CONTINUATION

Dear User,

Description in the manual is based on the newest products. Owing to improvement or other changes, contents of manual may differ from practical situation. Our company will reserve the right of recension at any moment. Please kindly forgive not to notify the revised places one by one.

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SUNDOO®
ADVANCED PRECISION INSTRUMENT

ST SERIES USER'S MANUAL

ST Series

User Manual

数 字 式 扭 矩 测 试 仪

DIGITAL TORQUE METER

For

ST-50

ST-100

ST-200

ST-500

CE CNAS

温州山度仪器有限公司
WENZHOU SUNDOO INSTRUMENTS CO., LTD

Thanks very much for your patronage to purchase ST Series Digital Torque Meter.
It is an intelligent multi-function measurement instrument, and can be used for testing various toqure. Before using it, please reading this manual carefully in order to take full advantage of this instrument all functions and get correct torque value.

CONTENTS

Packing List

Item	Name	Quantity
1	Instrument Case	1
2	Sensor	1
3	Power Cable	1
4	Sensor Connection Cable	1
5	M10×40 Inner Hexagon Screw	4
6	M10 Inner Hexagon Spanner	1
7	M6 Inner Hexagon Spanner	1
8	M6×12 Inner Hexagon Screw	4
9	ST Bakelite Handle Module	1
10	1/4' Square Connector	1
11	3/8' Square Connector	1
12	1/2' Square Connector	1
13	Straight-through RS232 Cable with Two- sided Holes	1
14	Software CD	1
15	Manual	1
16	Factory Inspection Report	1
17	Qualification Certificate	1
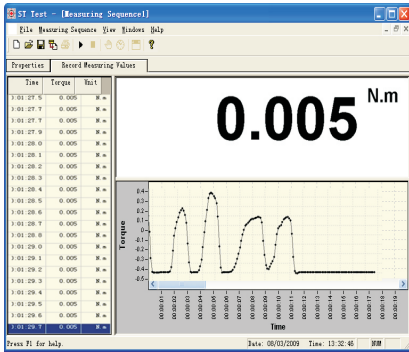
Picture 15
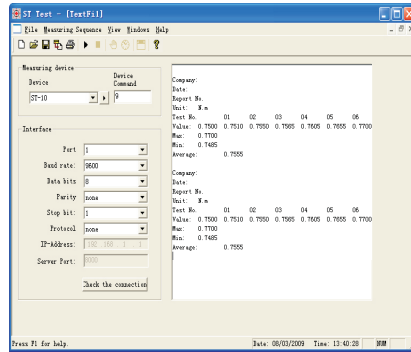
Picture 16

Cautions and Maintenance

1. Before using the torque meter, fix it on working table to ensure it will be not moved.
2. Do not use equipment overload, otherwise the meter may be damaged, even danger will happen.
3. Do not hit or put something on the LCD screen.
4. Do not press the button with nail, pointed tool or sharp objects.
5. Do not use the meter near water, oil or other liquids, and keep the meter in dry, shady and stable place.
6. Do not open the rear cover or adjust the resistor.
7. Do not loose the fixed screw on torque measuring head.
8. Do not plug in or out power with wet hand to avoid electric shock.
9. Clean the gauge with soft cloth. First put the dry cloth in the water with detergent and then dry the cloth and clean the gauge. Do not use volatile chemical liquid such as volatile oil, thinner, alcohol, etc.
10. Handle carefully while carrying and using the meter.
11. Do not tear, repair, or update the equipment by yourself, which may cause permanent malfunction.
12. If malfunction, please connect original sale department or our company.

Specification and Parameter

| Model	ST-50	ST-100	ST-200	ST-500
Capacity	50N.m	100N.m	200N.m	500N.m
Resolution	0.02N.m	0.05N.m	0.1N.m	0.2N.m
Accuracy	±1%FS			
Unit	N.m、kgf.cm、lbf.in			
Peak Collection Frequency	2000Hz			
Test Spted	≤3000 rpm			
Sensor Type	Sensor Outside			
Power	AC 220±10% V, 50Hz			

Function

ST Series Digital Torque Meter is an intelligent multi-function measurement instrument and can be used for testing various torque. It is mainly used for testing and calibrating the torque of various electric/ pneumatic screwdriver (speed is less than 3000rpm)/torque driver/torque wrench. It is also used for testing tightening force of other products and destructive test of parts torsional.

