EFGE Series

Digital Force Gauge

User's Manual

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NOTICE

Please Carefully Read This First

1.During the test, please wear protective masks and gloves in case of splash matter injury body.

2. **DO NOT** exceed the capacity of the gauge. At 110% of the capacity, the display flashes and sounds the alarm, please remove the load immediately.
Exceeds 150% of the rated capacity, the load cell will may be damaged forever.

Do not leave the device close to water or any other liquid to avoid damage.
-If not using this instrument for extended periods of time, remove the batteries or recharge it for every 2 ~3 month to prevent potential battery leakage from causing product damage.

3. When mounting adaptors, tighten them with hand, **DO NOT** use any tools .
4. The series force gauge can only measure and bearing measurement of axial, large radial force will damage the gauge.
5. Do not disassemble the gauge by yourself, or it may damage the instrument
6. Please use or stored in the suitable environment, so as not to reduce the service life or cause failure.

1. General Specifications

1.1 Overview

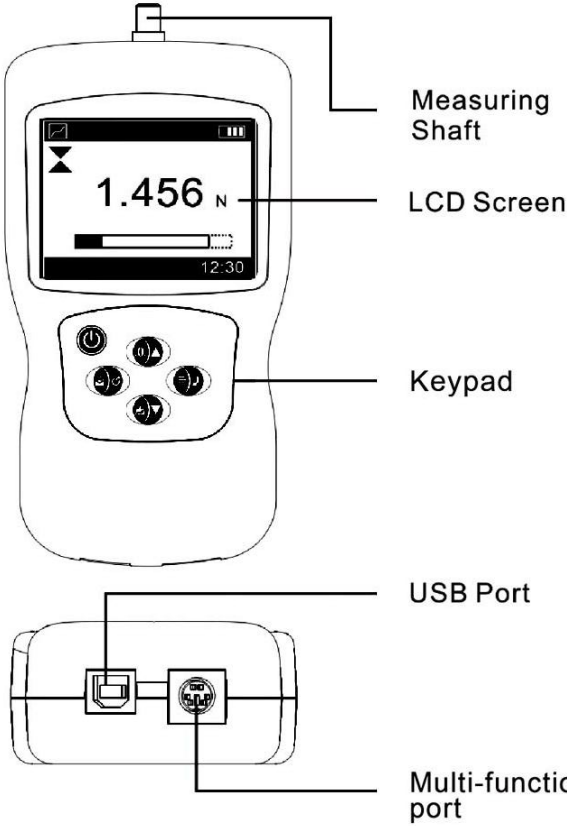


Fig 1-1

1.2 LCD Screen

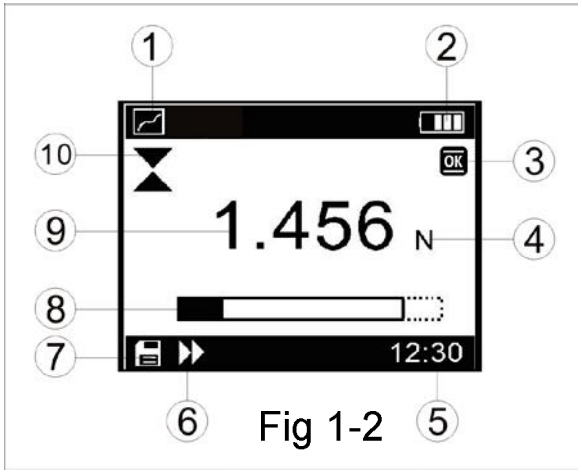


Fig 1-2

① Test mode icon:

: Track, : Peak, : Preset.

② Battery icon: Indicating the battery level or charging status, "" flashes when gauge needs to be recharged.

③Preset Mode Test status mark. OK : The measured value between the upper limit and lower limit，that is OK;

: The measured value between the lower limit and 75% of the lower limit,that is below the lower limit;

: The measured value higher than the upper limit.

④Test units: Displays selected measuring unit (N, kgf, ozf, and lbf selectable)

⑤The system time. ⑥Data transmission icon.

⑦Data storage icon. ⑧Analoge bar. ⑨The current measured value

⑩Force direction Indicator. tension:“ ” ; compression:" "

1.3 Key Functions

Power：ON/OFF

Storage / Back

Menu/Enter

Zero/Up

Test Mode/Down

1.4 Specifications

Accuracy	± 0.3% F.S.		
Units	N, kgf, ozf, and lbf.(Selectable)		
Display	160*128 matrix LCD with Backlight		
Overload Capacity	150% of F.S. (LCD flashes beyond 110% of F.S.)		
Measurement mode	Track ,Peak and Preset		
Data Sampling Rate	1000 Hz		
Memory	500 data		
Set Point	Programmable high and low limits		
Power	3.6VDC 450mAH Ni-MH rechargeable batteries		
Charger / Adaptor	USB/BM charger, Input:110~240VAC		
Temperature Effects	<0.03% FS per °C		
Dimensions	140*71.2*35.5 mm	Weight	0.4 kg (0.9 lb)

2 Operation

2.1 **Preparation**

Comfirm the model

This series force gauge has 5 models can be selected, each model corresponding to the capacity and resolution, shown in a table on the back cover of this manual.

Select the appropriate model you needed before use.

Choose the adapter

In order to complete the test work convenient, The series force gauge equipped with a variety of measuring heads. According to the actual need to select the appropriate measuring heads.Show as Fig 2-1

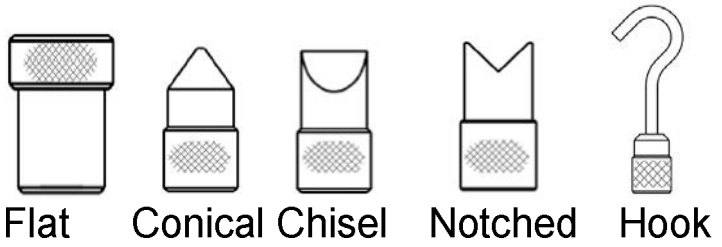


Fig 2-1

2.2 Testing

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

① Mounting measuring adapter. Install the adapter in the gauge's measurement shaft. Tighten it by hand no by any tools.

NOTE: Do not use tools for tighten the adapter, otherwise it will damage the force gauge.

② Select the appropriate units. A variety of measurement units can be chosen.

In the measure interface, press the Menu key to enter the menu interface, press or selet Measurement, press to enter, then select Unit to enter. Choose the unit you desired here.

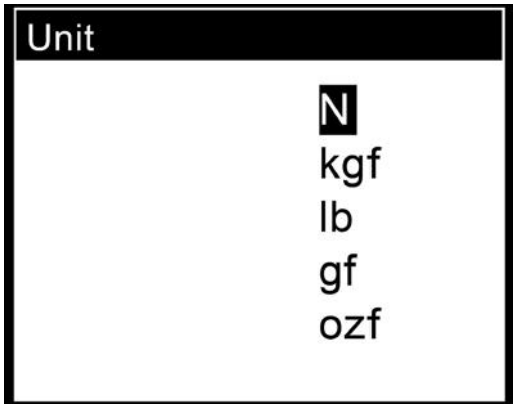


Fig 2-2

③ Select the appropriate Test Mode.

This series have 3 kinds of Test Mode, select your appropriate test mode for measurement.

Under the measure interface, just press can change the Test Modes one to another. You can also set it in Menu, see §3.2 .

Track: The real time measuring mode. Under this mode, press the zero key can remove the tare force.

Peak: In Peak mode, the maximum of force will measured and displayed. Under this mode, press the force gaue will update the display immediately.

Preset: In this mode, you can set the tolerance upper limit and lower limit of measured force value to do a GO/NG measurement. See §3.2.

④ Before the measurement, you should zero the tare by press usually.

⑤ You can use the force gauge in hand-held. But mounting it on a test stand to use may be more accurate and easier or safer. We recommend it.

2.3 Save the measured value

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

In the measuring, press the key  to store a value, and the storage Icon  will be displayed.
The data stored is the one displayed currently. So, in mode Track and Preset it is current force value measured, in mode Peak it is the peak value.

2.4 Browse and print data

All the data stored in the memory can be browsed or printed by the mini-printer.

See §3.3.1 and §3.3.2 for detail.

3. Setup

3.1 Setup menu

This series force gauge has multi-level menu interface. Show as Table 3-1.
The setting will be very simple.

Under the measure interface:

Press Menu key  can enter Menu setup.

Under the menu interface:

Press  or  can select the item of menu.

Press  will confirm a setup and return.

Press  can cancel some setting and return or just for return.

Table3-1

Menu	Measurement	Unit
		Test Mode
	Memory	Browse
		Print
		Delete All
	System	Display
		Auto Power
		Backlight
		Key Sound
		Date/Time
		Calibration
		Default
	Language	
	Info	

3.2 Measurement

Measurement item contains the unit of measure and measurement mode,shown as Fig 3-1.

In Unit, N, kgf, ibf, ozf can be selected.

Test Mode have Track, Peak, Preset etc. can be choose.(See Fig 3-2,or see §2.2 also)

If the Preset is selected, you can set the Upper limit and Lower limit.

Press  to adjust the number and press  to move the next digit.

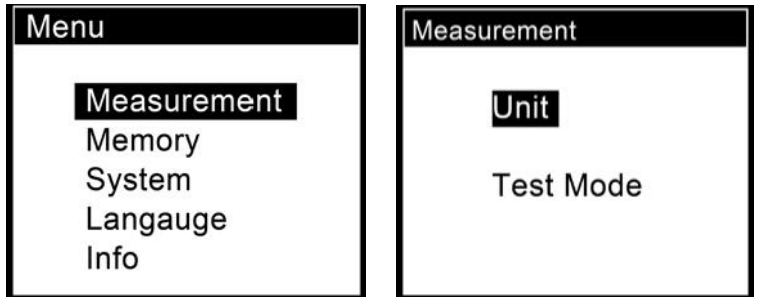


Fig 3-1

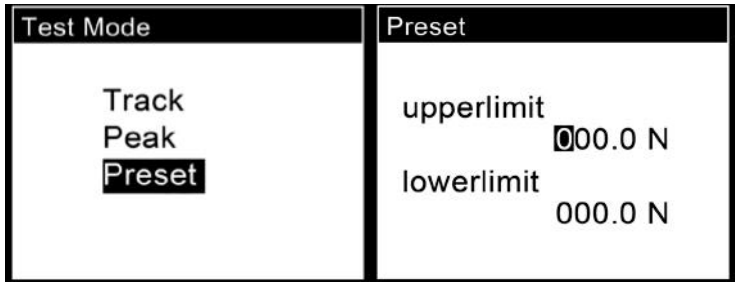


Fig 3-2

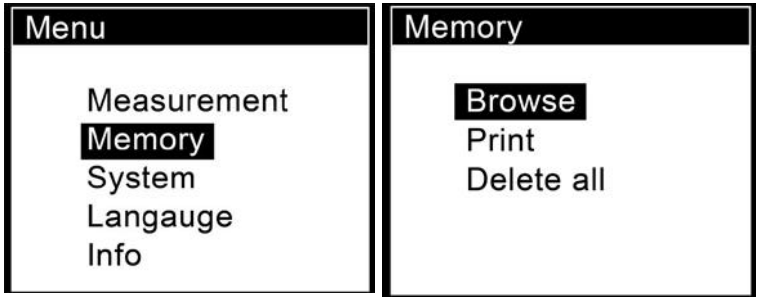


Fig 3-3

3.3 Memory

Memory item contains three submenus:Browse,Print,Delete all, shown as Fig 3-3.

You can browse or printer (wireless mini-printer), and delete some (in browse) or the all of data in memory.

3.3.1 Browse

Enter Browse, the data in memory can be reviewed in the order saved.

Press  or  to move and select. Maximum number of data is the one obtained recently.

Press  , a small window will pop out. Here you can select Delete or Print. See Fig.3-4.

If you select Delete, a confirm window will appear to ask you confirm.

Or press  to exit.

No.	Force	Dir
013	0.738 N	▲▼
014	1.958 N	▲▼
015	2.136 kgf	⧗
016	0.848 lbf	⧗
017	1.799 kgf	▲▼
018	29.38 ozf	⧗

(a)

No.	Force	Dir
013	0.738 N	▲▼
014	1.958 N	▲▼
015	2.136 kg	Delete
016	0.848 lb	Print
017	1.799 kgf	▲▼
018	29.38 ozf	⧗

(b)

Fig 3-4

Menu	Memory
Measurement	Browse
Memory	Print
System	Delete all
Langauge	
Info	

Fig 3-5

3.3.2 Print

You can print the data in memory with a wireless mini-printer.(Fig 3-5)
Enter Print, select Selected or All.
If Selected is chosen, enter the range of number will be needed.
If All is selected, a confirm window will appear to ask you confirm. See Fig 3-6

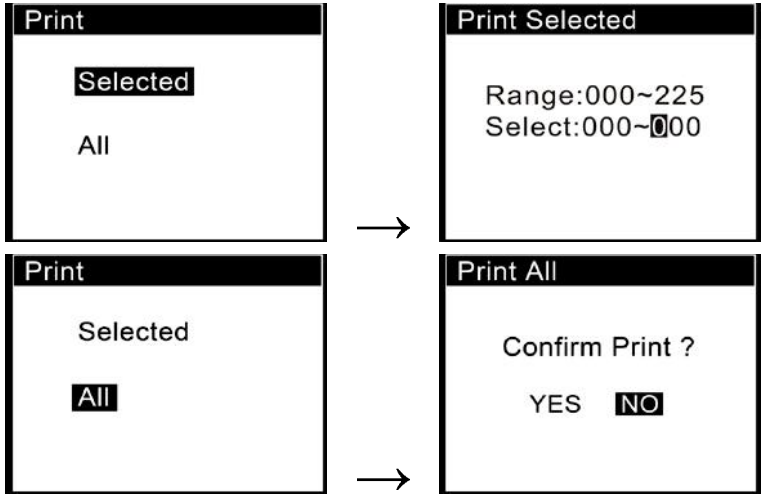


Fig 3-6

3.3.3 Delete All

All data can be deleted at one time to empty the memory.(Fig 3-7)

A confirm window will appear to ask you confirm.

Delete a individual data can be done in Browse. see §3.3.1.

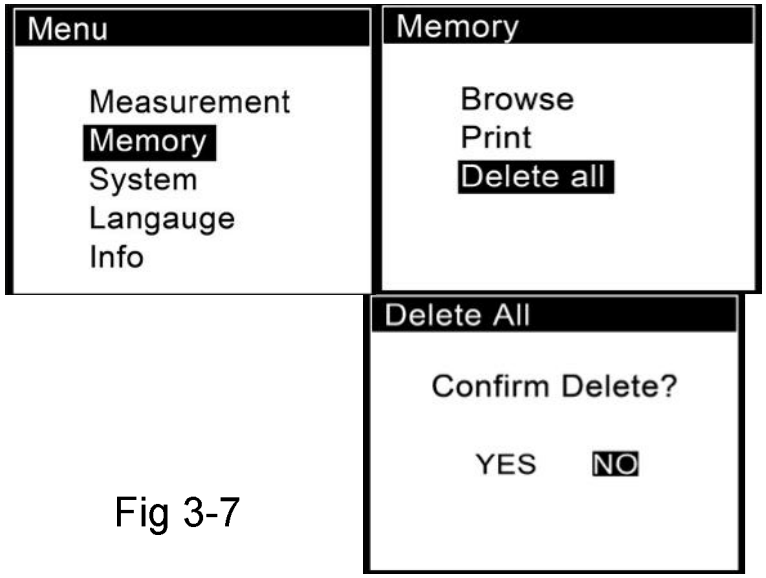


Fig 3-7

3.4 System

Under system settings menu, the display, auto power, backlight, key sound and so on can be set.

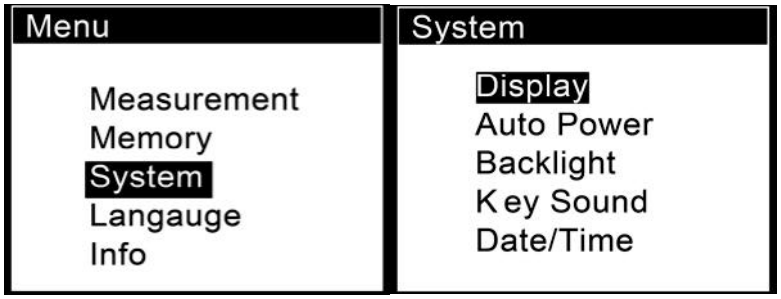


Fig 3-8

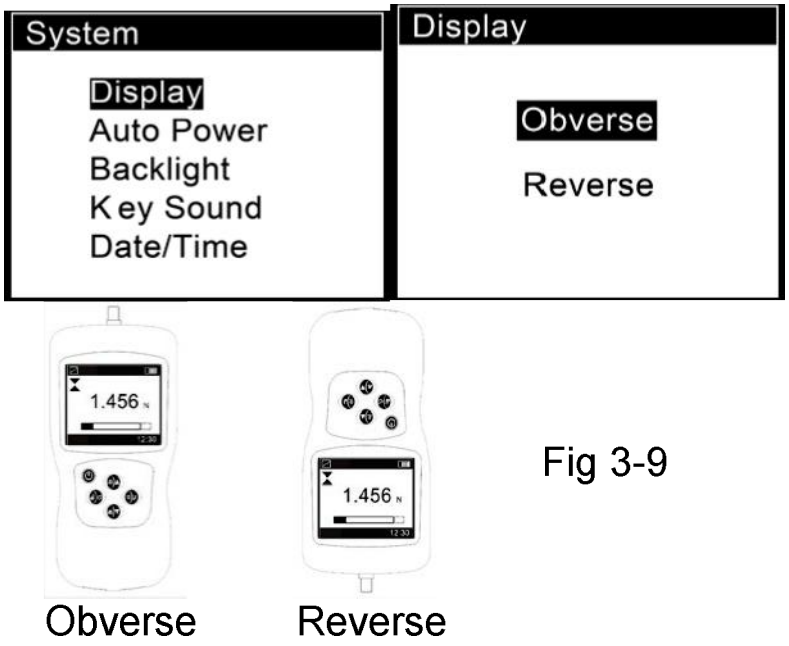


Fig 3-9

3.4.1 Display

There are two display modes: Obverse,Reverse, show as Fig. 3-7. According to actual needs, select the appropriate display mode, shown as Fig 3-9

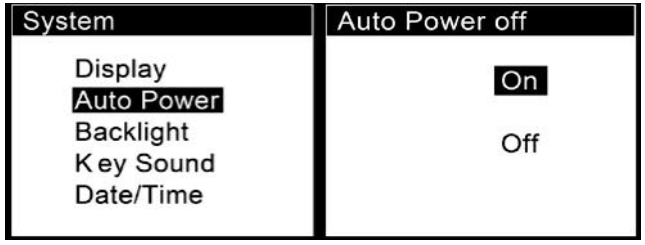


Fig 3-10

3.4.2 Auto Power.

This series force gauge has automatic power off function.

Turn on the Auto power, when no any operation is performed within 5 minutes it will power off automatically, shown as Fig 3-10.

3.4.3 Backlight.

The backlight can be set to turn on or off, show as Fig 3-11. Close the backlight will reduce the consumption of the battery.

3.4.4 Key Sound

Key sound can be turn on or turn off by this setting,shown as Fig 3-12.

3.4.5 Date/time

You can adjust system date and time under this menu.

Press  to adjust the number and press  to move the next digit. Shown as Fig 3-13.

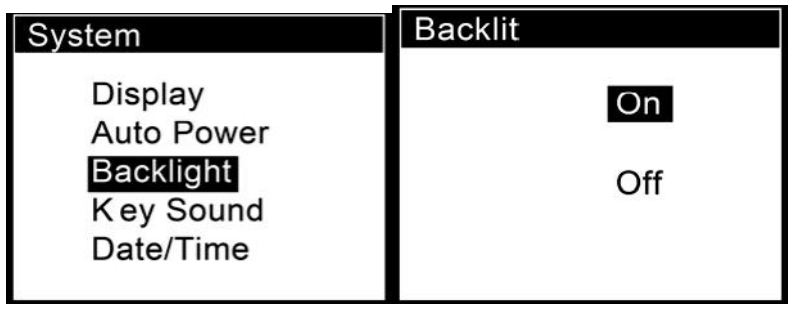


Fig 3-11

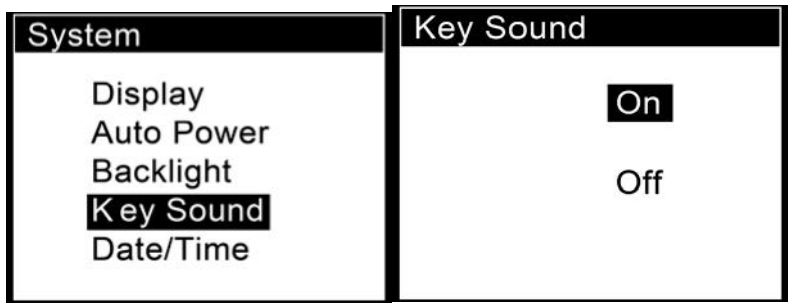


Fig 3-12

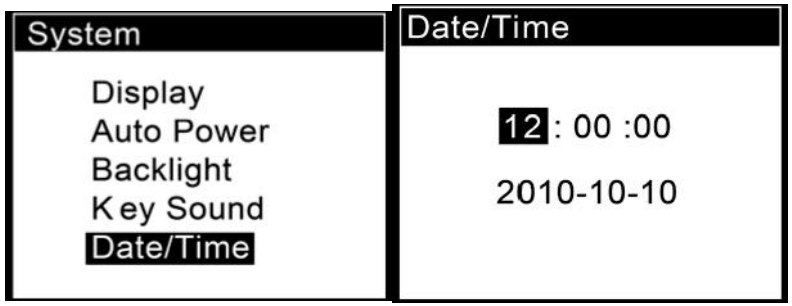


Fig 3-13

3.4.6 Calibration

For detail see §5.3.

3.4.7 Default

With this function, the force gauge can be restored back to the factory settings. Should perform this function under the guidance of professionals usually.

3.5 Language

The force gauge can display with multi-language, set the language desired.See Fig 3-14.

Fig 3-14

3.6 Info

You can find out some information about force gauge such as model, version and serial number.

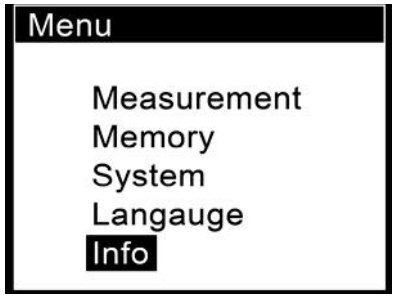


Fig 3-15

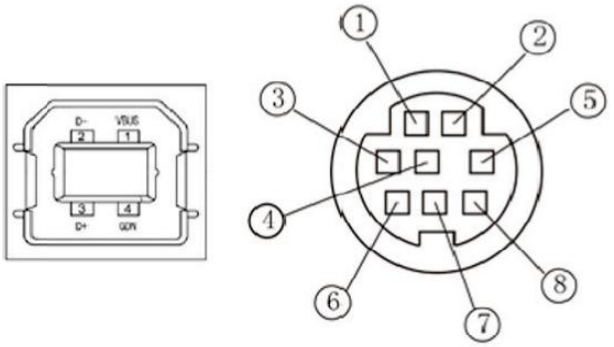
4. Communication Port

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.



USB/ Recharge　　Multifunction Port

Fig 4-1

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**

4.2.2 Setpoint Outoput

Two setpoint outputs are NPN open collector.
The internal circuit of setpoint output is shown as Fig 4-2.

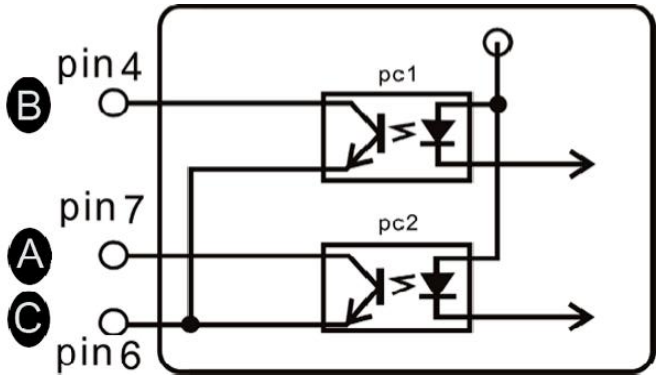


Fig 4-2

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

In Preset Mode, Pin7 to Pin6 is connected when the measured value exceed upper limit, Pin4 to Pin6 is connected when 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 .

5. Maintenance and Calibration

5.1 Maintenance

After use, please keep the instrument body clean, do not let oil and other substances are persistent in the body and the screen so as not to damage the instrument.

Please do not forget remove the load after the measurement. Applying a load for a long time may affect the accuracy of the instrument.

Unless there is a special need, please do not turn off the Auto Power, cause it can reduce the consumption of the battery and extend batteries life.

5.2 Charging

When the battery are low, the icon “ ” will be displayed. The batteries should be charged immediately.

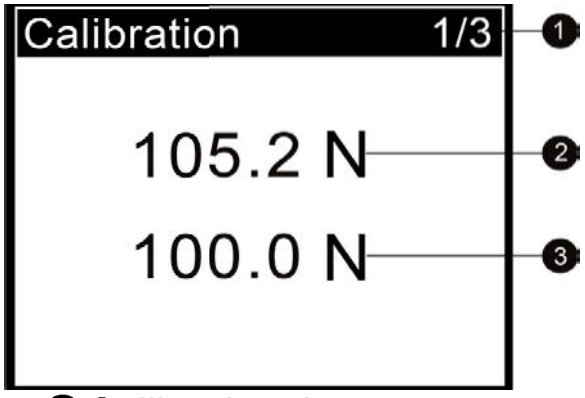
Connect the gauge and the charger use the USB cable, and then connect the charger with AC socket to start charging.

It takes about 3~4 hours for fully charging.

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



❶Calibration times
❷Current measuring value
❸Standard value input

Fig 5-2

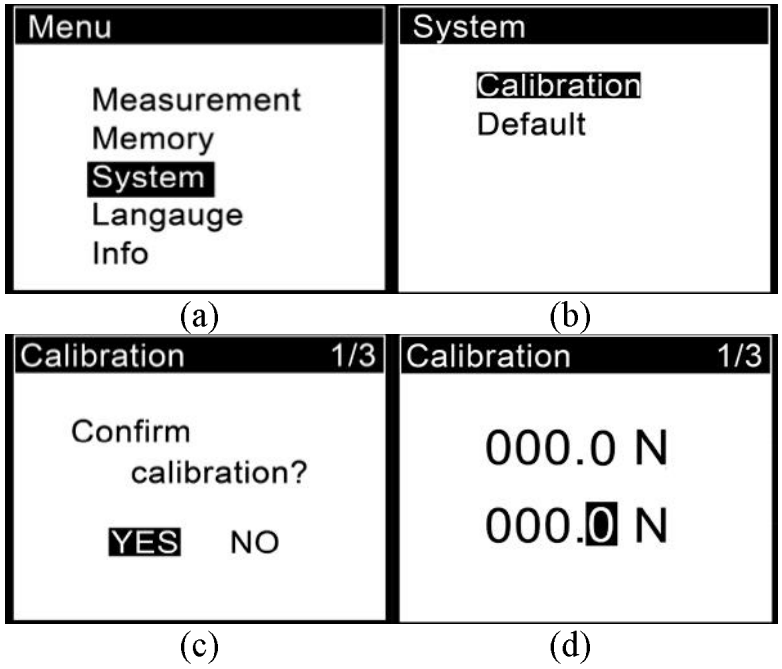


Fig 5-1

❶Mount the force gauge.

❷Remove the tare by use of the key  .

❸Enter Calibration interface, as Fig 5-1.

The calibration interface is shown as Fig 5-2.

❹Load 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.

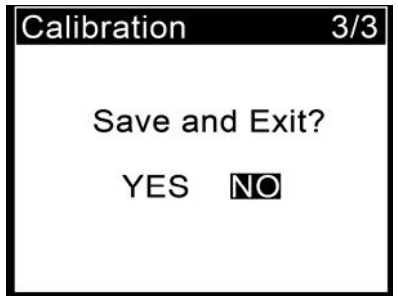
❺Press  and  to input the stansard force value.

❻Press  to enter the next calibration. Press  can interrupt the calibration.

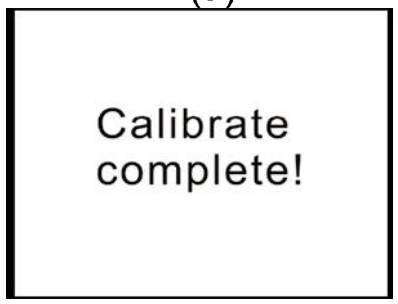
When the 3 times calibration had been finished or be interrupted, a confirm window will pop up for asking your "Save and Exit"(YES) or not save and exit(NO).(Fig 5-3a)

Press  or  to select, then press  .

If "YES" is selected, "Calibrate complete!" is displayed.



(a)



(b)

Fig 5-3

5.4 Troubleshoot

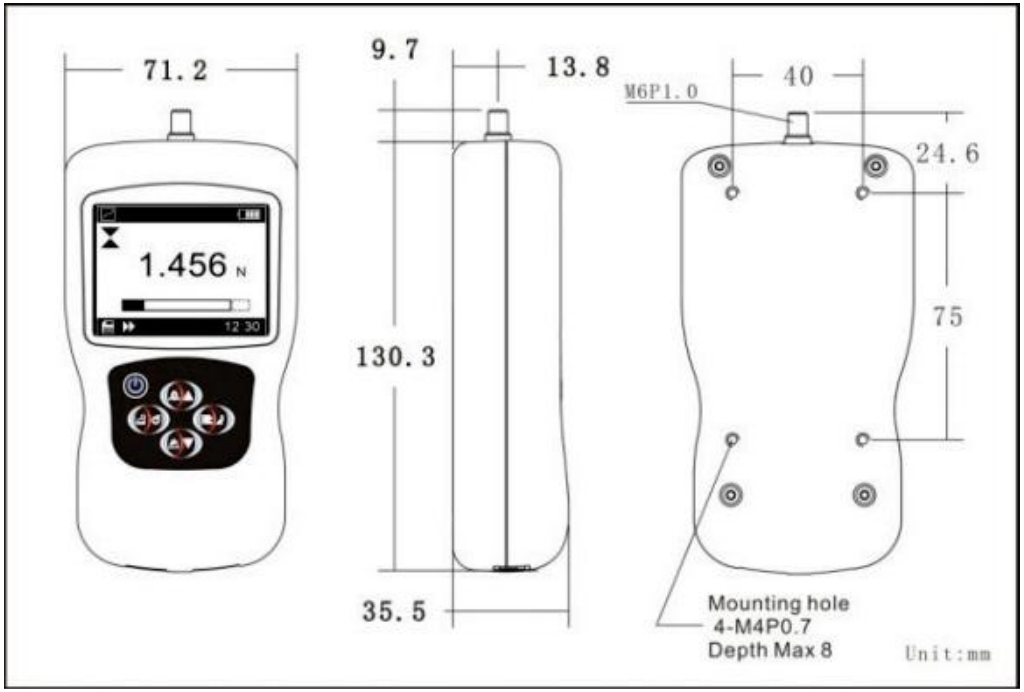
The force gauge in use process such as failure, please according to the following way for troubleshooting, do not disassemble the gauge by youself to repair. If you can not resolve the fault yourself, please contact the manufacturer or professional operator.

Failure	Possible causes	Treatment measures
Can not turn on	Low battery	Recharging and then boot
Without key sound	Key sound is turn off	Turn on the key sound
No backlight	Backlight is turn off	Turn on the key backlight
Error is too large	The gauge is not calibrated	Calibration force gauge
	The tare not be removed	Zeroing

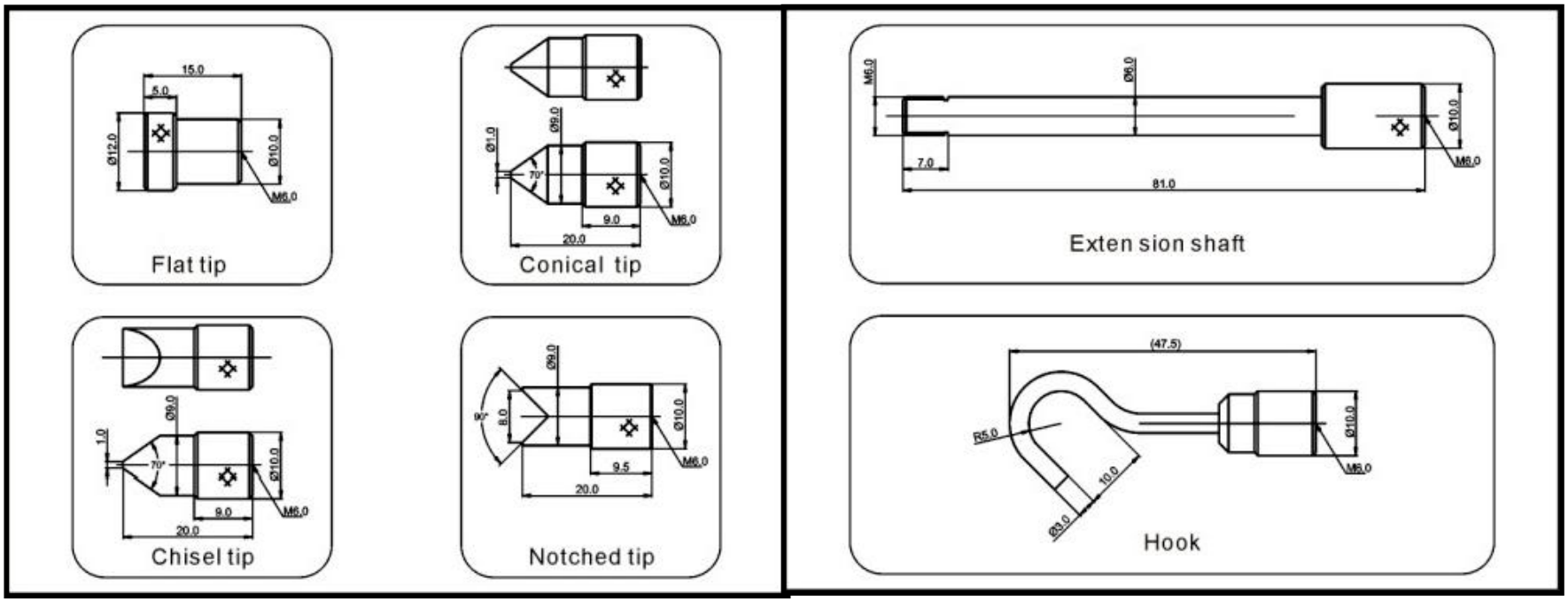
Appendix

A-1 Packing List.

A-2 Dimensions



A-3 Measuring adapter



Warranty Card

Description: *Digital Force Gauge*

Model: _____

User:_____Tel:_____

Add:_____

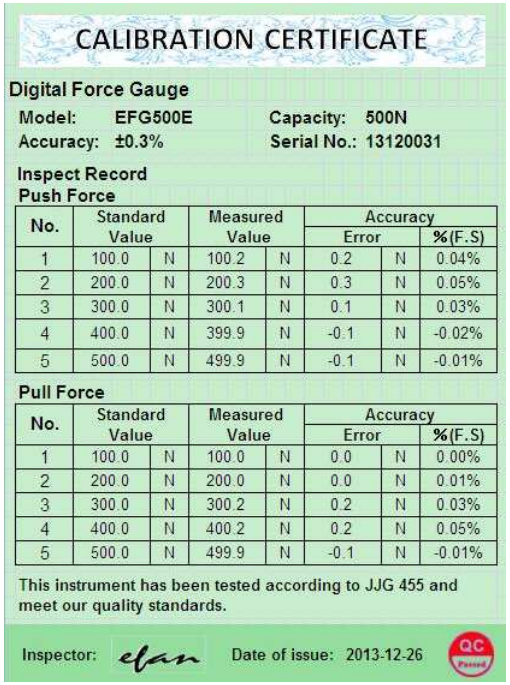
Agent:_____Tel:_____

Date:_____

Warranty Description

Please use our product exactly according to our user's manual.
All products sold by our company or authorized dealer are covered by 12 month warranty.
Anthropogenic causes, irresistible natural factors cause the product damage, our company will not warranty.

EFGE DIGITAL FORCE GAUGE FACTORY CALIBRATION CERTIFICATE SAMPLE



CALIBRATION CERTIFICATE

Digital Force Gauge

Model: EFG500E **Capacity:** 500N
Accuracy: ±0.3% **Serial No.:** 13120031

Inspect Record
Push Force

No.	Standard Value		Measured Value		Accuracy Error		Accuracy %(F.S)
1	100.0	N	100.2	N	0.2	N	0.04%
2	200.0	N	200.3	N	0.3	N	0.05%
3	300.0	N	300.1	N	0.1	N	0.03%
4	400.0	N	399.9	N	-0.1	N	-0.02%
5	500.0	N	499.9	N	-0.1	N	-0.01%

Pull Force

No.	Standard Value		Measured Value		Accuracy Error		Accuracy %(F.S)
1	100.0	N	100.0	N	0.0	N	0.00%
2	200.0	N	200.0	N	0.0	N	0.01%
3	300.0	N	300.2	N	0.2	N	0.03%
4	400.0	N	400.2	N	0.2	N	0.05%
5	500.0	N	499.9	N	-0.1	N	-0.01%

This instrument has been tested according to JJG 455 and meet our quality standards.

Inspector: Date of issue: 2013-12-26

Model		N	gf	kgf	ibf	ozf
EFG10E	**Capacity**	**10**	**1000**	**1**	**2.200**	**35.00**
	Resolution	0.01	1	0.001	0.001	0.01
EFG50E	**Capacity**	**50**	**5000**	**5**	**11.00**	**180**
	Resolution	0.01	1	0.001	0.01	0.1
EFG100E	**Capacity**	**100**	**-**	**10**	**22.00**	**350**
	Resolution	0.1		0.01	0.01	0.1
EFG500E	**Capacity**	**500**	**-**	**50**	**110.0**	**1800**
	Resolution	0.1		0.001	0.1	1
EFG1000E	**Capacity**	**1000**	**-**	**100**	**220.0**	**3500**
	Resolution	1		0.1	0.2	1

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