.
   Work in dark place may result in accident.
   Do not use the torque wrench or battery charger beside flammable liquid or gas in use.
   Do not use or charge the battery where flammable liquid or gas is used.
   May result in bursting, fire and/or accident.

4. Use only Tohnichi standard or optional accessories.
   Use only Tohnichi standard and optional accessories in this manual.
   Use of other products may cause accident and/or injury.

5. Do not throw the battery into fire.
   May result in bursting and/or leaking of harmful substances.
ATTENTION

1. Keep work place clean.
   Littered place and worktable may result in accident.

2. Keep out of children.
   Keep out other person from Digital Wrench and/or cord of the charger.
   Keep out other person from work place.

3. When it is not in use, keep it in safe place.
   Keep it in dry place, keep out from children’s reach, and/or keep it in locked. Please do not store
   the torque wrench and its battery charger in where the temperature will go up beyond 50 degree.

4. Do not use the Digital Wrench forcefully.
   The torque wrench should be used efficiently in safe place and must be operated accordingly within applicable torque range. Work in over capacity may result in accident.

5. Use Digital Wrench tool fitted to the work.
   Do not use it other than as appointed work.

6. Handle charger cord carefully.
   Please be careful with handling the cord of battery charger in use. Do not pull out the cord
   for unplug purpose or not to carry the battery charger hanging cord itself. Please keep it away from heated, greased or sharpened place. Pay attention, not step on, not to pull out, not to damage by external force during recharging operation.

7. Do not work with excessive position.
   Keep feet on the ground and balanced.

8. Maintenance it carefully.
   When replacement of attachment, follow this manual. Check up the cord of battery charger periodically. When it is damaged, please ask your Tohnichi distributor or Tohnichi for repair. When you use an extension cord, check it periodically and change it when it is damaged. Keep the grip dry and clean. Do not expose it to oil or grease.

9. Inspect the parts are not damaged.
   Needs inspection the case and parts of Digital Wrench. Please check if function is working properly and give you right performance. And also check up condition of each components and its setting. And be sure working condition is good enough for operating. Contact Tohnichi distributor or Tohnichi for repair and replacement of broken case and other parts.
NOTES

(1) Use Tohnichi AC adapter only.

(2) Use the power source with the required voltage indicated on the specification label.

(3) Do not give any shock or vibration to the Digital Wrench.

(4) Use the Digital Wrench only under the proper environment described in the operating manual.

(5) Verify the setting of the Digital Wrench before operation.

(6) Do not expose the Digital Wrench to water or oil. It will result in a possible breakdown or cause fire damage.

(7) Do not drop or hit the Digital Wrench. It will result in damage to the Digital Wrench and may cause a breakdown.

(8) Do not use the Digital Wrench beyond the specified maximum measuring range.

(9) Perform regular inspection for function and accuracy.

(10) Make sure that the display shows zero before operation.

Stop operation immediately if you notice burning odor or any other sign of fire. Do not use the Digital Wrench any more and immediately contact a Tohnichi sales office or your nearest Tohnichi distributor.
1. OUTLINE
   This digital wrench is designed based on angle tightening method. Tightening torque, tightening angle and number of tightening will be given. There are functions given such as Snug torque, 1st, 2nd, 3rd tightening angle and number of tightening. Each data and setting condition would be transferred by original application software. This wrench will tighten up the required number of bolts, and then judge them each time whether the results were OK. Otherwise will tighten up continuously to 1st, 2nd and 3rd angle for further judgments. Finally, all the data will be transferred to the original software for analyzing. Cope with NG can be chosen (Reset can be made for all data or only NG). Tightening torque at the final set angle will be memorized internally at the same time. Since a gyro-sensor detects the angle, there is no need for any external attachments to determine the angle.