It has high accuracy, easy to operate and handy to carry out, which is widely used in electric, light industry, machinery manufacture, scientific research, and so on.

Main Characteristics

1. High accuracy and high resolution.
2. Free setting and judgment of upper and lower limit deviation value, red/ green indication lamps and buzzer can alarm automatically with sound and light.
3. Torque Direction display.
4. Blue Background light.
5. Store and print 10 groups test value.
6. Real-time printing of single time test curve.
7. Calculate the average of stored data automatically.
8. Convert three units (N.m, kgf.cm , lbf.in) automatically.
9. Peak hold function.
10. Peak automatic diacharge function and discharge time can be set freely.
11. It can turn off automatically without any operation, and the shutdown time can be set freely.
12. Inside printer, print 10 group of test data to judge max, min, average, qualified and unqualified value.
13. RS-232C output, connecting to computer can realize curve test function; connecting to printer can print 10 groups of stored test data or current test curve.
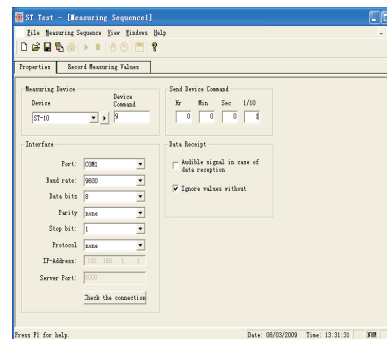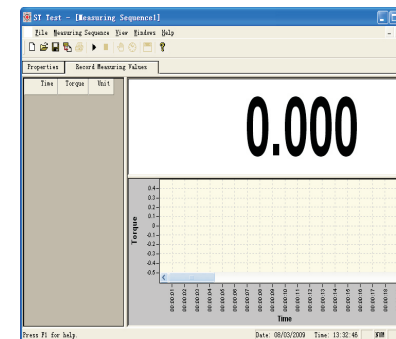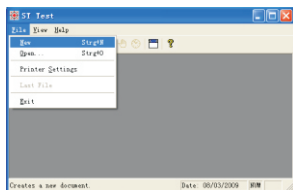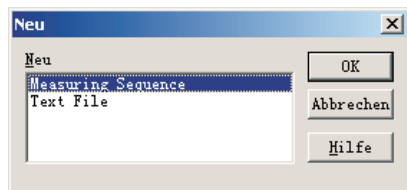

Picture 13   Picture 14

G. After setting the parameters, please click "Record Measuring values" option, and switch to curve display interface.After clicking start button " ▶ ", then click "TIMER" (⊙) to collect test data curve (See Picture 14 on Page 10).

H. After finishing test, please click stop button " ■ " to stop testing(See Picture 15).

I. Click save button to save the data.

J. If you choose the Text File, it means that you can import the stored data of the meter. Please choose the matched model and correspon-ding serial port, then click the start button " ▶ " to open the serial port and press "PRINT" on the meter to import the stored data to the computer (See Picture 16).

Icon instruction

" 🖼 "： The collection data is imported into EXCEL file;

" ▶ "： Open serial port to start test;

" ■ "： Close serial port to stop test;

" 🖐 "： Collect current value manually;

" ⊙ "： Collect the data continuously and regularly.

（1）Hardware environment
    A. CPU: Celeron 1G or above.
    B. Memory: 256MB or above.
    C. Hard disk available capacity: 300MB or above.
    D. Drive: CD-ROM or DVD-ROM.
（2）Software environment
    Operating system: Windows XP (32bit).
（3）Specific operation
    A. Connect meter with computer via straight-through RS232
      cable with two- sided holes.
    B. Turn on the meter, make it in working status, then set the serial
      ports mode as PC state(See Setting details on Page 7).
    C. Put CD into computer drive and open software route: CD-ROM/
      English/Measuring software/ST/ST Test/ST Test.exe.
    D. Click "New" in the "File" option (See Picture 11 on Page 10).
    E. There are two modes to choose in new dialog box: Measuring
      Sequence and Test File (See Picture 12).

