

Force Gauge

FG Series

Model FGJN

SCHMIDT
control instruments



Edition

FGJN 01.E

Operating Instructions

Valid as of: 01.10.2015 • Please keep the manual for future reference!



SCHMIDT · ALL OVER THE TECHNICAL WORLD

Safety Precaution

*Please keep this instruction manual at your side after you read.



Observe all warnings and cautions; it is extremely important and any safety serious contents are described. Expression and meaning are as follows.



Warning

When you use FGJN wrongly, it may cause serious problem, such as death or severe injury.



Caution

When you use FGJN wrongly, it might cause serious problem depend on the situation.

Here are pictures which you have to follow.



It shows the reminder.



It shows the prohibition.



It shows the compulsion which you have to do.



Warning



Please be careful to the flying apart of the test substance.

At the breakdown test or break test, you might get injury due to the flying apart of the objects. Please wear the mask for the protection, and pay proper attention to safety.



Do not use scarred hook or deformed hook.

They might be broken or slip. Heavy test substance might hit your foot.



Caution



Do not load more than rated capacity.

Sensor may be broken. If you load further more, accident may happen because of the broken parts.



When "OVR" is displayed, it means overload. Please reduce the load immediately. Measuring value which is measured during the "OVR" is not correct.



Caution



Please use only supplied AC adapter for charging.

If you use non-supplied AC adapter, electronic circuit might be broken, and fire break might happen.



Do not charge and use the FGJN other than AC 100 – 230V.

Become the source of fire disaster and electric shock.



Please plug the AC adapter in firmly.

When it is loose, short out and electric shock, and then it might be fire hazard.



Do not touch the AC adapter with wet hand.

There is the threat of electric shock.



Do not take down, repair, and make alterations to FGJN.








You might be hurt because of the unusual operation.




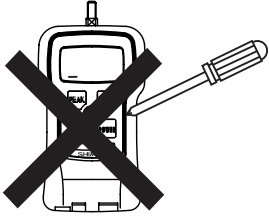
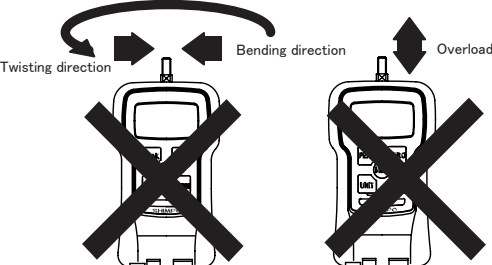
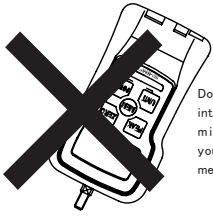
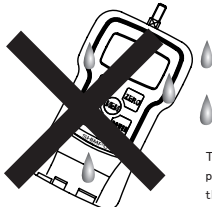

Do not pull the code to unplug the AC adapter.

The code might be cut and short out, and then it might be fire hazard.

Safety precaution

 Caution	
 <p>Do not use AC plug covered with dust.</p> <p>It might be the cause of the fire.</p>	 <p>Do not use and keep the FGJN under the following circumstances.</p> <ul style="list-style-type: none"> • Location which will be gotten water • Location which receive direct sunlight • Dusty, salinity and iron content environments • Corrosive and Flammable gas environment • Dew condensation place
 <p>When the FGJN is dirty, please wipe with dry soft cloth, or please give the cloth soak in detergent which has mixed with water, then wring the cloth and wipe with it. Do not use a volatile chemical such as benzene, thinner, and alcohol.</p>	 <p>Please use the FGJN in operating temperature in range 0°C~40°C.</p> <p>If you use FGP beyond above temperature, FGP might operate unusual.</p>
 <p>We recommend the force gauge to be checked and calibrated regularly. Though it is depend on the frequency of use and loading, the accuracy of measurement will be declined with time.</p>	 <p>Please operate the force gauge within operating humidity range; 35 ~ 85RH.</p> <p>If you use the force gauge beyond the above range, it might produce improper operation.</p>

Caution before use.

