

Instruction Manual

Digital Force Gage

MODEL-SX
series



Be sure to read through this instruction manual before using the product.

This instruction manual is very important for using the product properly.
Always keep it by the product and read it at any time when needed.

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AIKOH
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INTRODUCTION

Thank you for purchasing the Force gage SX Series.

This series comprise downsized force gages having the minimum required functions. They guarantee the precision of basic measuring instruments while ensuring the merits of the handy type.

Read through this instruction manual carefully and make full use of the SX Series.

- No part of this instruction manual may be reproduced in any form without permission.
- This instruction manual is subject to change without notice.
- This instruction manual is prepared with the greatest care.
- In spite of this, please contact the shop you purchased this product or Aikoh's office or agent, if you should find doubtful matters, omissions, etc.




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SAFETY INSTRUCTIONS

This section describes the instructions important to ensure the safety.




Be sure to observe these instructions. The symbols and their meanings are as shown below.





	DANGER Indicates an urgent situation that is likely to result in death or serious injury of the user and/or enormous damages to the product depending on the structure, material or circumstances, if the instruction should be ignored and the product should be used improperly.
	WARNING Indicates an urgent situation that is likely to result in death or serious injury of the user, if the instruction should be ignored and the product should be used improperly.
	CAUTION Indicates an urgent situation that is likely to result in slight injury of the user, if the instruction should be ignored and the product should be used improperly.






DANGER


	Do not recharge the battery for 24 hours or more.	If this instruction is disobeyed, the built-in battery may overheat excessively. Depending on circumstances, it may break, resulting in a fire.
	Use the AC adapter supplied with the product. Do not use any other instrument.	If this instruction is disobeyed, a trouble may occur in the electric circuits or the like, resulting in a fire.
	Recharge the battery or use the product on the specified voltage only.	Disobedience to this instruction may result in a fire, electric shocks or electrocution.

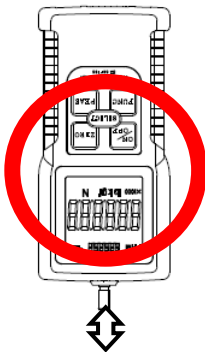
WARNING

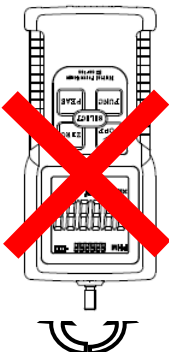
	Be careful about scattering of test piece.	The test piece may scatter and cause injury. Pay great attention to the safety of the user and operation environments.
	Do not use a flawed or deformed jig.	If a flawed or deformed jig is used, it may break or slip, resulting in injury. If a test piece drops onto your foot, it is very dangerous.
	Connect the plug of the AC adapter with the AC outlet to the very end.	If the plug is connected loosely with the AC outlet, it may short-circuit, resulting in a fire, electric shocks or electrocution.

 <h2 style="margin: 0;">CAUTION</h2>		
	<p>Do not connect or disconnect the AC adapter plug with a wet hand.</p>	<p>Disobedience to this instruction may result in electric shocks or electrocution.</p>
	<p>Do not disconnect the plug of the AC adapter by pulling the cable.</p>	<p>If this instruction is disobeyed, the cable may break, resulting in electric shocks or electrocution.</p>
	<p>Never attempt to disassemble, repair or modify the product.</p>	<p>If you attempt to disassemble, repair or modify the product, it may malfunction, resulting in injury.</p>

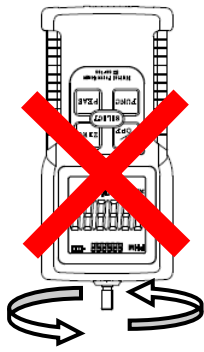
 <h2 style="margin: 0;">CAUTION</h2>		
	<p>Do not apply a load over the maximum measurement capacity.</p>	<p>If an excessive load is applied, the sensor may break. If a greater load is applied, the case or internal parts of the gage may break, resulting in an accident.</p>
	<p>Do not use or store the product in the environments shown on the right.</p>	<ul style="list-style-type: none"> -Environment subject to spattering of water -Environment subject to dew condensation -Dusty Environment
	<p>Use the gage within the allowable temperature range.</p>	<p>If the gage is used over or below the specified temperature range, it may malfunction. The guaranteed temperature range is from 5°C to 40°C.</p>
	<p>Pay attention to the length of the set screws.</p>	<p>Use M-4 screws to install this gage on another instrument. Make sure that the screws have 5-mm or shorter threads. Using screws with threads longer than 5-mm may damage the gage case.</p>


Do not apply a bending or twisting force to the load shaft.