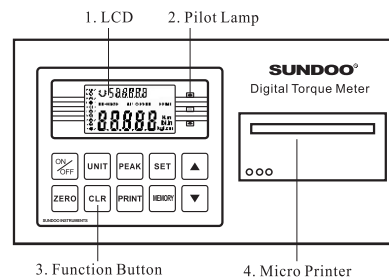Picture 11   Picture 12

F. After choosing "Measuring Sequence", please choose correspon-
   ding model and serial port, and set the time of capturing the signal
   of force value in Send Device Command. 1/10 means 0.1 second
   (See Picture 13: When Hr is 0, Min is 0, Sec is 0, 1/10 is 1, then the
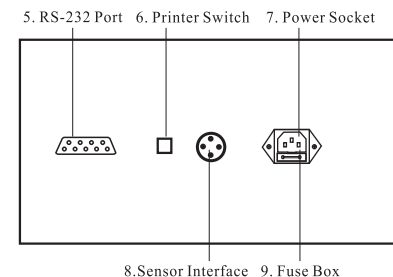   capturing time is 0.1 second).
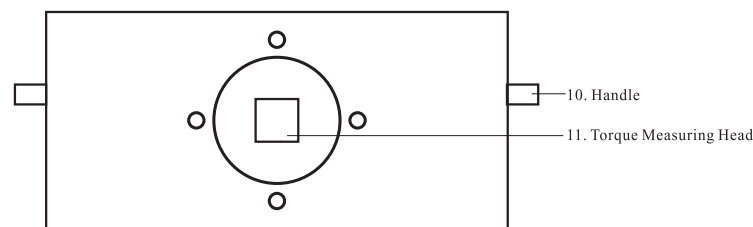
Parts and Functions
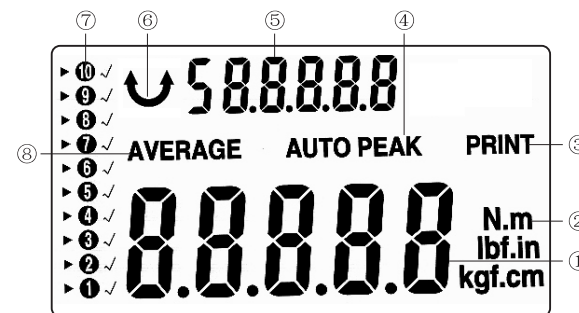
Front of Instrument: Back of Instrument:

1. LCD   2. Pilot Lamp   5. RS-232 Port   6. Printer Switch   7. Power Socket

SUNDOO®
Digital Torque Meter

3. Function Button   4. Micro Printer   8.Sensor Interface   9. Fuse Box

Picture 1   Picture 2

Sensor:

10. Handle
11. Torque Measuring Head

Picture 3

1、LCD

⑦   ⑥   ⑤   ④

⑧   AVERAGE   AUTO PEAK   PRINT ③

N.m ②
lbf.in ①
kgf.cm

Picture 4

① Torque test value reading, under setting status, it displays set value.

② Torque unit: Three different units of measurement (N.m, lbf.in, kgf.cm) can realize automatic conversion.

③ Printing indication, print all stored data or single test curve.

④ Peak value indication

　　When it displays " PEAK " on LCD screen, it is max test value in locked status ; when it displays "AUTO PEAK" , the peak is in automatic discharge status.

⑤ Stored test value, average of the stored data or the symbols of indication function at the set state.

⑥ The symbol of torque direction

　　" ↑ " is clockwise, " ↗ " is counterclockwise.

⑦ Store test value

　　" ❶❷❸❹❺❻❼❽❾❿ " ten locations, each location can store one test value;

　　" ▶ " shows that it is current stored reading location.

　　" √ " shows that the location has already stored test value.

⑧ Average indication symbol of stored test data.

2. The Pilot lamp of upper and lower limit automatic alarm

　　▣ Pilot lamp of upper limited alarm

　　OK Normal value indicator lamp

　　▣ Pilot lamp of lower limited alarm

　　Under test status, if test value is in the range of upper and lower limit devia-tion, normal value indicator lamp " OK " will light , meaning that it is eligible; If test value exceeds upper limit value, the indicator lamp of upper limit " ▣ " will light, and the buzzer alarms, meaning that it is not eligible; If the test value is less than lower limit value, the indicator lamp of lower limit " ▣ " will light,and the buzzer alarms, meaning that it is also not eligible. This can inform users that the test result isn't in the range.
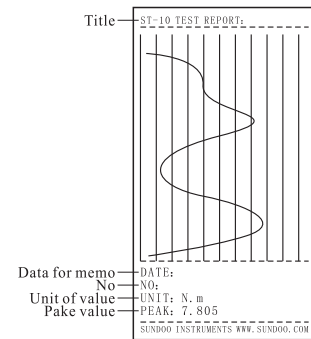
Port Output and Print