 Caution	
<p>1. Do not press the button with a sharp-pointed object.</p> 	<p>2. Do not load bending direction or twisting direction.</p>  <p>FGP can measure pulling load and compression load. Do not load bending direction or twisting direction. Though FGJN has a stopper which protects the sensor from careless operation, this stopper is helplessness for impact load, bending direction, and twisting direction.</p>
<p>3. Do not fall the force gauge.</p>  <p>Do not fall the force gauge into the ground. Sensor might be broken and you cannot get accurate measurement value.</p>	<p>4. Do not use the force gauge in location which will be gotten water.</p>  <p>This force gauge is not water proof. Please do not operate the force gauge in location which will be gotten water.</p>
<p>5. Measuring very small loading</p> <p>Tracking is ON at the factory default. When you measure small load, please turn the tracking OFF. (⇒ Please refer 4.4. Tracking)</p> 	

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1.Product Features

- Nickel –hydrogen battery enable us to use long time

→ 4.1. Charge

- Rated Capacity 2.000N (200.0gf, 8oz) ~ 500N (50.0kgf, 100lb)

→ 8 Specifications and Dimensions

- Reverse the display of the measuring value and the unit.

→ 4.6. Reverse the display

- One touch shimple operation for changing the unit N, kg(g), Lb(oz).

→ 5.3. Change display unit

- Measure peak value at plus and minus side.

→ 5.2.2. Peak hold mode

- High–speed measuring (1000times/second)

→ 5.2.2. Peak hold mode

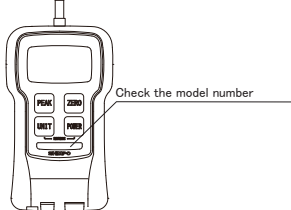
- Display update time is selectable up to 20 times/second.

→ 4.5.2 Display update time

2.Confirmation of Standard Accessories

- Before you use, please confirm the following items are included in the carrying case.

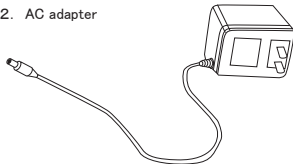
1. Main Unit



3. Instruction manual



2. AC adapter



4. Measuring adapters

M6 adapters are included with other types.



Hook

M6
M4



Flat head
φ 12
φ 8



Cone head
70°
60°



Notched head
70°
90°



Chisel
70°
60°

Extension rod L:92(M6)/L:86(M4)



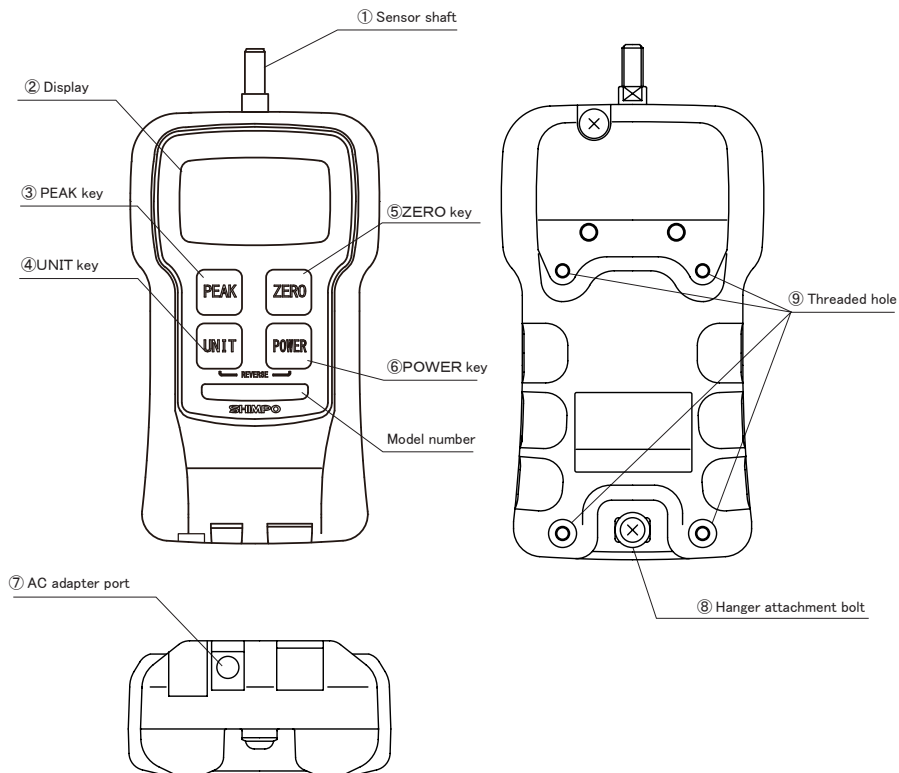
5. Hunger



6. USB cable (2.0m)

3. Part names and functions

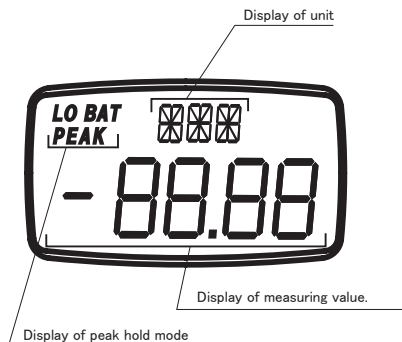
3.1.Main Unit



① Sensor shaft	Force bolt (Push/Pull Force)
② Display	Display the load and the unit.
③ PEAK key	<ul style="list-style-type: none"> • Switch standard measuring mode, + peak hold mode, or - peak hold mode. • Tracking ON/OFF. • It is used for function setting.
④ UNIT key	<ul style="list-style-type: none"> • Switch the unit (N \Rightarrow Kg \Rightarrow lb(oz) \Rightarrow N) • It is used for reverse the display. • Tracking ON/OFF. • It is used for function setting.
⑤ ZERO key	<ul style="list-style-type: none"> • Tare at standard measuring mode (not display a peak value). • It is used for function setting. • Press the ZERO key under the peak hold mode (display the peak value), clear the peak value. In this case, tare does not perform. If you need tare, press the peak key to change into standard measuring mode, then press the Zero key.
⑥ POWER key	<ul style="list-style-type: none"> • Press the POWER and release to turn ON/OFF. • It is used for reverse the display. • Tracking ON/OFF. • It is used for function setting.
⑦ AC adapter port	Supply the electricity through the AC adapter.
⑧ Hanger attachment bolt	Attache the hanger with this bolt.
⑨ Threaded hole	Use this threaded hole in order to attach the FGJN with a stand.

3.2.Display

3.2.1.Part names



3.2.2.Numeric Display

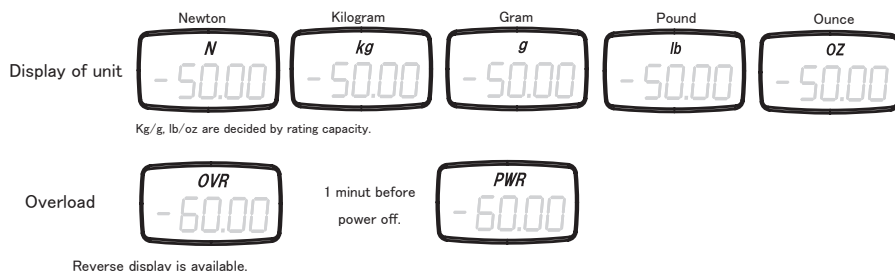
Display the measuring value with sign and 4 digits numbers. Compression force: plus, Tension force: minus.

(It's available to switch plus/minus with the setting of function (f01)).

Reverse display is available.

3.2.3.Unit Display

Display the units. In case of overload, "OVR" is shown. "PWR" appears to notify that there is 1 minute before power off.



3.2.4.Peak hold mode display

Depend on the condition of the force gauge, the following display is shown.



In case of the voltage of internal nickel hydride battery decrease, "LO BAT" has turned on and off. Please connect AC adapter to charge the battery.

During the charge of battery, "BAT" is shown. Even if turn the power off during the charge "BAT" has displayed.

"PEAK" has turned on when plus peak hold mode.※

"PEAK" has turned on when minus peak hold mode.※

※ Please discern plus peak hold mode and minus peak hold mode with or without "-".

4.Before use

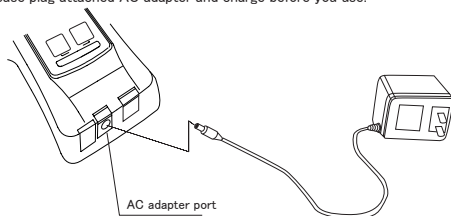
4.1.Charge



Do not charge with non-attached AC adapter.

Please use AC adapter which supplied with FGJN. If you use non-attached AC adapter, electronic circuit might be broken and fire might happen.

Before the FGJN arrive at your hand, nickel hydride battery might discharge electricity.
Please plug attached AC adapter and charge before you use.



① Please connect the attached AC adapter into the AC adapter port of the body, and plug them into outlet.

- Start to charge the Nickel hydride battery. After the completion of the charge, it stops charging automatically by itself.
- "BAT" will be shown on the LCD display while charging. After complete the charging, "BAT" will be disappeared from LCD.
- Charge time: Up to 16 hours at most
- Operating time: Approx. 8 hours per 1 full charge

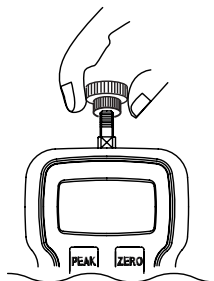
② The nickel hydride battery is charged automatically when it is discharged during the usage of AC adapter.

※ If you charge the battery frequently, its lifetime will be shorten.
When you use the FGJN with AC adapter, you should not insert and remove the AC adapter often.

③ You can measure during the charge.

④ When the voltage of nickel hydride battery decline, "LoBAT" has turned on in the LCD display. Please connect the AC adapter to charge. (If you leave the FGJN with turned on "LoBAT", the voltage decline furthermore, and then the power is turned off compulsory.)

4.2.Attaching measuring adapter



Please select the measuring adapter depend on the measuring purpose.
Screw the adapter until it stops lightly. Do not screw it forcibly in order not to give the damage to the sensor.



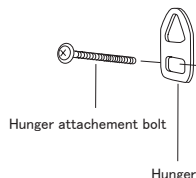
Do not screw the attachment in forcibly.



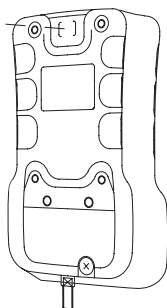
Do not use bruised hook or deformed hook.



4.3.Attaching hanger



Please attached the hunger according to need.



Please use the hunger to hang the FGJN with a nail or a winch.



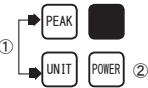

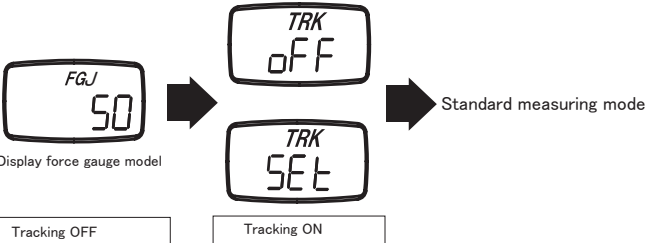
※ Please use the tolerable nail or winch against the load.

Please take off the attached hanger bolt. Fit the square hole of hanger into the salient part of the case, and then tighten the attached hanger bolt.

4.4.Tracking

A load cell of strain gauge is used for FGJN as a load sensing. By using this sensor, the measuring value is slightly changed due to temperature and so on, but tracking is able to cancel this slightly change by the software. When you measure very minute forces, measuring value error might happen due to the tracking. In this case, you may turn off the tracking function.

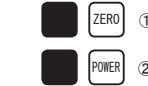


When the power off, while hold down the PEAK key and UNIT key simultaneously, press and release the POWER key (release the PEAK key and UNIT key after the value is appeared in the display more than 1 second), you can switch the tracking ON/OFF.

Key operation	Display
<p>Turn the power off</p>  <p>① Hold down PEAK and UNIT key. ② Press POWER key.</p>  <p>Release POWER key only.</p> <p>Please release the PEAK key and UNIT key after the value is appeared in the display more than 1 second.</p>	<div><div>Tracking ON</div><div>Tracking OFF</div></div>  <p>Display force gauge model</p> <p>Standard measuring mode</p> <p>Tracking OFF</p> <p>Tracking ON</p> <p>Turn power off, then press POWER key, you can confirm the condition of the present tracking.</p>

4.5.Function setting


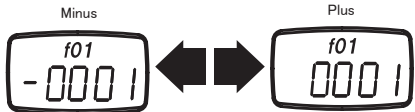


The following setting items in function mode.

Item	Unit	Set contents	Default factory setting
Display sign	f01	-0001(minus), 0001 (plus)	0001
Display update time	f02	1、 2、 3、 5、 10、 20 (times/second)	3
Auto power off	f03	10 (10 minutes)、 oFF (not valid)	10

Key operation	Display
<p>Turn the power off</p>  <p>① Hold down ZERO key. ② Press POWER key.</p>  <p>Release POWER key only.</p> <p>Please release the ZERO key after the value is appeared in the display more than 1 second.</p>	 <p>Display force gauge model</p> <p>Display function mode (f01)</p>


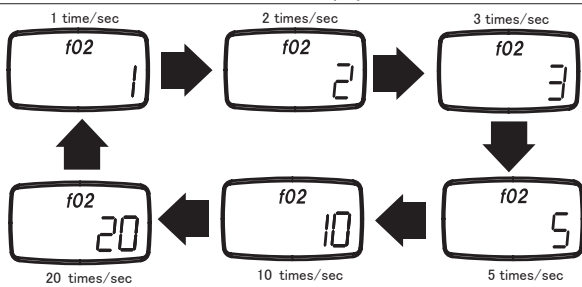


4.5.1.Sign: f01

It's available to set the sign (plus or minus) of measuring value for pushing the sensor shaft.
Select the sign by use of UNIT key / Press the PEAK key to move ahead.

Key operation	Display
 Each time to press UNIT	
	Register the all setting, and then move to the standard measuring mode.
	Reserve the change, and then move to f02.

4.5.2.Display update time: f02


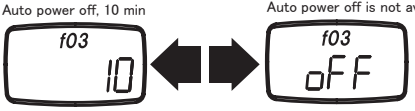


It's available to set the display update time for 1 time/second, 2 times/second, 3 times/second, 5 times/second, 10 times/second and 20 times/second. After the setting, the averaging value in display update time is shown every display update time.
Press the UNIT key to choose the display update time (1、2、3、5、10、20 (times/second)) / Press the PEAK key to move ahead

Key operation	Display
 Each time to press UNIT	
	Register the all setting, and then move to the standard measuring mode.
	Reserve the change, and then move to f03.

4.5.3.Auto power off: f03

If the gauge is on and there is no activity for 10 minutes*, the unit automatically powers off to conserve battery charge (In case of connected with AC adapter, Auto power off function does not work). "PWR" appears to notify that there is 1 minute before power off.
Press the UNIT key to switch the auto power off / Press the PEAK key to move ahead

※ There is no key operation, RS-232C communication, USB communication, change of measuring value.

Key operation	Display
 Each time to press UNIT	
	Register the all setting, and then move to the standard measuring mode.
	Reserve the change, and then move to f04.

4.5.4.Function mode–end

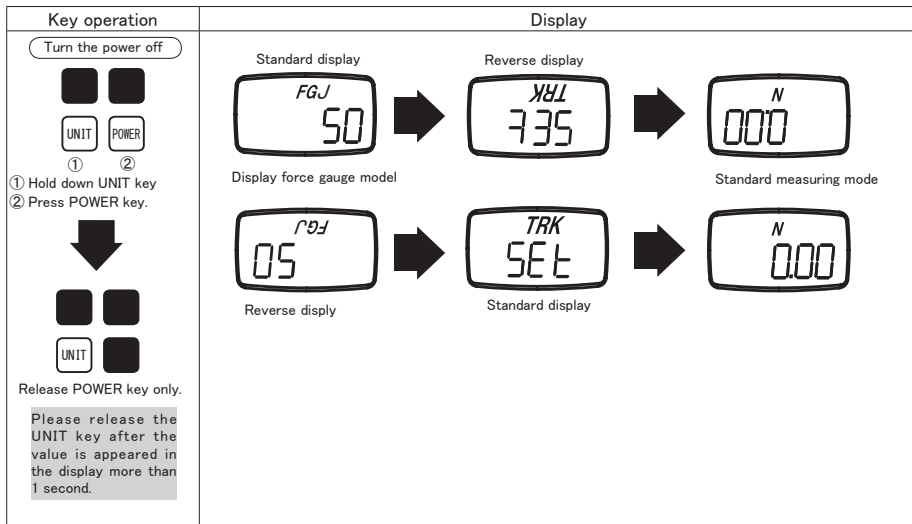
Press ZERO key to memorize the set value and come back from function mode to standard measuring mode.

In order to cancel the change of function mode, press POWER key, then turn the POWER off.

4.6.Reverse the display

In the case you attach FGJN with a stand, display of the value and the units can be reversed in order to read the display easily.

Turn POWER off. Press the UNIT key and hold, then press POWER key and release (release UNIT key after the value is appeared in the display more than 1 second). Then you can reverse the display.



5.Feature and Operation

5.1.Overview of operation

1) Basic operation

Key	Operation
POWER	Turn the POWER ON/OFF
ZERO	Tare (Peak reset at the PEAK Hold mode)
PEAK	Standard measuring mode / Plus peak hold mode / Minus peak hold mode
UNIT	Change the unit

2) Special operation

Key	Operation	How to operate
PEAK + UNIT POWER	Tracking ON / OFF	Turn POWER off. Press PEAK key and UNIT key simultaneously and hold, then press and release POWER key (release the PEAK key and UNIT key after the value is appeared in the display more than 1 second.)
ZERO POWER	Function mode	Turn POWER off. Press ZERO key and hold, then press POWER key and release (release ZERO key after the value is appeared in the display more than 1 second). Function mode; UNIT : Change the setting content PEAK : Switch the function ZERO : Register the setting content
UNIT POWER	Reverse display	Turn POWER off. Press UNIT key and hold, then press POWER key and release (release the UNIT key after the value is appeared in the display more than 1 second.)

5.2.Measuring Mode

There are standard measuring mode and peak hold mode in the measuring mode.

5.2.1Standard measuring mode

It's available to measure the compression and tension force. Measuring value is appeared at all times.

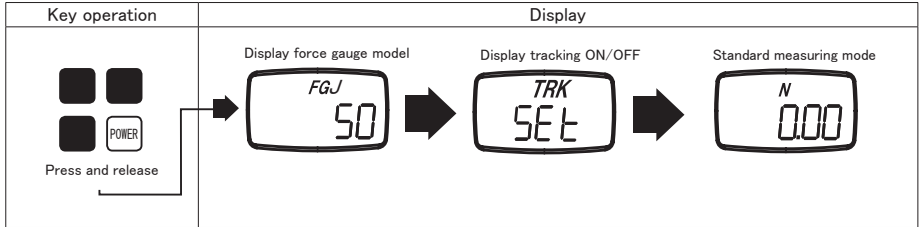
1) Press POWER key and release (Turn POWER on after release)

2) Press ZERO key to tare.

Displayed measuring value is averaged out the sampling value (every 1 msec *) per display update time.

Display update time of default factory setting is 3 times/second. In order to increase the display response against the change of measuring value, you may change the set value of display update time.

You can increase this time up to 20 times/second (regarding the change of display update time, please refer "4.5.2. Display update time").



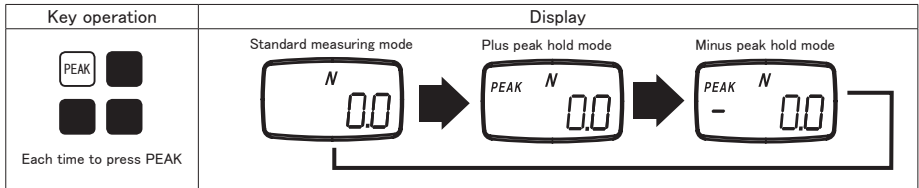
5.2.2 Peak hold mode

Display peak measuring value. Sampling time is 1ms. *

Press PEAK key to change standard measuring mode, Plus peak hold mode and Minus peak hold mode.

Under the plus peak hold mode, "PEAK" is appeared.

Under the minus peak hold mode, "PEAK" and "-" (minus) are appeared.



Under the plus peak hold mode and minus peak hold mode, press ZERO key to clear the peak value (Tare is not performed).

5.3.Change display unit

To change the display units, just press UNIT and the units will change every time the button is pressed.

N → kg (g) → lb (oz) → N

5.4.Tare

Press ZERO key to reset the measuring value. Please press the ZERO key before starting the measurement in order not to change the starting display value because of the own weight or measuring direction or weight of measuring fixture.

Measuring range is from maximum pulling load to maximum compression load. When measuring range is over, "OVR" is displayed.

Press the ZERO key under the plus peak hold mode or minus peak hold mode, plus peak value or minus peak value is cleared. At the plus peak hold mode and minus peak hold mode, tare does not performed even if press and release ZERO key.

When turning POWER on, tare is automatically performed (if you turn POWER on during the getting load, display becomes "0" and you cannot measure accurate value).

5.5.Overload

"OVR" shows on the LCD when the load exceed 120% of the capacity (tare value is not included).

Please reduce the load immediately.



6.Frequently –asked questions

6.1.Questions for trouble

Questions	Cause	Presumable reason	Procedure
When turning on power, “OVR” is displayed even if not applying load and cannot be cleared by pushing ZERO key.	There is possibility which internal loadsell is broken.	Due to dropment or overloading	Please send it for repair.
“Low bat” is displayed at LCD even if charging up for more than one day.	Voltage of battery is low.	<ul style="list-style-type: none"> • End of battery life • Breakdown of battery • Breakdown of charging 	Please send it fot repair.
It doesn't display even if pressing POWER Key.	Battery is weak. “BAT” isn't displayed on LCD even if charging up.	Voltage of battery is lower.	Please charge a battery.
		<ul style="list-style-type: none"> • Breakdown of battery • Breakdown of internal circuit • Breakdown of AC adapter 	Please send it for repair.
The value becomes “0” automatically when measuring small value near 0.	You can use tracking to prevent the fluctuation of the measuring value near “0” .	Tracking is on.	Please set tracking off.” (Refer to “4.4.Tracking”)
Value changes if you change the direction of force gauge.	This is not breakdown. This equipment is measuring the empty weight of sensor on his own.	Sensor or tools also have weight empty operating.	Push ZERO key after setting the direction to measure and clear the measuring value.
Although I downloaded “Toriemon” , it doesn't work even if connecting force gauge.	—	Since “Toriemon” is soft for RS-232C transmission, it doesn't respond to USB transmission.	Please download “ToriemonUSB” and use it.

6.2.Questions for technical

Questions	Explanation	Reference
How long does rechargeable battery (Nickel hydride battery) last?	Enable to use 500 times or more by complete electric discharge. It depends on the status of use.	Please charge battery after discharging electricity until “LO BAT” is displayed at LCD.
Why are there various rating capacity?	The value is more accurate when measuring near rating as much as possible.	It is ideal to use this equipment with 50% rating or more.
Why does measuring data show variations?	Although there are many reasons, the measuring value is affected by vibration if you hold by hands.	Fluctuation will be reduced when using stand.
How does biased loading affect accuracy?	Although it depends on the angle, you cannot measure accurate value with biased loading.	
How do you proceed ISO cariblation ?	It measures the value by pushing or pulling load by certificated weight.	Weight with traceability is necessary.
Please tell easy test methods which user can.	Please hang the weihgt which weight is clear.	
Can user exchange battery?	User cannot exchange battery.	Please let our dealers know since exchange of battery is as repairment.
Do you have CAD data ?	Yes.	Please let our dealers know.
Is it possible to use in water ?	No. It is not waterproof structure.	Please pay attention not to pour water.

7.Support

7.1.Repair and Calibration

We have calibration service for value. We recommend calibrating regularly for keeping up the accuracy of force gauge. Please ask our dealers for the price and lead time of the calibration.

7.2.Warranty

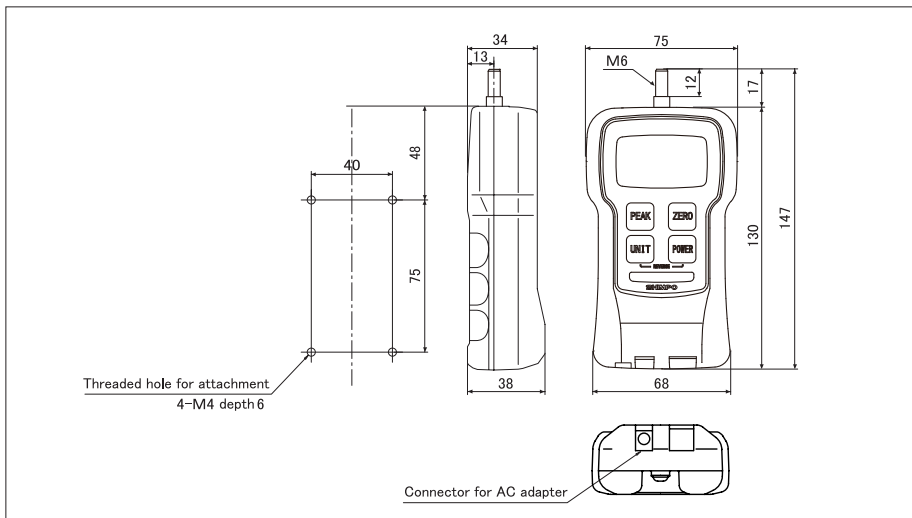
Nidec-Shimpo Corp. warrants, to the original purchaser of new products only, that this product shall be free from defects in workmanship and materials under normal use and proper maintenance for one year from the date of original purchase.

8.Specifications and Dimensions

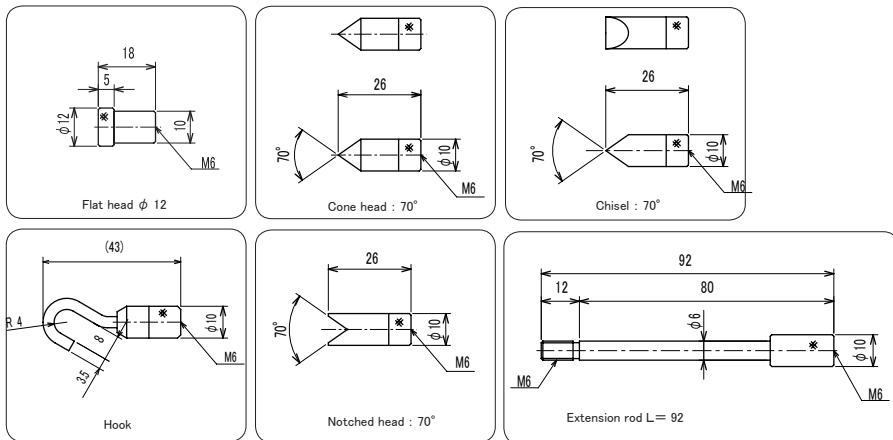
Model	FGJN-2	FGJN-5	FGJN-20	FGJN-50
Capacity(R.C.)	± 20.00 N (± 2.000 kg) (± 5 lb)	± 50.00 N (± 5.000 kg) (± 10 lb)	± 200.0 N (± 20.00 kg) (± 50 lb)	± 500.0 N (± 50.00 kg) (± 100 lb)
Display range	± 20.00 N ± 2.000 kg ± 5 lb	± 50.00 N ± 5.000 kg ± 10 lb	± 200.0 N ± 20.00 kg ± 50 lb	± 500.0 N ± 50.00 kg ± 100 lb
Resolution	0.01N 0.001g 0.001lb	0.01N 0.001g 0.01lb	0.1N 0.01kg 0.01lb	0.1N 0.01kg 0.1lb
Unit	N/kg/lb Reversible display			
Mesuring mode	Standard measuring, Plus peak measuring, Minus peak measuring			
Display cycle	1, 2, 3, 5, 10, 20 times per second			
Sampling rate	1000 times per second			
Accuracy	± 0.3%R.C ± 1/2digit(23°C)			
Influence of temperature	Gain : ± 0.03%/LOAD/°C, Zero : ± 0.02%/R.C/°C (Drift of zero point can be cancelled with tracking function.)			
Display	Main display: 4-digits 12mm high, Reversible display Unit display: 3-digits 7mm high ① "LO BAT"(Decrease battely voltage), ② "BAT"(Battery charge), ③ "OVR"(Over load), ④ "Peak"(Peak hold mode)			
Overload	200%R.C			
Tracking	Available(ON/OFF)			
Power	Rechargeable Nickel hydride battery or AC adapter/charger, Muasurable during the charge Operating hours: about 8 hours after full charge Charging time: Max 12 hours (when the battery is full, charge is finished automatically.)			
Auto Power Off	10 minitus (not active if adapter/charge is in use) or OFF			
Temperature range	0° - 40°C no condensation			
Humidityrange	35 ~ 85%RH no condensation			
Dimensions	147mm (L)x 75mm (W) x 38mm(H)			
Weight	Approx. 450g			
Accessories (included)	6 different measuring adapters, hanger, AC adapter/charger, carrying case			

8.Specifications and Dimensions

Dimensions



Force measuring attachments (standard accessories)



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