2. STANDARD CONSTRUCTION
   1) Digital Angle Wrench
   2) Battery Charger (QC-1)
   3) Battery pack (BP-3R)
   4) Exchangeable head QH (Compatible ratchet head)
   5) Cable (CTA→computer)
   6) Application Soft (CD)
   7) Operating manual
   8) Application Soft manual
3. SPECIFICATIONS

### 1. SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CTA50 × 12D-P</th>
<th>CTA10 × 15D-P</th>
<th>CTA20 × 19D-P</th>
<th>CTA36 × 22D-P</th>
<th>CTA500 × 22D-P</th>
<th>CTA850 × 32D-P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GUARANTEED ACCURACY RANGE</strong></td>
<td>(2.5)10~50</td>
<td>(5)20~100</td>
<td>(10)40~200</td>
<td>(18)72~360</td>
<td>(25)100~500</td>
<td>(43)170~850</td>
</tr>
<tr>
<td><strong>TORQUE 1-digit</strong></td>
<td>0.05N·m</td>
<td>0.1N·m</td>
<td>0.2N·m</td>
<td>0.4N·m</td>
<td>0.5N·m</td>
<td>1N·m</td>
</tr>
<tr>
<td><strong>ANGLE DISPLAY RANGE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0~999°</td>
</tr>
<tr>
<td><strong>RESOLUTION (ANGLE) 1-digit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1°</td>
</tr>
<tr>
<td><strong>DIRECTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clockwise only</td>
</tr>
<tr>
<td><strong>MASS</strong></td>
<td>0.7kg</td>
<td>0.8kg</td>
<td>1.1kg</td>
<td>1.6kg</td>
<td>3.5kg</td>
<td>4.9kg</td>
</tr>
<tr>
<td><strong>TORQUE ACCURACY</strong></td>
<td>±1%+1digit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANGLE ACCURACY</strong></td>
<td>±2° +1digit (Angular velocity within 30°/s ~ 180°/s when bolt is turned to 90°)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DISPLAY</strong></td>
<td>TN Reflection Type Liquid Crystal Display</td>
<td>Counter Value: 2 Figures (Height 3mm)</td>
<td>Counter Display: 2 Figures (Height 7mm)</td>
<td>Torque Value: 4 Figures or 3 Figures (Height 7mm)</td>
<td>Angle Value: 3 Figures (Height 7mm)</td>
<td></td>
</tr>
<tr>
<td><strong>MEASUREMENT MODE</strong></td>
<td>RUN (Angle/Torque) PEAK (Torque Tightening/Angle Tightening)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DATA MEMORY</strong></td>
<td>Tightening torque value - 1st angle value - 2nd angle value - 3rd angle value - final tightening torque value (final tightening angle torque value) Maximum 20 data for each tightening value (ex: 1 engin 20 data x 5 types = 100 data)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DATA OUTPUT</strong></td>
<td>RS232C based on output 1 data at tightening and all data after 1 process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PARTICULAR SETTING</strong></td>
<td>Snug torque setting - tightening torque setting - tightening torque setting - maximum setting - 1st, 2nd, &amp; 3rd tightening angle setting - 1st, 2nd, &amp; 3rd maximum tightening angle setting - tightening number - auto reset data output - NG measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MEASURING FUNCTION</strong></td>
<td>When it comes to set value, buzzer will go off. It will measure after load release. Condition: NG: maximum value &lt; measured data OK: maximum value ≥ measured data ≥ set value OK: buzzer and LED will light (approx. 1 second) NG: buzzer and LED will blink</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OTHER FUNCTIONS</strong></td>
<td>Auto Reset, Auto Zero, Auto Power Off (Approx. 20 Minutes), Battery Residual Display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OUTSIDE SIGNAL OUTPUT (OPTION)</strong></td>
<td>Total finish signal output (approx. 0.5 second output)</td>
<td>Gauge point capacity (Load Resistance) DC30V 1A AC125V 0.3A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POWER</strong></td>
<td>Ni-cd (BP-3R)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONTINUOUS OPERATION</strong></td>
<td>8 Hours (Recharging Time: Approx. 1 Hour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPERATING ENVIRONMENT</strong></td>
<td>Temperature: 0~40°C</td>
<td>Moisture Below: 85%RH (No Bedewing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STANDARD ACCESSORIES</strong></td>
<td>QH, BP-3R, QC-1 (1 Piece each)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Angle-Measurement area (°) Minimum~maximum</td>
<td>1digit</td>
<td>Angle accuracy</td>
<td>Torque Measurement area (N·m) Minimum~maximum</td>
<td>1digit</td>
<td>Torque accuracy</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------</td>
<td>--------</td>
<td>----------------</td>
<td>-----------------------------------------------</td>
<td>--------</td>
<td>----------------</td>
</tr>
<tr>
<td>CTA50 × 12D-P</td>
<td>0~999</td>
<td>1</td>
<td>±2° +1digit</td>
<td>(2.5)10~50</td>
<td>0.05</td>
<td>±1% +1digit</td>
</tr>
<tr>
<td>CTA100 × 15D-P</td>
<td></td>
<td>1</td>
<td>(30° /s ~ 180° /s)</td>
<td>(5)20~100</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>CTA200 × 19D-P</td>
<td></td>
<td>1</td>
<td>90° when rotated</td>
<td>(10)40~200</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>CTA360 × 22D-P</td>
<td></td>
<td>1</td>
<td></td>
<td>(18)72~360</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>CTAE500 × 22D-P</td>
<td></td>
<td>1</td>
<td></td>
<td>(25)100~500</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>CTAE850 × 32D-P</td>
<td></td>
<td>1</td>
<td></td>
<td>(43)170~550</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
4. Parts names
   I. Names of display