This meter is RS-232C level output, which can be connected with printer, computer or other equipments. The matching micro printer must support RS-232C electrical level. The setting method of RS-232 port output is on the Page 7.
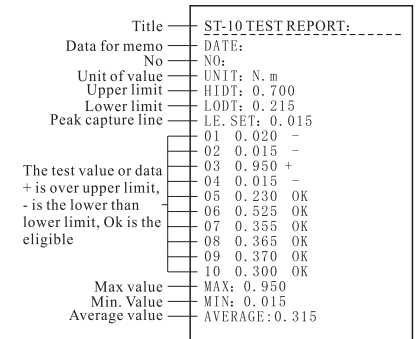
Illustration of RS-232 Port
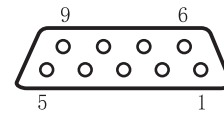
Needle	Signal	Illustration
2	TxD	output signal of SCM
3	RxD	reception signal SCM
5	GND	Signal place

1. When RS-232C output is set at Pr.1, it means the single tested Curve will be printed. Press " PRINT " , and "Print" will appear on the screen, then test curve will be printed synchronously in the process of testing. The picture on left is a sample(See Picture 9 on Page 9).

Title — ST-10 TEST REPORT:_____

Data for memo — DATE:
No — NO:
Unit of value — UNIT: N.m
Pake value — PEAK: 7.805
SUNDOO INSTRUMENTS WWW.SUNDOO.COM

Picture 9

Title — ST-10 TEST REPORT:_____
Data for memo — DATE:
No — NO:
Unit of value — UNIT: N.m
Upper limit — HIDT: 0.700
Lower limit — LODT: 0.215
Peak capture line — LE.SET: 0.015
01 0.020 −
02 0.015 −
03 0.950 +
04 0.015 −
05 0.230 OK
06 0.525 OK
07 0.355 OK
08 0.365 OK
09 0.370 OK
10 0.300 OK
Max value — MAX: 0.950
Min. Value — MIN: 0.015
Average value — AVERAGE:0.315

The test value or data + is over upper limit, - is the lower than lower limit, Ok is the eligible

Picture 10

2. When RS-232C output is set at Pr.2,it is exported to micro printer to print 10 groups stored data. The screen will flicker and show "Print". When " PRINT " is pressed and ten groups of data and analysis report will be printed synchronously. Please refer to the picture(See Picture 10).

3. When serial port output mode is PC, you can view force curve by software or input 10 groups of stored data to computer by connecting to computer. The required configuration and specific operation are as follow :

Press "[SET]" for the first time, the LCD screen will display "HIDT", and the digital box displays current upper limit value. Pressing "[▲][▼]" can change current value.

Press "[SET]" for the second time, the LCD screen will display "LODT", and the digital box displays current lower limit value. Pressing "[▲][▼]" can change current value.

Press "[SET]" for the third time, the LCD screen will display "P.OFF", and the digital box displays automatic power-off time. Pressing "[▲][▼]" can change current value.

Press "[SET]" for the fourth time, the LCD screen will display "A.PE', and the digital box displays peak holding automatic-discharge time. Pressing "[▲] [▼]" can change current value.

Press "[SET]" for the fifth time, the LCD screen will display "RS232", and the digital box displays PC, Pr.1or Pr2. Pressing "[▲][▼]" can change current status.

Press "[SET]" for the sixth time, the LCD screen will display "LIGHT" , and the digital box displays "ON"or " OFF". " ON " means background lamp is lighting, "OFF" means background lamp isn't lighting. Pressing "[▲][▼]" can change current status.

Pressing "[▲][▼]" for the seventh time, the instrument will save all changed settings and back to working condition.

Note: During setting, pressing "[ZERO]" can save setting and back to test condition.

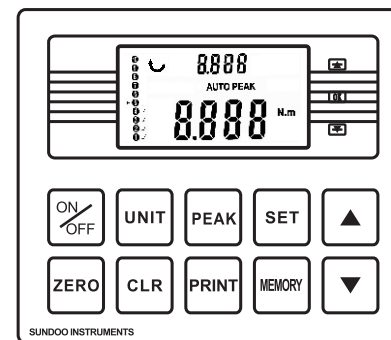5. After using the meter, please turn off the meter and put it back into instrument box.

