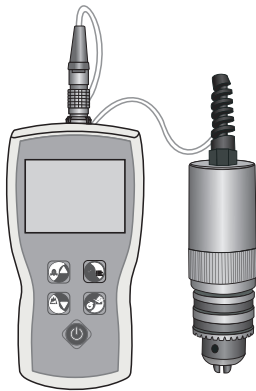


Digital Torque Gauge



User's Manual

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1. Introduction

1.1 Overview

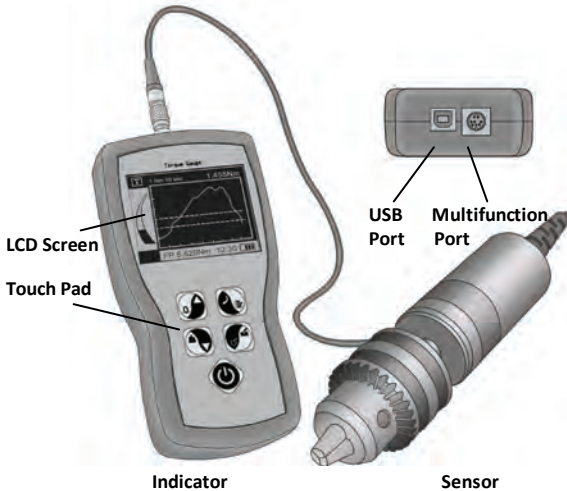


Fig. 1-1

The torque gauge consists of a torque indicator and a torque sensor. An indicator can be equipped with a few of torque sensors. Every torque sensor can be calibrated independently, and indicator can identify them automatically.

Fig.1-1.

1.2 Indicator

1.2.1 Touch Pad



Power

Push for 2 seconds to power On or Off.



Save/Exit

During Measurement:
Print the current value or store data, depending on the key setting.
In Menu: Back or Exit.



Menu/Enter

During Measurement:
Enter the menus.
In Menu: Select or Enter.



Zeroing/Up

During Measurement: Zeroing.
In Menu: Moves selection up or increases the value.



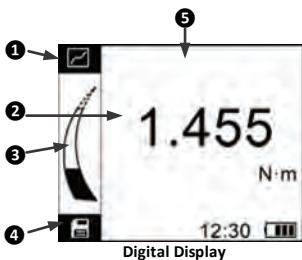
Mode/Down

During Measurement: Changes Test Mode.
In Menu: Moves selection down or decreases the value.



Fig. 1-2

1.2.2 LCD Screen



Digital Display

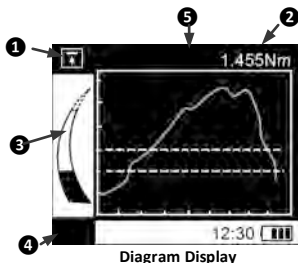


Diagram Display

Fig. 1-3

1 Test mode



Track,



Peak,



Preset,



First Peak

2 Torque value

3 Analog bar and Direction Icon: Indicates current position in whole capacity.

When the bar enters the area enclosed by dotted line, means overload. “”

Clockwise(CW), “” Counterclockwise(CCW).

4 Saving icon &

Sensor icon: Indicates

data is being saved. If

no torque sensor



Fig. 1-4

connecting, show “” here and twinkling.

5 Tolerance alarm Indicator: “”: under lower limit; “”: between lower limit and upper limit; “”: over upper limit.

1.3 Torque Sensor

There are 3 types of torque sensor can be connected with indicator. The indicator can identify their capacity automatically.

1.4 Specifications

Accuracy	$\pm 0.3\%$ F.S.		
Selectable Units	N*m, N*cm, kgf*cm, lbf*in (Selectable)		
Display	160*128 dot matrix LCD with LED Backlight		
Overload	120% of F.S. (LCD flashes beyond 110% of F.S.)		
Measurement Mode	Track, Peak, Auto Peak, Preset, First Peak		
Set Point	Tolerance Alarm		
Sampling Rate	1000 Hz	Display Update	10 times/sec.
Memory	1000 data		
Power	3.6VDC Ni-MH rechargeable batteries		
Battery Life	Approx. 12 hours continuous use per full charge		
Charger / Adaptor	Universal USB/BM charger, Input:110~240VAC		
Outputs	USB, RS232, Set points output		
Environment	Operating: -10 to 40°C, 20 to 80% RH Storage : -20 to +50°C , 5 to 95%RH		
Accessories	AC adapter/charger		

The capacity and resolution is in table on back cover.

2. Operation

2.1 Test Preparation

2.1.1 Choose model

This series torque gauge has 3 models can be selected, different models corresponding to different capacity and resolution, as shown in table on back coverl.

Select the appropriate model based on practical need before use. **DO NOT** exceed the capacity of the gauge, or it may damage the torque gauge forever.

2.1.2 Choose adapters

In order to complete the test work convenient, the torque gauge equipped with a variety of adaptors (adapters). Select the appropriate adaptors according to the actual need.

2.1.3 Test stand

For high capacity test, some kind of test stand may be necessary.

2.2 Power on/off

Touch  for 2 seconds to power On or Off.

The indicator can identify the load cell. You should check the model wheith it is you want.

Check Battery Icon. If the power is low, should be recharged.



Fig. 2-1

2.3 Testing

After completion of the test preparation, testing can be done.

2.3.1 Select Units

The torque gauge has a variety of measurement units, select the appropriate unit of force. (See **3.2.1 Unit**)

2.3.2 Select Test Mode

This series torque gauge has 4 kinds of measurement test mode can choose.

You can select it by touching  under the measure interface,

Or can change it in menus (See **3.2.4 Test Mode**).



Track:

The real time measuring mode, under this mode, press the zero key the torque gauge will be cleared (remove tare).



Peak:

Peak readings will not change until a higher value is measured. Under this mode, touch the zero key  the torque gauge will update the display immediately.



Preset:

In this mode, you can set the upper limit and lower limit for GO/NG measurement



First Peak:

In this mode, the gauge can capture the first peak value of force, when the force value decreased to reach the drop ratio. The drop ratio can be set in menus.

2.3.3 Set Tolerance Limit

The tolerance limits can be set for GO/NG measurement also.

If you set the alarm on and a valid limit, The icon , ,  will be displayed for within limit, lower than lower limit or exceed upper limit.

2.3.4 Zeroing

Touch  to clear the torque gauge in track mode for removing the tare.

2.4 Storage

Measured results can be stored in the torque gauge, so that you can review or print them later.

Under the measure interface, touch  to save value measured, and the save icon  will be displayed.

2.5 Browse or Printing

The values saved in memory can be reviewed in Browse function, see **3.3.2 Browse Data** for detail.

The data in memory can be printed to a report, see **3.4 Printing** for detail.

3 Menus

3.1 Menus Structure

The Force Gauge has multi-level menu interface.

Menu	Measurement	Unit
		Group
		Tolerance
		Test Mode
		Peak Time
		Alarm
	Memory	Storage Mode
		Browse All
		Browse Selected
		Delete Selected
		Delete All
	Printing	Print Recent
		Print Selected
		Print All
	System	Display Mode
		DisplayDirection
		Power Off
		Backlight
		Key Tone
		Date/Time
		Password
		Key Setting
		RS232 Baudrate
		Default Setting
	Language	
	Calibration	
	Information	

From the home screen, touch “” to enter the Menu. (Fig. 3-1、 Fig. 3-2)

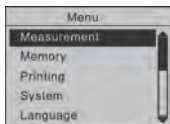


Fig. 3-1



Fig. 3-2

Touch  or  can move selection. Then touch  can enter the next layer of menu.

Touch  can cancel the setting or exit.

In number input, touch  can

increase the number, and touch  can change to another digit or item.

3.2 Measurement

The Measurement contains six selectable items: Unit, Group, Tolerance, Test mode, Peak Time and Alarm. (Fig. 3-3)

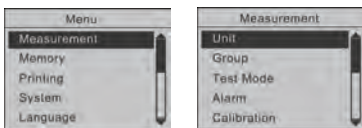


Fig. 3-3



Fig. 3-4

capabilities. See Fig.3-4.

3.2.2 Group

When several test samples need to be measured, the samples can be coded into groups. The range is 01-99. See Fig.3-5.



Fig. 3-5

3.2.3 Test Mode

Test mode can be selected. There are 4 kinds of mode: Track, Peak, Preset and First Peak. (Fig. 3-6)



Fig. 3-6

See 2.4.3 Select Test Mode also.

If the **Preset** is selected, you

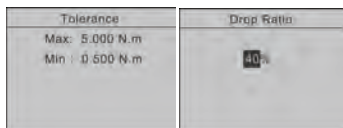


Fig. 3-7

need input the Max. and Min. of tolerance, or confirm them.

if the **FirstPeak** is selected, you should input or confirm the drop ratio.(Fig.3-7)

3.2.4 Alarm

You can turn on/off the sound of tolerance alarm(**Fig.3-8**). The sound for overload alarm cannot be turned off.