   ![Diagram of parts names]

   - Buzzer Output
   - Reset Switch (inside)
   - End lamp
   - Liquid Crystal Display
   - メンプレンスリッチ
   - Terminal for AC Adapter
   - RS232C Output
II. Display after Reset (Run Mode)
Angle/Torque Run Mode (Switch Display)

- Display after Reset
  - Torque/Angle Run Mode

- Battery Check Indicator
- Unit Display
- Torque Display
- Alternate torque and angle by pushing MD key

- MD
- Angle Display

- Key Function

  ▲ Will not use
  ▼ Will not use

  MEM Measurement start key (measurement display will appear)

  MD Display switch key
  Display Reset, manual zero (only at torque display)

  C Auto zero function will activated when the angle standstill for 2 seconds.
III. Measure mode display (torque/angle peak display)
Press the MEM key while it is run mode to change display.

- Measurement Display
  - Torque Tightening Display

- 1st, 2nd, 3rd Angle Tightening Display
  Torque display remains until snug torque achieved. Display would change into angle afterwards.

<table>
<thead>
<tr>
<th>Process</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>Snug Torque</td>
</tr>
<tr>
<td>1t</td>
<td>1st Angle, Torque display</td>
</tr>
<tr>
<td>2t</td>
<td>2nd Angle, Torque display</td>
</tr>
<tr>
<td>2A</td>
<td>2nd Angle</td>
</tr>
<tr>
<td>3t</td>
<td>3rd Angle, Torque display</td>
</tr>
<tr>
<td>3A</td>
<td>3rd Angle</td>
</tr>
</tbody>
</table>

- Key Function
  - ▲ ▼: Will not use
  - Cancel one tightening
    - One countdown
  - MEM: Data memory, display reset after 1 data output. One count down
  - MD: Process reset (back to snug torque tightening)
  - C: Display reset, manual zero (only at run mode)
  - Automatic zero function will activated when the angle staysttill for 2 seconds.
5. Function and operation of key
   1. Function
      □ Zero Adjustment (Angle)
      Place the Digital wrench on a flat bench or desk, turn on the power key
      and leave the digital wrench at a standstill for more than 2 seconds in
      order to automatically adjust to zero. If “Err 0” appears in the display, the
      zero adjustment is made by key operation. (Angle zero)

      □ Automatic Zero (Torque)
      In case of residual force remaining after releasing the load, “0” would be
      shown on the display if it’s value is bellower than 2%.
      If the value is beyond 2%, error message “Err 9” will be displayed.