Bending force



Twisting force

CHECKING CONTENTS

Make sure that the following are supplied.

- | | | |
|----|--------------------------------|----|
| 1. | Gage body (*1) | :1 |
| 2. | AC adapter (*2) | :1 |
| 3. | European specification plug | :1 |
| 4. | Warranty sheet | :1 |
| 5. | Instruction manual (this book) | :1 |
| 6. | Measurement attachments (*3) | :6 |

NOTES

*1: Check the model of the product you purchased.

*2: MODEL-770 (100VAC to 240VAC)

*3: Models 011B, 012B, 013B, 014B, 015B and 016B

BEFORE USING PRODUCTS

<Recharging>



Use the AC adapter supplied with the products. Do not use any other instrument.

If this instruction is disobeyed, a trouble may occur in the electric circuits or the like, resulting in a fire.

The built-in battery (Nickel hydrogen battery) has been charged before shipment. However, it may have been charged during transportation. Connect the supplied AC adapter with the gage in order to rechargeable the battery before using the gage.

-Connect the supplied AC adapter with the AC adapter connector of the gage, and plug the AC adapter into an outlet.

-When connect the AC adapter, and electricity is supplied by an outlet, start charge to exclusively battery (Nickel hydrogen battery). (*1)

-Recharging stops automatically after completion of recharging. However, do not recharge the battery for 24 hours or more for safety. Normally, the battery in the low-charge condition will be fully recharged in approximately 4.5 hours. In the fully recharged condition, the gage runs for approximately 35 hours continuously.

-It is possible to carry out measurement while recharging the battery, unless the battery voltage is exclusively low.

NOTES

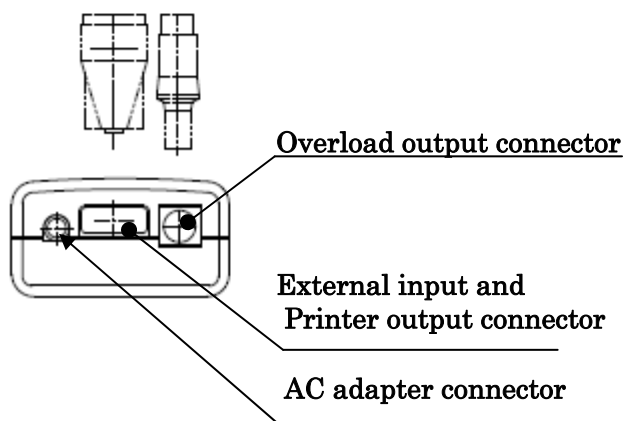
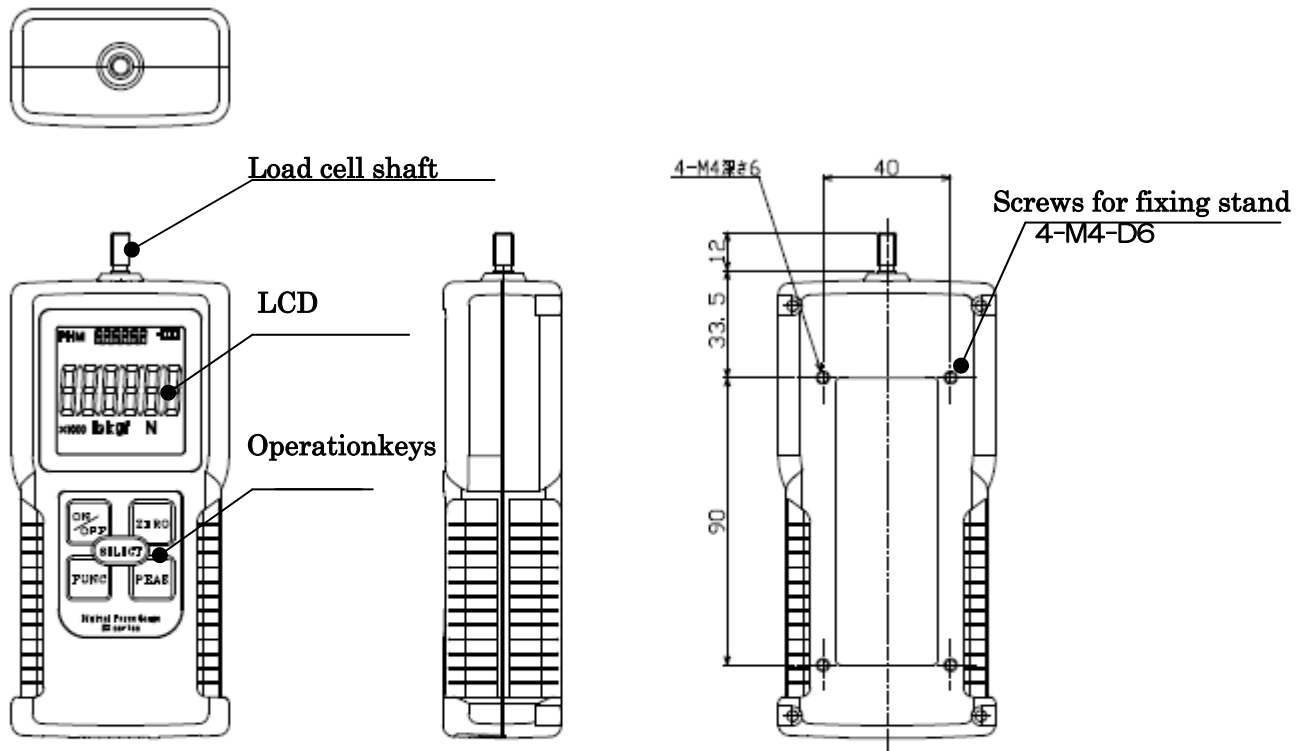
*1: When the AC adapter is plugged, the displayed remaining battery capacity may sometimes decrease. This phenomenon does not imply any trouble.

The built-in battery (Nickel hydrogen battery) is consumable.



Normally, the built-in battery may be recharged approximately 300 times, which depend on the use conditions. If the gage runs for shorter time or does not run at all even though the battery is recharged for the specified time, the battery need be replaced. Ask the shop you purchased this product or Aikoh's office or agent to replace the battery.

COMPONENT PARTS



FUNCTIONS OF COMPONENT PARTS

Load cell shaft: Detects variance of the load. If a load over the maximum measurement capacity is applied to this shaft, the load detecting element may be broken.

LCD: Displays the conditions and results of measurement.

Operation keys



Pressing this key turns on power and re-pressing this key turns off power.



This is a key for shifting to [Function setting mode] and for auxiliary key for shifting to [Measurement setting mode].



Alternates the tack mode and peak mode.



Resets the displayed load to zero.

**(Zero resetting does not function when the load is over certain limit.)*



This is the setting key for selecting [Function setting mode] and [Measurement-setting mode] and this is also used for printout of the measured value.

Overload output connector . . . It connects our motorized stand for measurement through the optional exclusive cable.

Printout connector . . . Press it to connect the printer. (See the “External input/output connector table.”)

AC adaptor connector . . . It connects the attached AC adapter during continuous use or charging.

Four stand fixing screws . . These are used for installing this product on the measuring stand, etc.