Torque Measuring Head and Connection Dimension

15　　　20

20
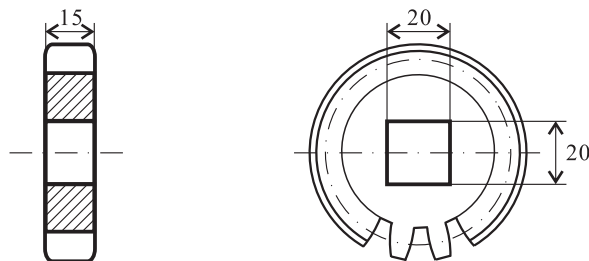
Tooth Number:18,   Modulus:3, Tooth Shape Angle:20°

Picture 8

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3. Function Buttons

Picture 5

[ON/OFF]　Power ON / OFF

[ZERO]　Zero Button
Be used for cleaning to zero, cleaning peak value and saving set value.

[UNIT]　Unit Button
→ N.m → kgf.cm → lbf.in →

[CLEAR]　Clear Button
In the state of testing, pressing " [CLEAR] " will delete the data which "▶" points at; pressing "[CLEAR]" all the time will delete all the memory testing data.

[PEAK]　Peak Button
Converting three states: peak hold, peak hold automatic discharge and real-time tracking of torque value. Real-time tracking of torque value is default status after power on.

[PRINT]　Print Button
Be used for printing current data (See details on Page 9).

Memory

Be used for saving test value and calculating the average of stored data; Pressing "MEMORY" can store test value on the LCD screen; Press the button all the time and the LCD will display "AVERAGE", thus you could view the average of all stored value.

Set Button

A. Set upper and lower limit automatic alarm values.

B. Set automatic shutdown time (free setting from 1~60minutes, 0 is not automatic shutdown).

C. Set peak hold automatic discharge time (free setting from 1~30 seconds).

D. Set serial port output mode.

E. Set ON/OFF status of blue background light.

Add Button

A. Under storing test value status, press"▲", and "►"symbol will forward one location. Pressing the "MEMORY" can store test value on the LCD screen. If there is" √ " symbol beside the location, it means that test value has been stored into the location, and the new test value will replace previous stored value.

B. Under setting status, press"▲" and the set value will increase. If you press it all the time, the data will increase continuously.

Reduce Button

A. Under storing test value status, press " ▼ ", and " ►"symbol will backward one location. Pressing the " MEMORY " can store test value on the LCD screen.If there is " √ " symbol beside the location, it means that test value has been stored into the location, and the new test value will replace previous stored value.

B.Under setting status, press " ▼ " and the set value will decrease. If you press it all the time, the data will decrease continuously.

4. Micro Printer

Print 10 group of test data to judge max, min, average, qualified and unqualified value.

5. RS-232 Port

RS-232 port output, test data can be transferred into computer for analysis.

6. Printer Switch

7. Power Socket

8. Sensor Interface

9. Fuse Box

Fuse inside is used for protecting the meter against overload current.
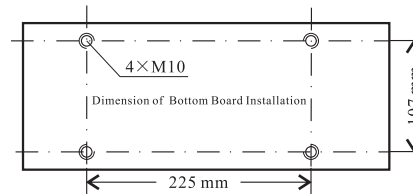
10. Handle

11. Torque Measuring Head

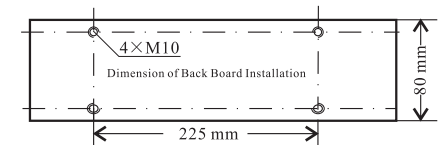Combine with various clamps to transmit torque load to sensor.

Operation Environment

1. Temperature:0℃-40℃.

2. Relative humidity:35％RH～65％RH.

3. No vibrancy and no cautery around.

Operation Process

1. Fix the tester on the working table;

4×M10

Dimension of Bottom Board Installation

107 mm

225 mm

4×M10

Dimension of Back Board Installation

80 mm

225 mm

Picture 6   Picture 7

2. Normally, the value is zero when the meter is on. If the value is not zero, please press zero button to clear .

3. Press unit button to choose the unit according to test requirement.

4. Setting upper and lower limit deviation values, automatic power-off time, peak hold automatic discharge time, serial port output mode and background light ON/OFF choice: