

Digital Force Gauge

User's Manual



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Please Carefully Read This First



Warning
MELNIB

- Operators should wear protection such as a mask and gloves in case pieces or components break away from the unit under test.
- Whether the unit is ON or OFF, DO NOT exceed the capacity of the gauge. NEVER exceed 150% of the rated capacity, or the load cell will be damaged. At 110% of the rated capacity, the display will flash a warning.
- When mounting the Digital Force Gauges, use M6 mounting screws with a maximum insertion depth of 7 mm into the gauge.
- Hand tightens adapters, DO NOT use tools. Do not use damaged clamp.
- Measure in line tension and compression forces only. DO NOT attempt to measure forces at an angle to the measuring shaft – damage to load cell and/or shaft may result.
- Do not attempt to repair or alter this instrument. Warranty will be voided and damage to the unit may result.
- Use and store within the stated temperature and humidity ranges, or damage and failure may result.
- If not using for extended periods of time, recharge it for every 2 to 3 months, or remove the batteries to prevent potential battery leakage from causing product damage.

1. Introduction

1.1 Overview

Fig.1-1.

1.2 LCD Screen

See Fig.1-2.

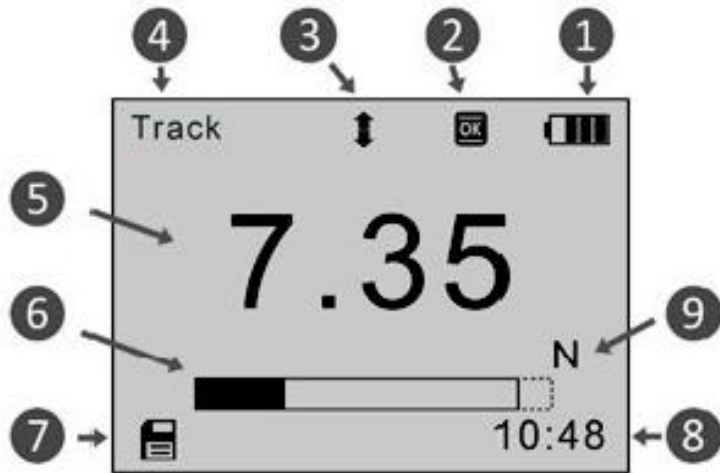





Fig. 1-2

1. **Battery icon:** Battery level or charging status, Flashes when needs to be recharged.

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

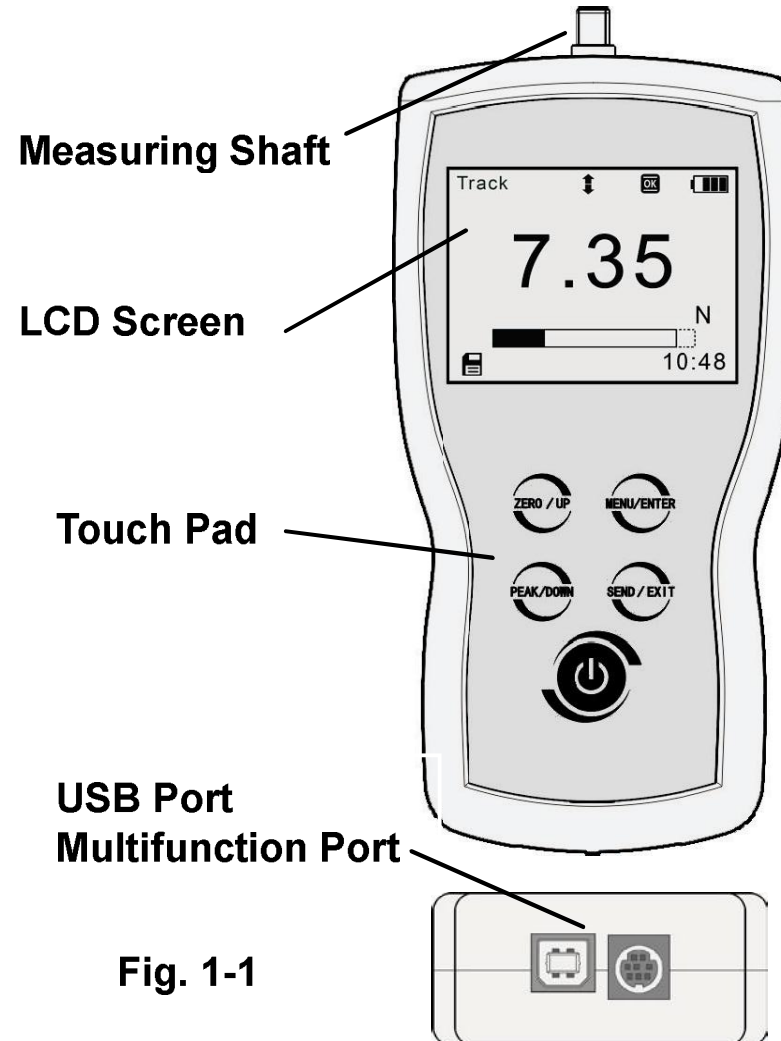




Fig. 1-1

- 3. **Direction Icon:** “” tension, “” compression.
- 4. **Test Mode Icon:** Three measurement modes. Track, Peak and Auto Peak.
- 5. **Current measured value**
- 6. **Analog bar:** Indicates current position in whole capacity. When the bar enters the area enclosed by dotted line, means overload.
- 7. **Saving icon:** Indicates data is being saved. 8. **System time.** 9. **Units.**

1.3 Touch Pad

Power: Push for 2 seconds to power On or Off.



