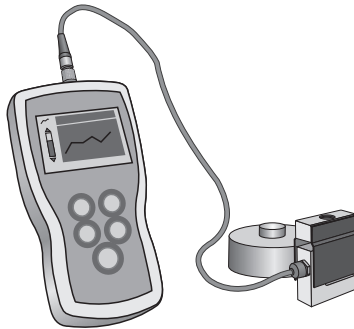


User's Manual



Contents

1. Introduction			
1.1 Overview	1	3.4 Printing	10
1.2 Indicator	1	3.5 System Setting	11
1.3 Load Cell	2	4. Communications Ports	
1.4 Specifications	3	4.1 USB/Recharge	13
2. Operation		4.2 Multifunction port	13
2.1 Choose model	4	5. Maintenance and Calibration	
2.2 Measuring adapters	4	5.1 Charging	15
2.3 Power on/off	4	5.2 Calibration	15
2.4 Testing	4	6. Connecting Load Cell	
2.5 Storage	5	6.1 Connection	17
2.6 Browse and Printing	5	6.2 Capacity Setup	17
3. Menus		Appendix	
3.1 Menus Structure	6	Packing List	18
3.2 Measurement	7	Dimension	18
3.3 Memory	8	Warranty Card	19

1. Introduction

1.1 Overview

The force gauge consists of a force indicator and a load cell. An indicator can be equipped with a few of load cells. Every load cell can be calibrated independently, and indicator can identify them automatically..

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 Menus: Back or Exit.



Menu/Enter

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



Zeroing/Up

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



Mode/Down

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

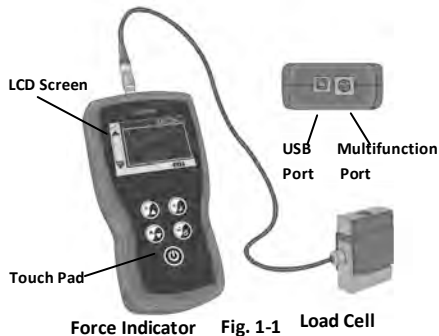


Fig. 1-2

1.2.2 LCD Screen

① Test mode



Track,



Peak,



Auto Peak,



First

Peak

② Force value

③ **Analog bar:** Indicates current position in whole capacity. When the bar enters the area enclosed by dotted line, means overload.

④ **Saving icon:** Indicates data is being saved

⑤ **Direction Icon:** “↔” tension, “↔” compression.

⑥ **Tolerance Indicator:** “



”: between lower limit and upper limit; “

⑦ **Load Cell:** The capacity of load cell. If no load cell connecting, show “

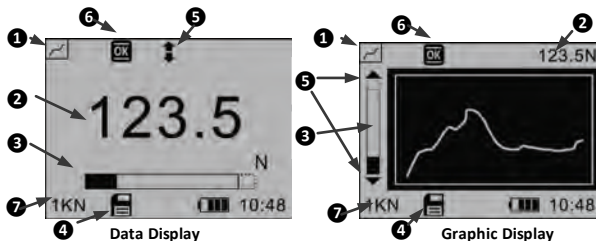


Fig. 1-3

1.3 Load Cell

There are 2 types of load cell can be connected with indicator, they are S-beam and ring type.

	S-beam type	Ring type		S-beam type	Ring type
Rated Output(mV / V)	2.0±1	1.5±0.5	Safe Overload(F.S.)	150%	120%
Zero Balance(%F.S.)	±2	±2	Input Impedance(Ω)	410±10	410±10
Non-linearity(%F.S.)	0.03	0.05~0.1	Output Impedance(Ω)	350±5	350±5
Hysteresis(%F.S.)	0.03	0.05~0.1	Protection Class	IP76	IP76
Temp. Effect(F.S./10°C)	0.03	0.05%			

1.4 Specifications

Accuracy	± 0.2% F.S.		
Selectable Units	N, kN, kgf, tf, lbf, klbf.(Selectable)		
Display	160*128 dot matrix LCD with LED Backlight		
Overload	150% of F.S. (LCD flashes beyond 110% of F.S.)		
Temperature Effects	<0.03% FS per °C		
Measurement Mode	Track, Peak, AutoPeak, FirstPeak		
Set Point	Tolerance Alarm		
Sampling Rate	2000 Hz	Display Update	10 times/sec.
Memory	1000 data		
Power	3.6VDC Ni-MH rechargeable batteries		
Battery Life	Approximately 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		

2. Operation

2.1 Choose model

This series has a variety of models can be selected, different models corresponding to different capacity and resolution, as shown in table on back cover of this manual.

2.2 Choose measuring adapters

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

2.3 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.

2.4 Testing

2.4.1 Adaptor

Select the appropriate adaptor, install it in the measurement axis of the load cell. Tighten it by hand, without the use of tools. Do not use a deformed or damaged adaptor.

NOTE: Do not use tools to vigorously tighten the adaptor, otherwise it will damage the force gauge.

2.4.2 Select Units

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

2.4.3 Select Test Mode

This series force 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 force 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 force gauge will update the display immediately.



Auto-Peak: In this mode, the gauge display a peak value of force in a fixed duration. The duration time can be set in menus.



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.

2.4.4 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.

2.4.5 Zeroing

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

2.5 Storage

Measured results can be stored in the force 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.

2.6 Browse and 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 Menu Structure

The Force Gauge has multi-level menu interface.

Table 3-1

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

selection. Then touch  can enter the next layer of menu.

Touch  can cancel the setting or exit.

From
the
home
screen,
touch



to
enter
the Menu. (Fig. 3-1、 Fig. 3-2)

Touch  or  can move

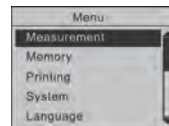


Fig. 3-1

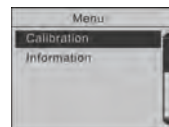


Fig. 3-2

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. 3-4

3.2.2 Group



Fig. 3-5

3.2.3 Tolerance

In the Tolerance menu, program upper and lower limit for GO/NG Measurement.

3.2.1 Unit

The measuring unit can be selected under this menu. Different range models may have different unit selection capabilities. See Fig.3-4.

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

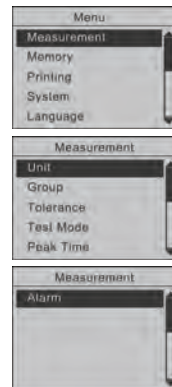


Fig. 3-3



Fig. 3-6

The upper limit value must be greater than the lower limit, and both limit value can not be greater than 110% of the rated capacity.

See Fig.3-6.



Fig. 3-7

Auto Peak and First Peak. (Fig. 3-7) See 2.4.3 Select Test Mode also.



Fig. 3-8

3.2.4 Test Mode

Test mode can be selected.

There are 4 kinds of mode: Track, Peak ,

3.2.5 Peak Time

If AutoPeak mode is used, you can set the peak value capturing time interval- Peak Time. Default setting of Peak Time is 5 sec. The range is 1~99 seconds. (Fig. 3-8)

3.2.6 Alarm

You can turn on/off the sound of tolerance alarm(Fig.3-9). The sound for overload alarm cannot be turned off.



Fig. 3-9

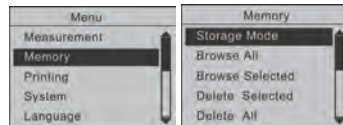


Fig. 3-10

3.3 Memory

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

3.3.1 Storage Mode

There are two storage mode can be selected, Single and Series.

Single: The current value displayed can be saved when touch .

This mode can be use in all 4 test modes.

Series: Continuous storage mode, only in Auto Peak mode is effective. When a peak capture time interval is reached, the peak value is saved, no need touch any key (Fig. 3-11).

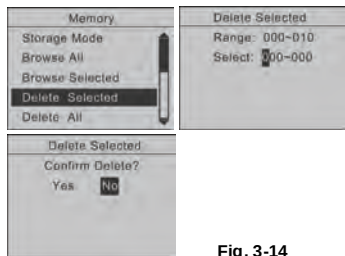


Fig. 3-14



Fig. 3-15

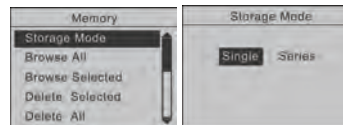


Fig. 3-11

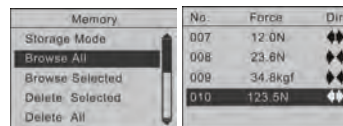


Fig. 3-12

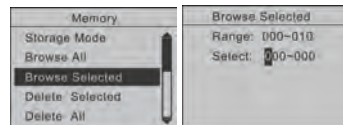


Fig. 3-13

3.3.2 Browse Data

You can browse the data in memory with two method, Browse All or Browse Selected. (Fig.3-12, Fig3-13)

The greatest number is the most recent data. For Browse Selected, selecting the range of data number is needed.

Touch  or  can turn the page.

3.3.3 Delete Data

Delete selected: Delete data in number range selected.

Delete All: Delete all data saved.

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.

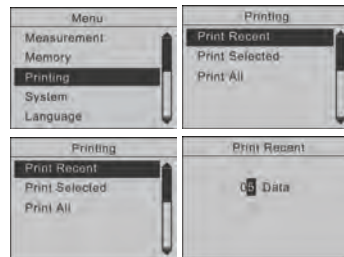


Fig. 3-16

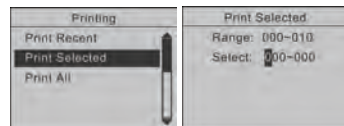


Fig. 3-17

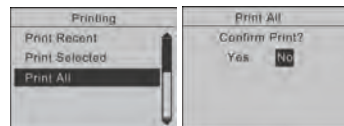


Fig. 3-18

3.4.1 Connect Printer

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

3.4.2 Printing Setup

Test Report		
001	12.0N	pull
002	23.6N	push
003	34.8kgf	push
004	123.5N	pull
005	305.0N	pull

Print Date: 2013-2-11

Fig. 3-19

Print Recent: Print some data measured recently (Fig. 3-16)

Print Selected: Print data in a number range (Fig. 3-17).

Print All: Print all data in memory (Fig. 3-18).

It may take a long time to print all the data and need many printing paper, so a

prompt window will pop out to ask for confirmation. Fig. 3-19

3.5 System Setting

3.5.1 Display Mode

There are two display modes: Digital and Graphic.

The display styles shown as **Fig. 1-3**

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.

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.

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. 3-24)

3.5.5 Key Tone (Fig. 3-25)

3.5.6 Date/Time (Fig 3-26)

3.5.7 Password

Some operations of force gauge may need to enter a password to prevent

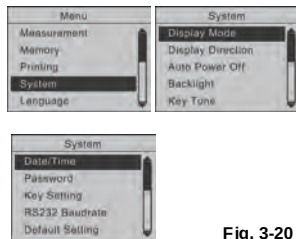


Fig. 3-20

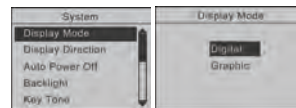


Fig. 3-21

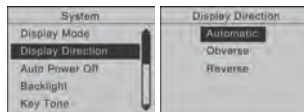


Fig. 3-22

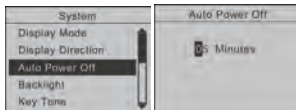


Fig. 3-23

mistake or unexpected change.

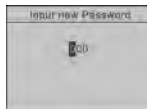
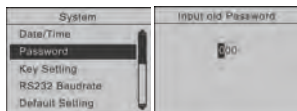


Fig. 3-27

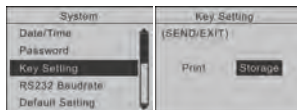


Fig. 3-28

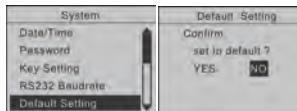


Fig. 3-29

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

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 customs.

Carefully use this function!

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



Fig. 3-24



Fig. 3-25



Fig. 3-26

4 Communications Ports

The force 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 recharger.

4.2 Multifunction port

The assignment of pins is shown in Table 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		

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.

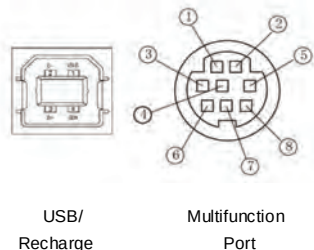


Fig 4-1



Fig. 4-2

the measured value below lower limit.

! 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 .

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

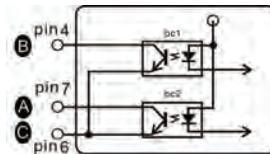


Fig 4-3

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.



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 force 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.

- ① Mount the force gauge.
- ② Remove the tare by use of the key .
- ③ Enter Calibration interface (Fig 5-2)

The calibration interface is shown (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

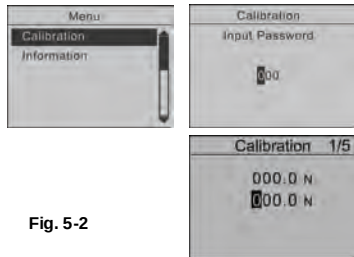


Fig. 5-2

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)

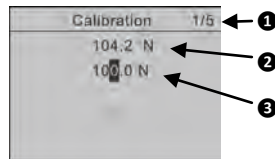
Touch  or  to select, then press .

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 remove 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.

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



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

Fig. 5-3



Fig. 5-4

6 Connecting Load Cell

The force indicator can be connected to the other load cells. Connecting to a plug and setup may be needed when using the load cell not from us.

6.1 Connection

Welding the cable of load cell with the plug.

The Force Indicator can identify the capacity of load cell which

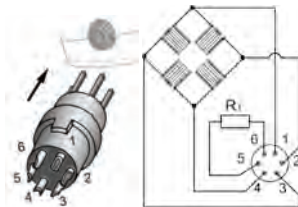


Fig.6-1

Pin#	Description	Capacity (kN)	Resistance RI(k Ω)
1	Power +	1	2
2	Output +	2	3.3
3	Output -	5	5.1
4	Power -(Gnd)	10	7.5
5,6	Resistor	20	10
		50	15
		100	22
		200	33

Table 6-1 Connector

have a identified resistor, the capacity setup is not needed.

Table 6-2 Resistance

6.2 Capacity Setup

If there is no identified resistor, the capacity setup is needed.
Enter **Menu-System-Capacity**.

Select the capacity. Touch  to confirm the setting.

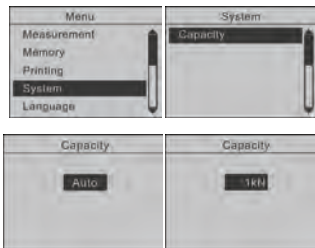


Fig. 6-2

Appendix

Packing List

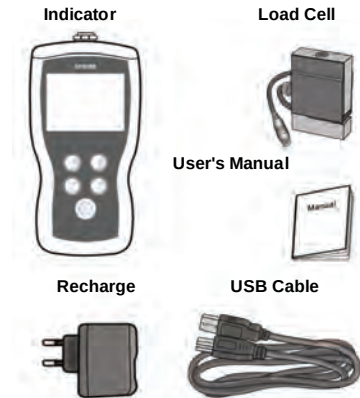


Fig. A-1

Dimension

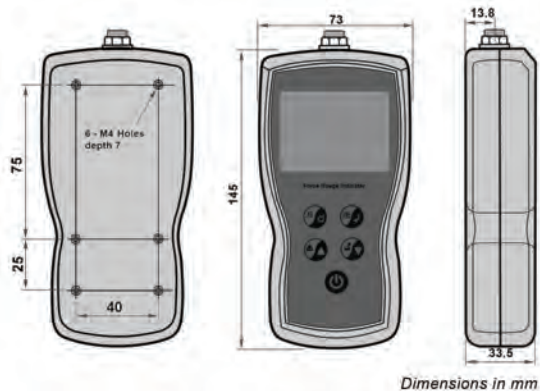


Fig. A-2

	Capacity	Type	N	kgf	lbf	kN	tf
	1kN	S	1000/0.1	100/0.01	220/0.05	-	-
	2kN		2000/0.5	200/0.05	450/0.1	-	-
	5kN		5000/1	500/0.1	1100/0.1	-	-
	10kN		10000/1	1000/0.1	2250/0.5	10/0.001	-
	20kN		-	2000/0.5	4500/1	20/0.005	-
	10kN	R	10000/1	10000/1	2250/0.5	10/0.001	-
	20kN		-	2000/0.5	4500/1	20/0.005	-
	50kN		-	5000/1	11k/0.001k	50/0.01	5/0.001
	100kN		-	-	22k/0.005k	100/0.01	10/0.001
	200kN		-	-	44k/0.01k	200/0.05	20/0.005