      □ RUN Mode (Continuous Display)
      After resetting the operation, display would be set as Run-Mode.
      When loaded, displayed value will go up and will go back to “0” when it is
      released. And rotate the wrench at angle run mode; it will display the Angle.
      (clock wise only) For angle display reset, press C button or standstill for
      more than two seconds in order to get Auto zero setting.

      □ Peak Torque (Maximum Torque)
      If the display value exceeds over approximately 2.5% of the maximum
      capacity, maximum torque value applied remains as Peak torque. If the
      display value does not exceed approximately 2.5% of the maximum
      capacity, the display value will return to zero.

      □ Measurement Function
      When it go up to set value, the buzzer will go off and release the load to
      do measurement.
      OK: buzzer and LED will light on for 1 second
      NG: buzzer and LED will blink

      □ Snug Torque Setting
      Setting the Torque value to start angle measurement.

      □ Tightening Torque Setting
      Setting of tightening Torque.
□ Tightening Torque maximum setting
Setting Maximum Tightening torque

□ 1st (2nd · 3rd) tightening angle setting
Setting tightening angle from snug torque to 1st, 2nd, and 3rd.

□ 1st (2nd · 3rd) maximum angle setting
Setting maximum tightening angle from snug torque to 1st, 2nd, and 3rd.

□ Tightening number setting
Set the tightening number

□ Measure time setting
Measurement time setting value 0.5 ～ 5 seconds.
(Interval can be adjusted freely with 0.5 seconds as minimum digit)

□ Data Output Method Setting
Setting data output method (format)

□ Procedure at NG
Procedure at NG, Leave the count as it is or start from beginning.

Each setting can be transmitted by original application software from computer.

□ Over Torque Alarm
If the applying torque exceeds the guaranteed Torque, the display starts flashing and the buzzer sounds.

□ Manual Reset
When automatic function is not used, data reset can be made by pressing C key. And also measured data can be memorize the peak value by pushing MEM key and output RS232C. Then display will reset.

□ Automatic Power Off
Power would be turned off unless there is any measurement action either with any key operation for 20 minutes at Applicable condition.
Or power would be turned off without any key operation for a minute at Battery Alarm condition.
**Battery Check Display**

Battery residual amount is displayed as follows.

<table>
<thead>
<tr>
<th>Battery Condition</th>
<th>Residual Amount</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Battery 4 bars]</td>
<td>Approx. 8 hours operation available</td>
<td>None</td>
</tr>
<tr>
<td>![Battery 3 bars]</td>
<td>Battery residual amount is half.</td>
<td>None</td>
</tr>
<tr>
<td>![Battery 1 bar]</td>
<td>Only 30 minutes operation available.</td>
<td>Be prepared for recharging. Transmit the stored data to other recorder if necessary.</td>
</tr>
<tr>
<td>![Battery 1 bar]</td>
<td>Operation no longer available, but still able to transmit data.</td>
<td>Transmit the stored data within 3 minutes and recharge the battery.</td>
</tr>
</tbody>
</table>

**Data Transmission**

RS232C(Standard)

Stored data can be transmitted with Tohnichi cable connected to printer or PC.

(See 8 Data output application instruction manual)

**Error Message**

Err0---Zero adjustment not possible  
Err6---Angle sensor abnormal  
Err9---Torque sensor abnormal
II. OPERATION

① Zero Adjustment

If error message "Err 0" appears in the display when the power switch is turned on, adjust to zero by key operation.

Automatic procedure when the switch is turned on.

Unless zero adjustments completed within 6 seconds standstill, "error0" will appear in the display.

Press two keys at the same time.

If Zero kept 2 seconds standstill "good" will be appeared as measurement ready.

Unless zero adjustments completed within 6 seconds standstill, "Error0" will appear in the display.
Various Setting

- Various Setting (No.1)

Run mode display

Snug Torque setting

Sn1

Maximum Tightening Torque setting

SE

Caution
When not using tightening torque, set value to 0.0.

Maximum Tightening Torque setting

SEH

1st Angle value setting

AS1

1st Angle maximum value setting

AH1

to 2nd Angle setting

- Caution
Setting can only be made from run mode.
Push reset from measuring mode to run mode to setting.

Press keys, C → MEM → MD

Vertical movement

Count down

Write setting

Next Step

Cancel

<table>
<thead>
<tr>
<th>Display</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sn1</td>
<td>Snug Torque</td>
</tr>
<tr>
<td>SE</td>
<td>Tightening Torque</td>
</tr>
<tr>
<td>SEH</td>
<td>Tightening Torque maximum value</td>
</tr>
<tr>
<td>AS1</td>
<td>1st Angle</td>
</tr>
<tr>
<td>AH1</td>
<td>1st Angle maximum value</td>
</tr>
<tr>
<td>AS2</td>
<td>2nd Angle</td>
</tr>
<tr>
<td>AH2</td>
<td>2nd Angle maximum value</td>
</tr>
<tr>
<td>AS3</td>
<td>3rd Angle</td>
</tr>
<tr>
<td>AH3</td>
<td>3rd Angle maximum value</td>
</tr>
<tr>
<td>Cn1</td>
<td>Tightening count</td>
</tr>
<tr>
<td>Ar</td>
<td>Measurement Time</td>
</tr>
<tr>
<td>do</td>
<td>Data output method</td>
</tr>
<tr>
<td>nG</td>
<td>Setting at NG</td>
</tr>
</tbody>
</table>
Various Setting (No.2)

2nd Angle value
AS2
Caution
when not using 2nd angle, set value to 0.0.

2nd Angle maximum value
AH2

3rd Angle value
AS3
Caution
When not using 3rd angle, set value to 0.0.

3rd Angle maximum value
AH3

Tightening count
Cn1
Count 1~20
Measuring time

Ar
Measuring time 0~5.0 seconds
Caution
When not using measurement function, set 0 second

Data output method
do

Pc  PG output
Prn  Printer output

Setting at NG

nG

nG-o

nG-0  Only NG
nG-A  Start from begging

Run Mode Display
End Setting

rUt
0.0

Nm
Nm
Nm
Nm
Nm
Nm
Nm
Nm
Nm
Nm
6. How to Use

[Diagram showing tightening procedure with steps]

- **Tightening Procedure**
  - Power ON
  - Check Setting
  - Start Tightening
  - Torque unit display

- Measurement function on/off
- Tightening count display
- Torque display
- Torque tightening

- Tightening process

<table>
<thead>
<tr>
<th>Process</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1t</td>
<td>1st angle tightening torque display</td>
</tr>
<tr>
<td>2t</td>
<td>2nd angle tightening torque display</td>
</tr>
<tr>
<td>3t</td>
<td>3rd angle tightening torque display</td>
</tr>
<tr>
<td>3A</td>
<td>3rd angle tightening</td>
</tr>
</tbody>
</table>

- Torque display
- Maximum 3 digits
  - ex. 100.0N.m + 100N.m
  - 10.0N.m -> 10.0N.m

- Angle display
- 1st angle tightening
  - Tightening start from torque display.
  - Will change to angle display when it goes over snug torque.

- Angle display
- 2nd angle tightening
  - Tightening start from torque display.
  - Will change to angle display when it goes over snug torque.

- Angle display
- 3rd angle tightening
  - Tightening start from torque display.
  - Will change to angle display when it goes over snug torque.

- "doUt" blink
- Data output
1. Torque Tightening

- Torque Tightening Mode

```
Start
  Tightening
  Tightening till tightening torque
  Buzzer ON (continuous)
  Return wrench
  Torque load release → buzzer OFF
  Measurement
  OK
    LED 1 second lit, and buzzer
    Automatic reset?
    On
      Manual reset (MEM)
      (count down, data memory)
      Automatic reset
      (count down, data memory)
    No
      count=00?
        Yes
        next process
        No
  NG
    LED blink, buzzer
    C key
    wait for input
    Yes
    Manual Mode
    only NG
    All count
    same count
    Count reset
    return process
    start over
```
II. Angle Tightening