During Measurement: Print the current force value or store data, depending on the key setting.
(See 3.5.7 Key Setting)
In Menus: Back or Exit.



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



During Measurement: Track mode-Zeroing. Peak & Auto Peak modes-Resets the peak value.
In Menus: Moves selection up or increases the value.



During Measurement: Changes Test Mode from Track, Peak or Auto Peak
In Menus: Moves selection down or decreases the value.

1.4 Specifications

Accuracy	± 0.2% F.S.		
Selectable Units	mN, N, gf, kgf, ozf, and lbf.(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	Peak, Autopeak or Track Mode		
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 16 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		
Dimensions	145*73*35.5		
Weight:	0.7 kg (1.5 lb)		
Accessories	AC adapter/charger,6 attachments: hook, flat tip, conical tip, chisel tip, notched tip, extension shaft		

The capacity and resolution is in table on back cover.

2. Operations

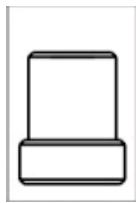
2.1 Choose model

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

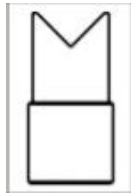
Select the appropriate model based on practical need before use. **DO NOT** exceed the capacity of the gauge, or it may damage the force gauge forever.

2.2 Choose measuring heads

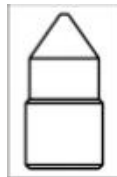
In order to complete the test work convenient, the force gauge equipped with a variety of measuring heads (adapters). Select the appropriate measuring heads according to the actual need.



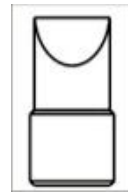
Flat tip



Notched tip



Conical tip



chisel tip



Hook



Extension shaft

Fig. 2-1

2.3 Power on/off

Touch  for 2 seconds to power On or Off.

After switching the instrument on, you should check the model wheith it is you want.
Check Battery Icon. If the power is low, should be recharged.

2.4 Testing

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

2.4.1 Measuring heads

Select the appropriate measuring head, install it in the gauge's measurement axis. Tighten it by hand, without the use of tools. Do not use a deformed or damaged measuring head.

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

2.4.2 Units

The force gauge has a variety of measurement units, select the appropriate unit of force. Under the measure interface, press the Menu key to enter the menu interface (See **3.2.1 Unit**)

2.4.3 Test Mode

This series force gauge has 3 kinds of measurement test mode can choose.

You can select a Measure Mode 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.*

2.4.4 Tolerance Limit

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

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 Hand-held or Mounting

The force gauge is a portable Instrument, you can do the testing hand-held, or you also can install the force gauge on the test stand so as to obtain accurate measurement results. There are 6 M4.0 mounting screw holes on the back , can be fixed on the test stand, shown as **Fig. 2-2**.

NOTE: The depth of the mounting hole is 8.0mm, please choose the appropriate screws, screw into the depth of the force gauge shall not be greater than 7mm.

2.6 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.

2.7 Browse and Printing


The values saved in memory can be reviewed in Browse function.

The data in memory can be printed to a report.

3. Menus

3.1 Structure

The Force Gauge has multi-level menu interface (Table 3-1).

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

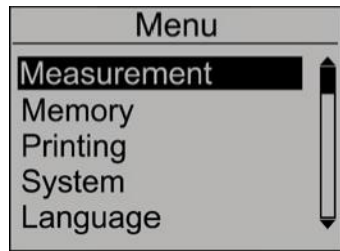


Fig. 3-1

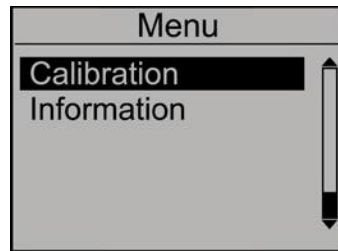





Fig. 3-2

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.

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
		Power Off
		Backlight
		Key Tone
		Date/Time
		Password
Key Setting		
Default Setting		
Language		
Calibration		
Information		

Table 3-1

3.2 Measurement

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

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.

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.