Fig. 3-8

3.3 Memory

In this menu, you can set the memory mode, browse the data in memory or delete it/them.

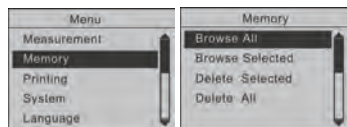


Fig. 3-9

3.3.1 Browse Data

You can browse the data in memory with two method, Browse All or Browse Selected. (Fig.3-10, Fig3-11)

No.	Torque	Dir
007	0.900 N.m	↶
008	0.534 N.m	↶
009	66.5 N.cm	↶
010	6.225 lbf.ft	↶

Fig. 3-10

The greatest number is the most recent data.

For Browse Selected selecting the range of data number is needed.

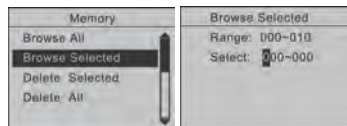


Fig. 3-11

Touch  or  can turn the page.

3.3.2 Delete Data

There are 2 methods to delete the data for restoring the memory.

Delete selected: Delete data in number range selected.

Delete All: Delete all data saved.

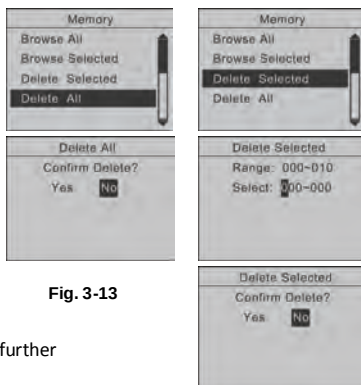


Fig. 3-13

Before delete data, a warning window will pop up for further confirmation.

3.4 Printing

The force gauge can be connected to a printer for printing the report. In Printing menu, you can Print Recent, Print Selected and Print All.

Fig. 3-12



Fig. 3-14

3.4.1 Connect Printer

Connect the printer to the force gauge with a printing cable. Then turn on the power of printer.



Fig. 3-15

3.4.2 Printing Setup

Print Recent: Print some data measured recently (Fig.

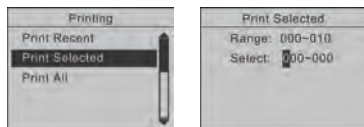


Fig. 3-16

3-15)

Print Selected: Print data in a number range(Fig. 3-16).

Print All: Print all data in memory(Fig. 3-17).

It may take a long time to print all the data and need many printing paper, so a prompt window will pop out

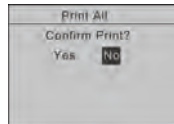
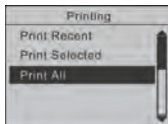


Fig. 3-17

to ask for confirmation.

The style of test report is shown as Fig.3-18.

if it is in diagram display

mode(3.5.1) and the key 

is set to "Print"(3.5.8), the

diagram can be printed as

touching . Touch it again to stop printing.

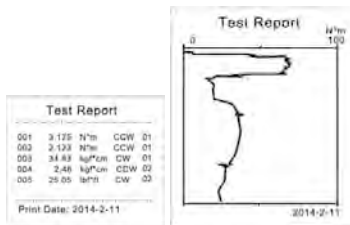


Fig. 3-18

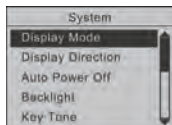
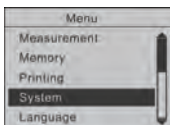


Fig. 3-19

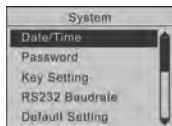


Fig. 3-20

3.5 System Setting

3.5.1 Display Mode

There are two display modes:

Digital and Diagram.

Fig. 3-20

3.5.2 Display Direction

LCD display direction can be transformed according to the position of force gauge automatically. You can set it to Obverse or Reverse and not Automatic.



Fig. 3-21

3.5.3 Power Off

The force gauge can turn the power off automatically, some time interval after no measuring and no any operation. 5 minutes is default. You can change it for a longer or shorter standby.