1st, 2nd, and 3rd Angle Mode

```
Start tightening

tightening till snug torque

Start angle count

tightening till settled angle
buzzer ON(continuous)

return wrench
load release—buzzer OFF

measurement

OK

LED light for 1 second.
Buzzer sound

Off

Automatic reset?

On

manual reset(MEM)
count down, data memory

Automatic reset
count down, data memory

No
count=00?

Yes

End of final angle tightening
output (approx. 0.5 seconds)

next process/data output

NG

LED blink, buzzer sound

C key

No

Yes

All count

manual mode

Only NG

leave count, count reset

return process

start from
beginning
```
III. Battery charging

① Insert the jack of the charger into the Digital Wrench.
② Insert the plug of the charger into the wall outlet. Charging starts.
   Charging takes approximately 1 hour.
③ Check the lamps on the charger.
   Red lamp lit---------On charging
   Green lamp lit--------Charging is completed
   Red lamp flashing/Green lamp lit--------charging error
④ When green lamp is lit, the charging is completed.

⚠ CAUTION
Disconnect the AC charger from the Power Supply and the Digital Wrench after charging.
7. OPTIONAL ACCESSORIES

I. Tohnichi Printer

II. Cable for EPP16M2 Printer

Catalog No.381 (EPP16M2)
Catalog No.377 (EPP16M)

8. Data output

Data Form : RS232C
Transmit Method : Start stop synchronous serial
bps Rate : 2400bps
Data Length : 7bit
Stop Bit : 1bit
Varity : None

Snug Torque output format

<table>
<thead>
<tr>
<th>R</th>
<th>E</th>
<th>S</th>
<th>0</th>
<th>1</th>
<th>0</th>
<th>2</th>
<th>0</th>
<th>.</th>
<th>0</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header</td>
<td>Snug Display</td>
<td>Counter</td>
<td>Snug Torque Data</td>
<td>Delimiter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Angle 1st, 2nd, and 3rd output format

<table>
<thead>
<tr>
<th>R</th>
<th>A</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>0</th>
<th>9</th>
<th>0</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header</td>
<td>Angle Display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1:1st Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2:2nd Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3:3rd Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counter</td>
<td>Angle Data</td>
<td>Delimiter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Final Torque output format

<table>
<thead>
<tr>
<th>R</th>
<th>E</th>
<th>T</th>
<th>0</th>
<th>1</th>
<th>0</th>
<th>2</th>
<th>0</th>
<th>.</th>
<th>0</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header</td>
<td>Final Torque display</td>
<td>Counter</td>
<td>Final Torque Data</td>
<td>Delimiter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Transmission to PC

1. Transmit 1 data
   Transmit data to PC by pressing MEM key.
   When at automatic measure mode, data is automatically transmitted if data is OK.

2. Transmit all data (Refer to application manual)
   After final process, "doUt" display will blink. Transmit all data by pushing ▼ key.
   Output 1 engine (Maximum 20 count each) snug torque, 1st angle, 2nd angle, and final torque (when torque reach final set angle).
PC Data Output example

RES,01,020.0
RES,02,021.0
RES,03,020.5
RES,04,020.4
RES,05,020.6
RA1,01,090
RA1,02,092
RA1,03,090
RA1,04,095
RA1,05,090
RA2,01,090
RA2,02,091
RA2,03,092
RA2,04,091
RA2,05,090
RET,01,065.0
RET,02,064.0
RET,03,063.0
RET,04,066.0
RET,05,065.0

Snug Torque Data

1st Angle Data

2nd Angle Data

Final Torque Data

Caution
CR+LF display at delimiter will be added in actual display. Above example omitted it.

Printer Output Example (Output altogether)

Printer Data Output Example

1: S 20.0 N\cdot m → Snug Torque
   :1A 90 deg → 1st Angle
   :2A 92 deg → 2nd Angle
   : T 65.0 N\cdot m → Final Torque

2: S 21.0 N\cdot m
   :1A 91 deg
   :2A 92 deg
   : T 64.0 N\cdot m

3: S 22.0 N\cdot m
   :1A 93 deg
   :2A 95 deg
   : T 66.0 N\cdot m