3.2.3 Tolerance

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

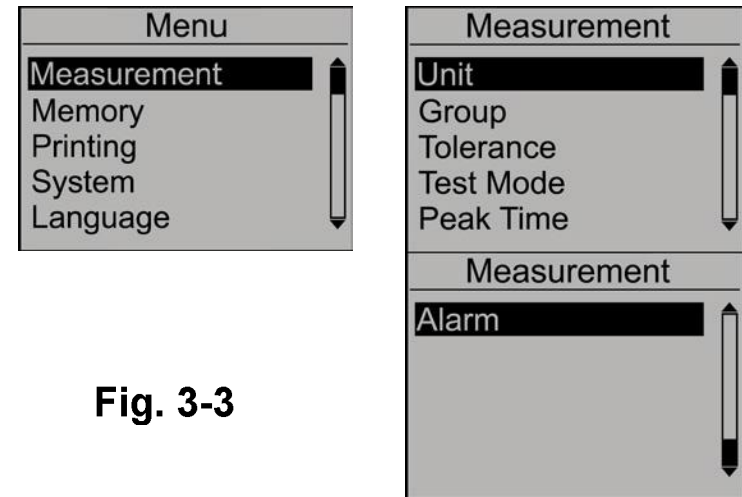


Fig. 3-3

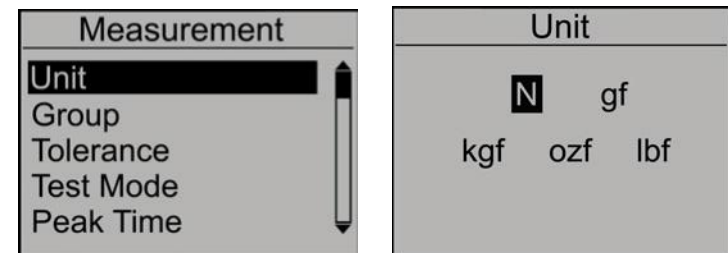


Fig. 3-4

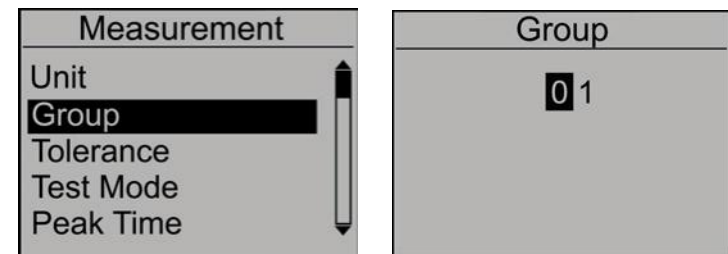


Fig. 3-5

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**.

3.2.4 Test Mode

Test mode can be selected. There are three kinds of mode: Track, Peak and Auto Peak. (**Fig. 3-7**)

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.

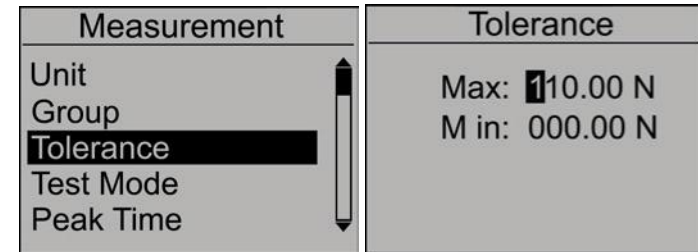


Fig. 3-6

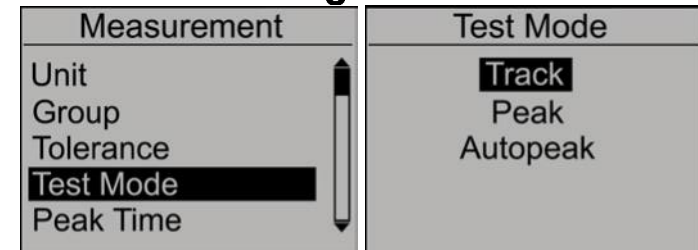


Fig. 3-7

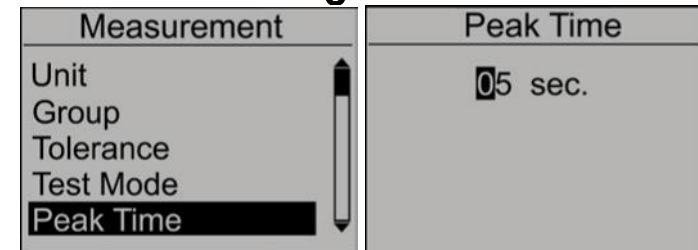


Fig. 3-8

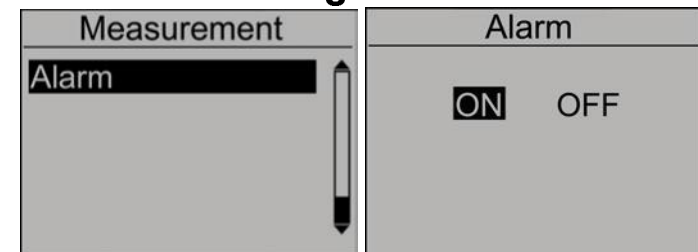



Fig. 3-9

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 3 test mode.

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).

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.

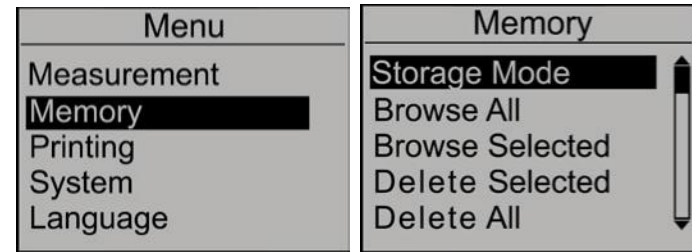


Fig. 3-10

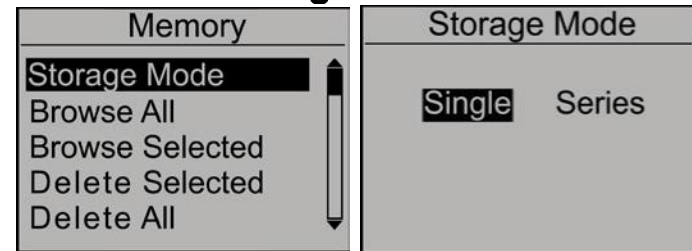


Fig. 3-11

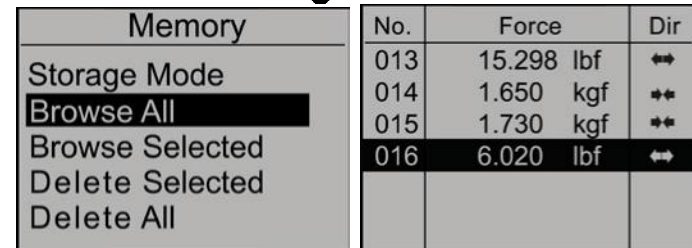


Fig. 3-12

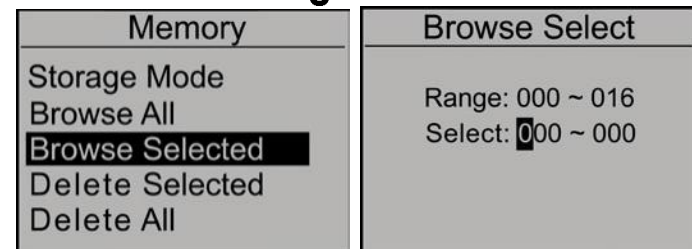


Fig. 3-13

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

Touch  or  can turn the page.