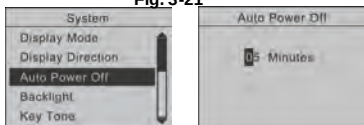


Fig. 3-22



Fig. 3-23

3.5.4 Backlight

The force gauge can turn off backlight, some time interval after no measuring and no any operation. You can select this time or turn it on or off always. (Fig. 3-23)

3.5.5 Key Tone

(Fig. 3-24)



Fig. 3-24

3.5.6 Date/Time

(Fig 3-25)



Fig. 3-25

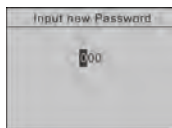
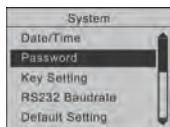


Fig. 3-26

password first, then enter a new one.

3.5.8 Key Setting

The key  is a multifunction key, It can be set as "store the current display value(**Storage**)" or "print the recent data (**Print**)". "**Storage**" is default.

If set to **Print** , touch  can start or stop diagram printing in diagram display mode.

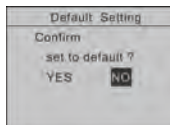
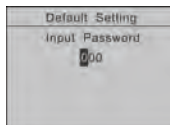
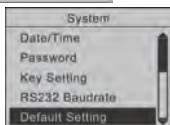


Fig. 3-27

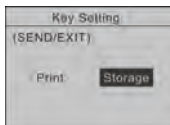
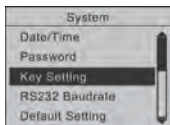


Fig. 3-28

3.5.9 Default Setting

When the artificial error, and do not know how to restore, the gauge can be restored to factory settings. it will lose that some information set by

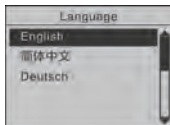
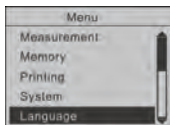


Fig. 3-29

3.5.7 Password

Some operations of force gauge may need to enter a password to prevent mistake or unexpected change.

The default System password is "123". You can change it to your favorite You should enter the old

customs.

Note!

Restoring to Default Setting, the password must be enter and a prompt must be confirmed.

3.6 Language

You can select the language appropriate.

3.7 Information

Some information such as the logo, the model, the version of program and the series number are displayed here.

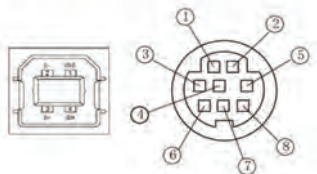
4 Communication Ports

The torque gauge have two kinds of port for recharging and communicating with PC and the other equipments.

4.1 USB/Recharge

Use this port, you can connect the gauge to the computer for transform data to PC in accordance with USB2.0.

Or recharge the internal Ni-MH battery with connecting the



USB/
Recharge

Multifunction
Port

Fig 4-1

Table 4-1 Pin Assignment

Pin#	Description	
1	RS232	Tx
2		Rx
3		Gnd
4	Setpoint Output B	
5		
6	Setpoint Output C (Common)	
7	Setpoint Output A	
8		

recharger.

4.2 Multifunction port

The assignment of pins is shown in Table 4-1.

4.2.1 RS-232

The RS232 serial port is only used to connect the mini-printer to print the memory data.

RS-232 specifications:

-Hardware Flow Control:	None
-Data word length:	8 bits
-Stop bit:	1 bit
-Parity:	None
-Baud rate:	38400

The baudrate can be changed in menus.



Fig. 4-2

4.2.2 Setpoint Outoput

Two setpoint outputs are NPN open collector.

The internal circuit of setpoint output is shown as Fig 4-3.

Pin7 with Pin6 will be connected when an overload alarm occurs.

If **Alarm** is turned on, Pin7 to Pin6 is connected when the measured value exceed upper limit, Pin4 to Pin6 is connected when the measured value below lower limit.

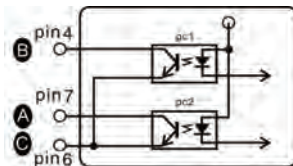


Fig 4-3

**! Maximum permissible voltage: pin 7 to 6, pin 4 to 6 must be lower than 35V ;
pin 6 to 7, pin 6 to 4 must be lower than 6V .**

5 Maintenance and Calibration

5.1 Charging

When the battery are low, the icon “” will be displayed.

The batteries should be charged immediately.

Connect the gauge and the charger use the USB cable, and then connect the charger with AC socket to start charging.

It takes about 3~4 hours for fully charging.

You can also use other USB device (e.g. Laptop PC) to recharge the gauge.



Fig. 5-1

5.2 Calibration

Because of the sensor material performance or the influence of external factors, there may be errors in a certain range after a period of time use.

Should send the torque gauge to a specialized testing organization for calibration.

If you have some standard force weights or the other standard load and some test stand, you may calibrate it also.

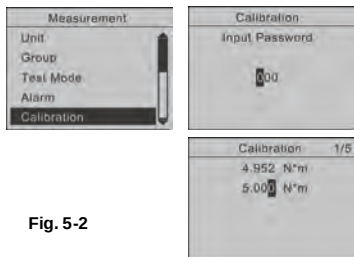
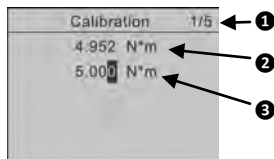


Fig. 5-2

- ① Mount the torque gauge.
- ② Remove the tare by use of the key .

- ③ Enter Calibration interface, as Fig 5-2.



- ① Calibration times
- ② Current measuring value
- ③ Standard value input

Fig. 5-3

The calibration interface is shown as **Fig 5-3**.

- ④ Load a standard force. Now the value in standard input area is just equal to the current measured value. Wait a moment for the force stability.
- ⑤ Touch  and  to input the standard force value.
- ⑥ Touch  to enter the next calibration. Touch  can interrupt the calibration.

When the 5 times calibration had been finished or be interrupted, a confirm window will pop up to ask for save or not save the calibration. (**Fig. 5-3**)

Touch  or  to select, then press .

If "YES" is selected, "Calibrate complete!" is displayed. The calibration data will be saved and be executed in subsequent measurements.

NOTE:

- ① Set the unit of force to the unit used in calibration previously (as shown in **3.2.1 Unit**)
- ② Ensure that the tare weight of attachment has been removed before calibration.
- ③ You can do any point or points calibration from 1 to 5 point, we recommend 5 points calibration.
- ④ For the load cell which can measure pull and push, if the force of two directions are used, it should be calibrated in both directions separately.
- ⑤ The calibration data is corresponded to capacity of Load cell.

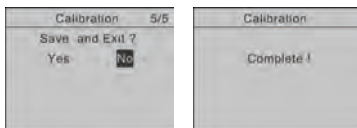
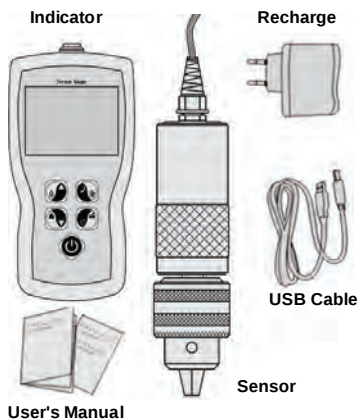


Fig. 5-4

If an indicator is equipped with load cells with different capacity, then they should be calibrated separately. When the Indicator identifies a load cell, its calibration data will be executed automatically.

Appendix

Packing List



Dimension

Fig. A-1

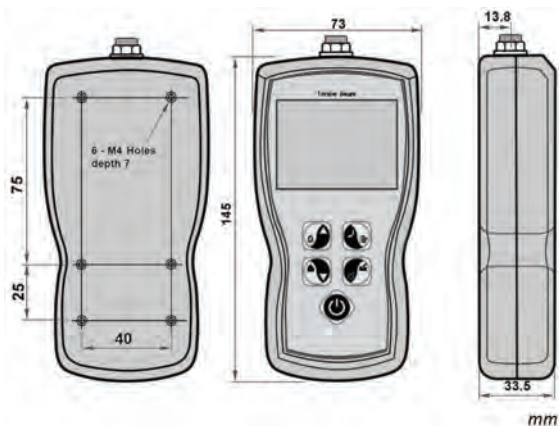


Fig. A-2

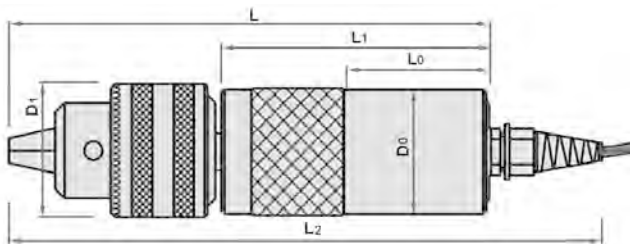


Fig. A-3

Capacity	D_0	L_0	L	L_1	D_1	L_2
1 N*m	$\Phi 40$	48	156	88	$\Phi 42.8$	216
5 N*m	$\Phi 46$	48	156	88	$\Phi 42.8$	216
10N*m	$\Phi 46$	48	178	88	$\Phi 52.8$	240