3.3.3 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.

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.

3.4.1 Connect Printer

Connect the printer to the force gauge with a printing

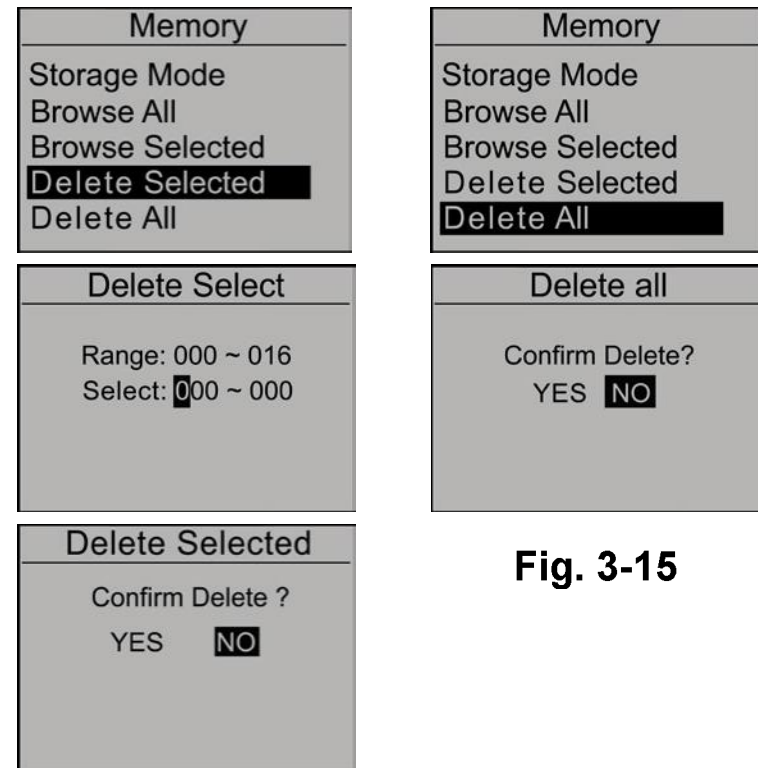


Fig. 3-15

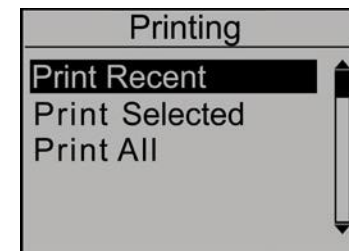
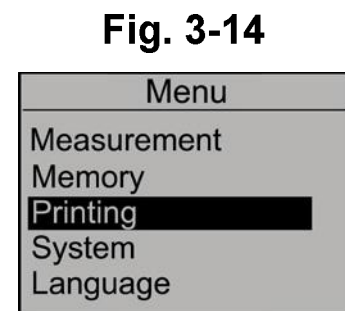


Fig. 3-16

cable. Then turn on the power of printer.

3.4.2 Printing Setup

Print Recent: Print some data measured recently(**Fig. 3-17**)

Print Selected: Print data in a number range(**Fig. 3-18**).

Print All: Print all data in memory(**Fig. 3-19**).

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.

Test Report			
001	2.00kgf	push	01
002	70.5ozf	pull	01
003	3.03lbf	push	01
004	13.5 N	push	01
005	0.00lbf	push	01
Print Date : 2010-12-25 13:19:38			

Fig. 3-20

The style of test report is shown as **Fig.3-20**.

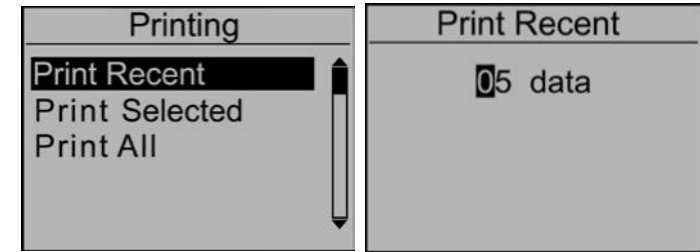


Fig. 3-17

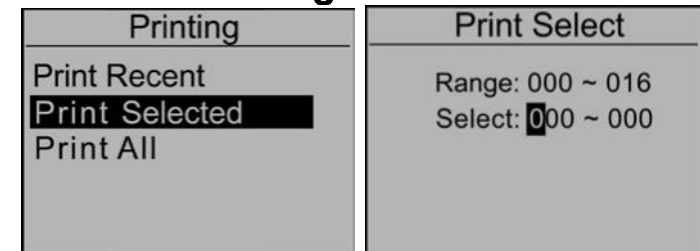


Fig. 3-18

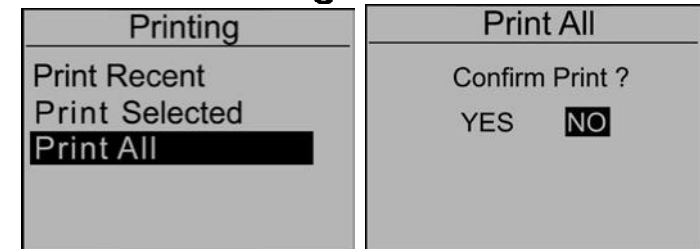


Fig. 3-19

3.5 System Setting

3.5.1 Display Mode

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.

3.5.2 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.

3.5.3 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)

3.5.4 Key Tone (Fig. 3-25)

3.5.5 Date/Time (Fig. 3-26)

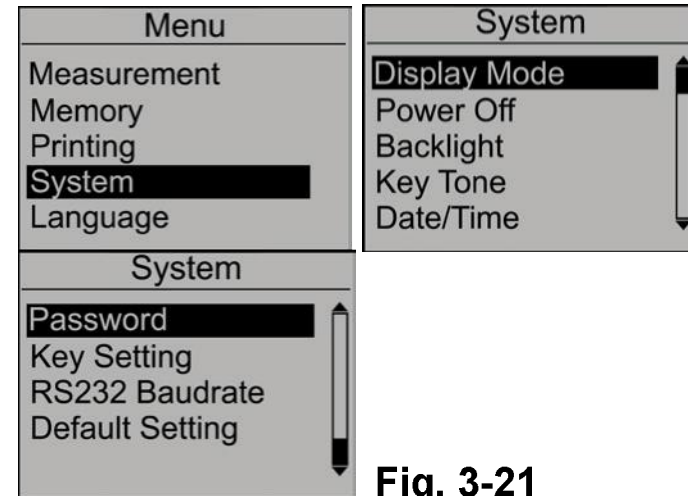


Fig. 3-21

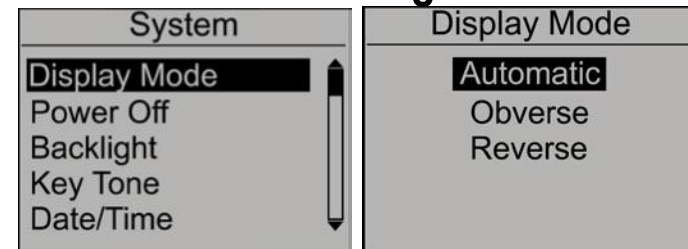


Fig. 3-22

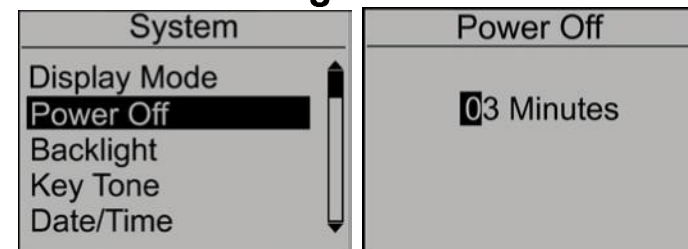


Fig. 3-23

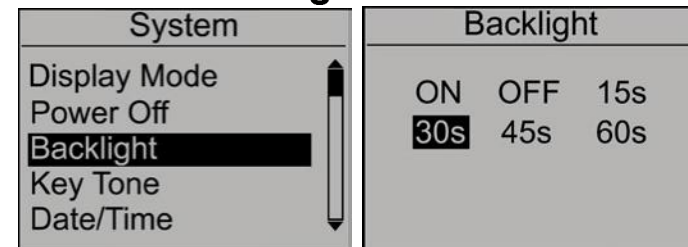



Fig. 3-24

3.5.6 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 password first, then enter a new one.

3.5.7 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.

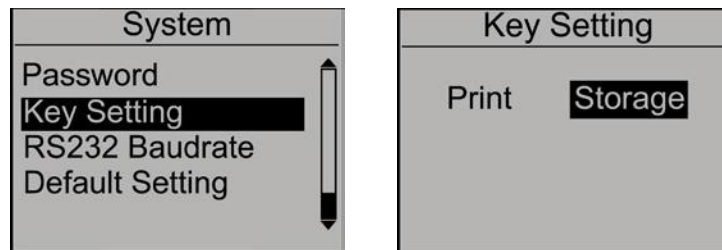


Fig. 3-28

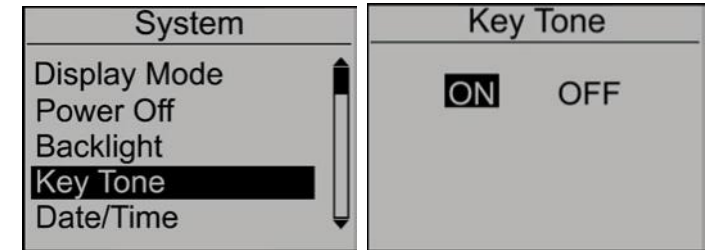


Fig. 3-25

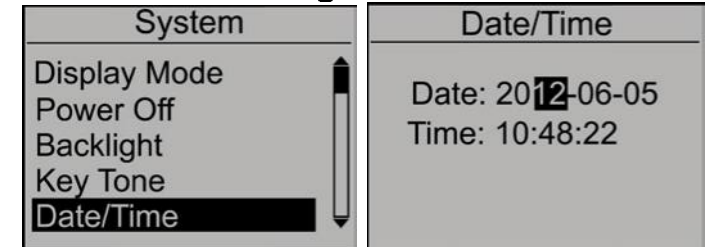


Fig. 3-26

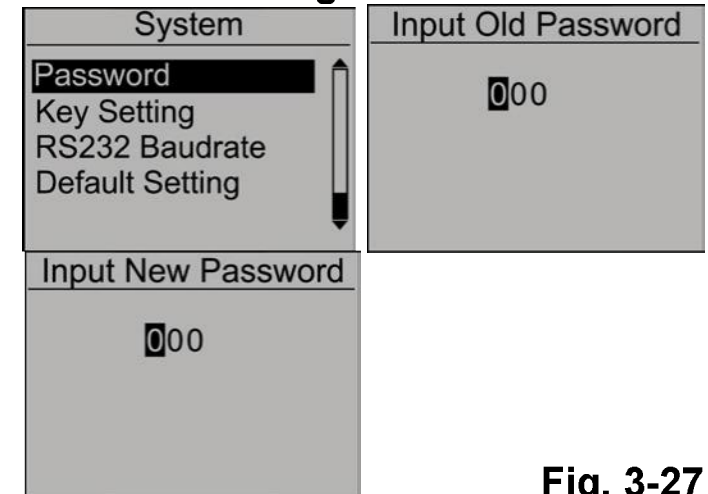


Fig. 3-27

3.5.8 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 entered and a prompt must be confirmed.

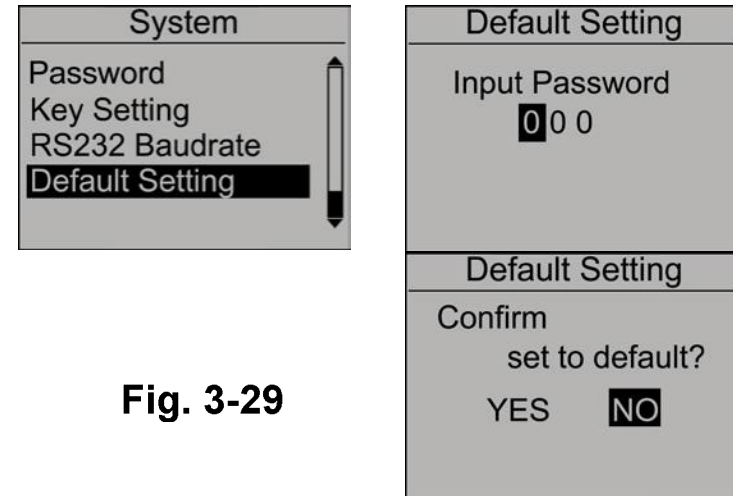


Fig. 3-29

3.6 Language

Here 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.



Fig. 3-30

4 External Interface

The force gauge have 2 external ports, a USB port and an MD8 port.

MD8 multifunction port	
Pin	Description
1	RS232- Transmit(TX)
2	RS232- Receive (RX)
3	RS232- Ground
4	Alarm Output A+
5	Reserved
6	Alarm Output Com -
7	Alarm Output B+
8	Reserved

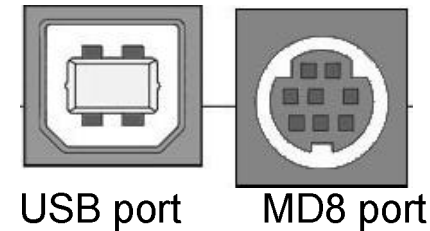


Fig. 4-1

4.1 USB Port

The USB port is used to transmit data to PC and recharge.

Connect the USB cable to a charger for recharging.

Connect to the PC for upload data. The software EDMS need to setup in PC, see manual of EDMS for detail.

4.2 Multifunction Port

The MD8 port is a multifunction port, it includes a RS232 interface for connect to the printer or computer, and two alarm outputs.

RS232 Specifications	
Data word length	8 bits
Stop bit	1bit
Parity	None
Baud rate	9600,19200, 38400
Hardware Flow Control	None

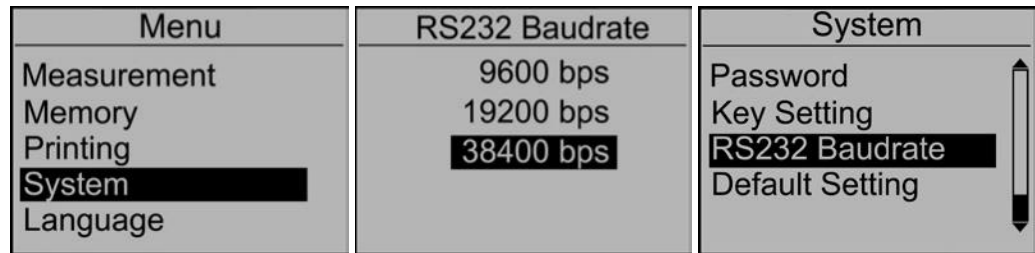


Fig. 4-2

You can change the baud rate in menus. shown in **Fig.4-2**.

Alarm output:

There are two alarm outputs, you can connect them to the other equipment (such as test stand, PLC etc.), or connect to some alarm units.

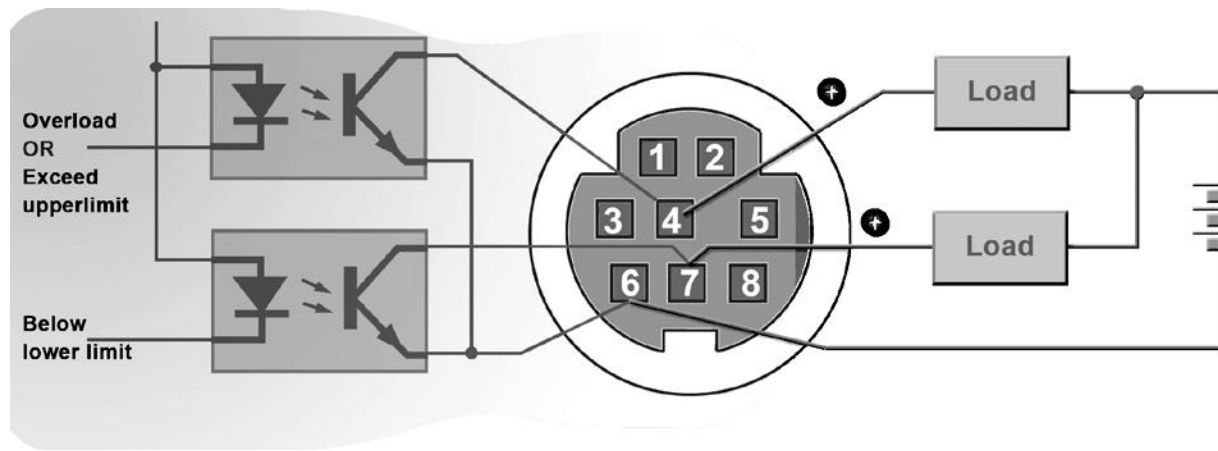


Fig. 4-3

! Maximum permissible voltage

- pin 7 to pin 6, pin 4 to pin 6: 35V;
- pin 6 to pin 7, pin 6 to pin 4: 6V.

5 Maintain 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.

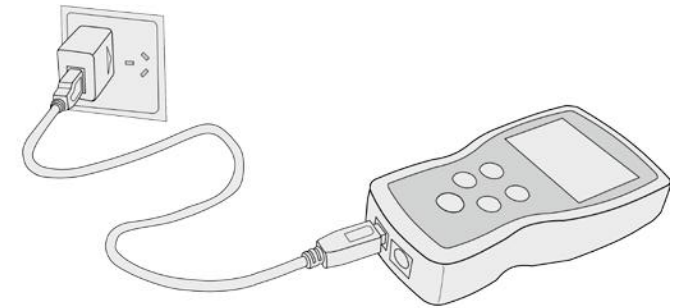
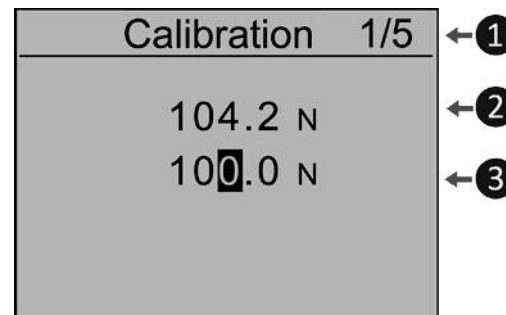


Fig. 5-1

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 force gauge to a specialized testing organization for calibration.



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

Fig. 5-3

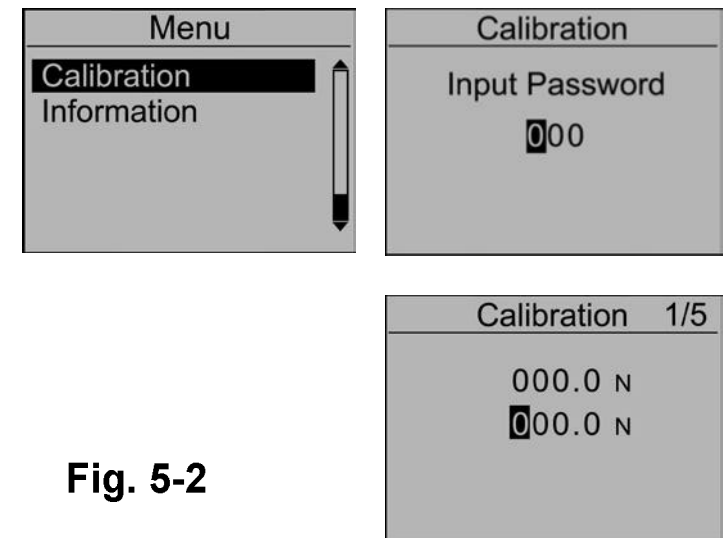


Fig. 5-2

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, as **Fig 5-2**.

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.

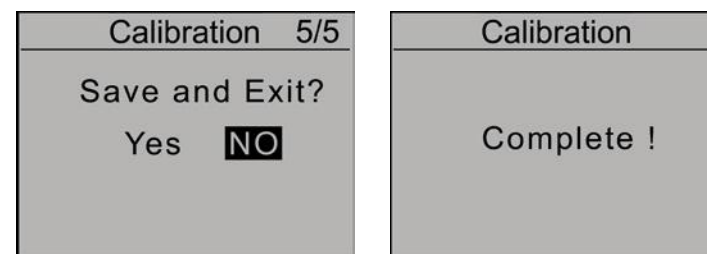


Fig. 5-4

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 points., we recommend 5 points calibration.

Appendix

A-1 Packing List

1. Force Gauge



3. User's manual



4. Measuring head



Hook



Flat tip



Conical tip



Notched tip

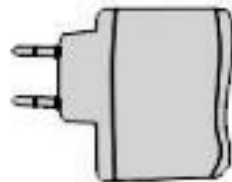


Chisel tip



Extension shaft

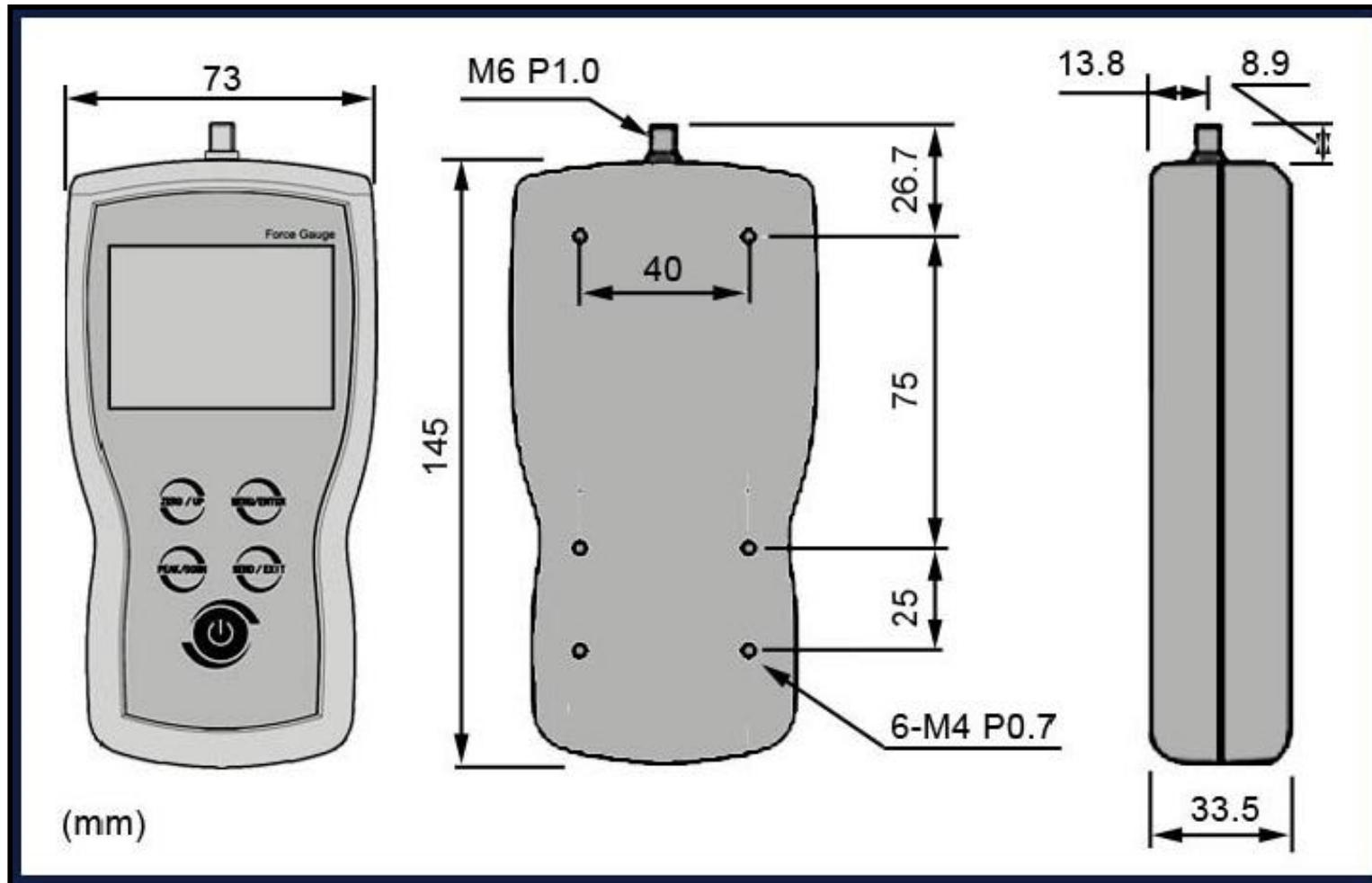
2. Charger



5. USB Cable



A-2 Dimensions



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.

EFG DIGITAL FORCE GAUGE
 FACTORY CALIBRATION
 CERTIFICATE SAMPLE

CALIBRATION CERTIFICATE							
Digital Force Gauge							
Model: EFG200				Capacity: 200N			
Accuracy: $\pm 0.2\%$				Serial No.: 13040021			
Inspect Record							
Push Force							
No.	Standard Value		Measured Value		Accuracy		
					Error		%(F.S)
1	39.15	N	39.20	N	0.05	N	0.025%
2	78.31	N	78.40	N	0.09	N	0.045%
3	117.46	N	117.50	N	0.04	N	0.020%
4	156.61	N	156.60	N	-0.01	N	-0.005%
5	195.77	N	195.75	N	-0.02	N	-0.010%
Pull Force							
No.	Standard Value		Measured Value		Accuracy		
					Error		%(F.S)
1	39.15	N	39.15	N	0.00	N	0.000%
2	78.31	N	78.30	N	-0.01	N	-0.005%
3	117.46	N	117.40	N	-0.06	N	-0.030%
4	156.61	N	156.60	N	-0.01	N	-0.005%
5	195.77	N	195.75	N	-0.02	N	-0.010%
This instrument has been tested according to JJG 455 and meet our quality standards.							
Inspector: <i>efan</i>				Date of issue: 2013-4-16			
							



	Capacity (N)	N	kgf	lbf	ozf	gf	mN	
	5	5/0.0005	-	1.1/0.0001	18/0.005	500/0.05	5000/0.5	
	10	10/0.001	1/0.0001	2.2/0.0005	35/0.01	1000/0.1	10000/1	
	20	20/0.005	2/0.0005	4.4/0.001	70/0.01	2000/0.5	20000/5	
	50	50/0.005	5/0.0005	11/0.001	180/0.05	5000/0.5	50000/5	
	100	100/0.01	10/0.001	22/0.005	350/0.1	10000/1	-	
	200	200/0.05	20/0.005	44/0.01	700/0.1	20000/5	-	
	500	500/0.05	50/0.005	110/0.01	1800/0.5	-	-	
	1000	1000/0.1	100/0.01	220/0.05	3500/1	-	-	



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