Special Display

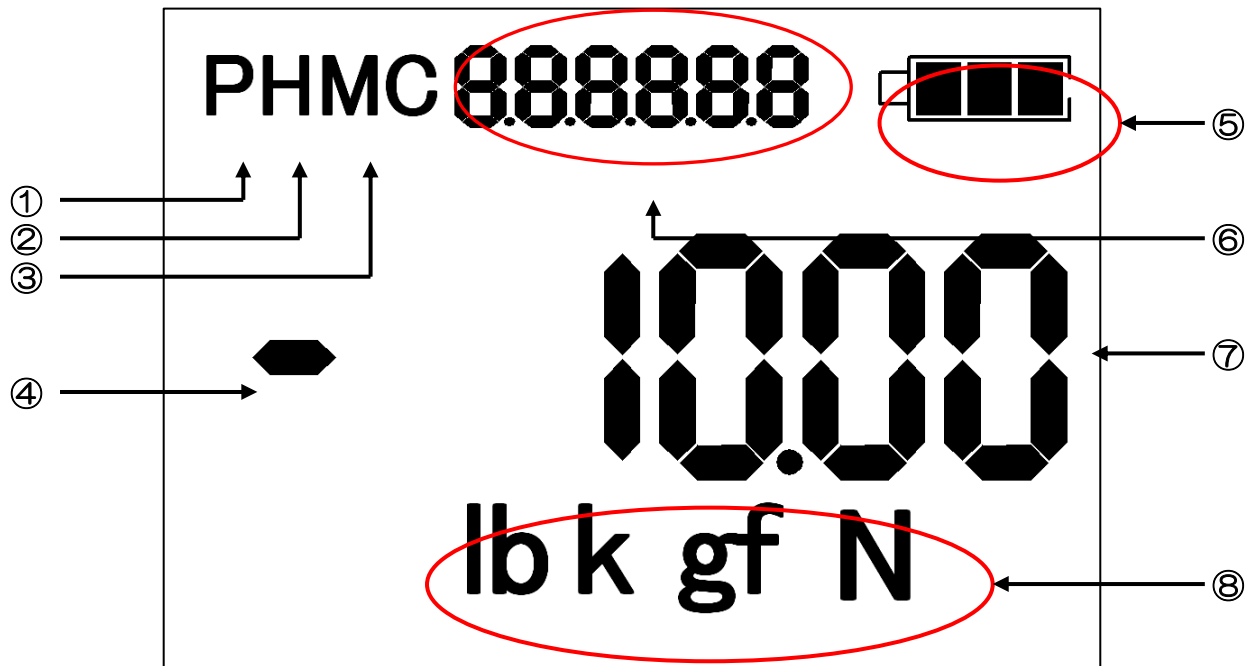


Overload (O.L.)
The symbol on the above is displayed in the main display area when a load exceeding the maximum measurement capacity is applied to the load cell shaft.



Low battery (L.b.)
The symbol on the above is displayed in the main display area when the remaining battery capacity is too low and measurement is disabled.

DISPLAY UNIT



① : P : [PEAK hold mode]

Each time **P** is pressed, it changes the lighting status of [PEAK] key P, according to the order of (Blinking) → (Lighting) → (OFF).
 (During blinking) . . . It gets the value whichever is higher, the tensile or compression strength.
 (During lighting) . . . It displays the compression peak value at ⑦ Main display and the tensile peak value at ⑥ sub-display on the right-hand side.
 (During light-out) . . . It releases [PEAK hold mode] and will return to [Track mode].

② : H : [External contact hold mode]

This comes on the external contact input changes. (See “the external contact hold function”)

③ : M : [Printout display]

Press the [SELECT] key, and this makes **M** light on for about a second, and will indicate printout. Printout occurs when the external printer is connected. It is effective for all of [Track mode], [Peak hold mode] and [External contact hold mode].

④ : Sign display

The negative (-) sign is displayed in the sixth digit. No (+) sign appears when the tensile load is displayed.

⑤ : Battery remaining charge (■) gage.

The current remaining of the battery charge is displayed in four levels.

1		When the remaining battery charge is 80 to 100%.	2		When the remaining battery charge is 50 to 80%.
3		When the remaining battery charge is 20 to 50%.	4		When the remaining battery charge is less than 20%.

⑥ : Sub display:

It is used for an auxiliary display for each setting or in the [Peak hold mode] or [External contact hold mode].

⑦ : Main display:

It indicates the load in an ordinary setting, or the selected item in each setting mode.

⑧ : Measurement unit display:

Indicating the load unit for each setting. N (Newton) is displayed as the standard unit of setting.
 *(N is displayed for every setting upon shipment.)

FUNCTION SETTING MODE

• • The setting value is required for each function or mode operation is displayed.



• • When it is pressed for more than three seconds in the standby state for measurement, the functional setting mode is set.

Selection item list and selection flow



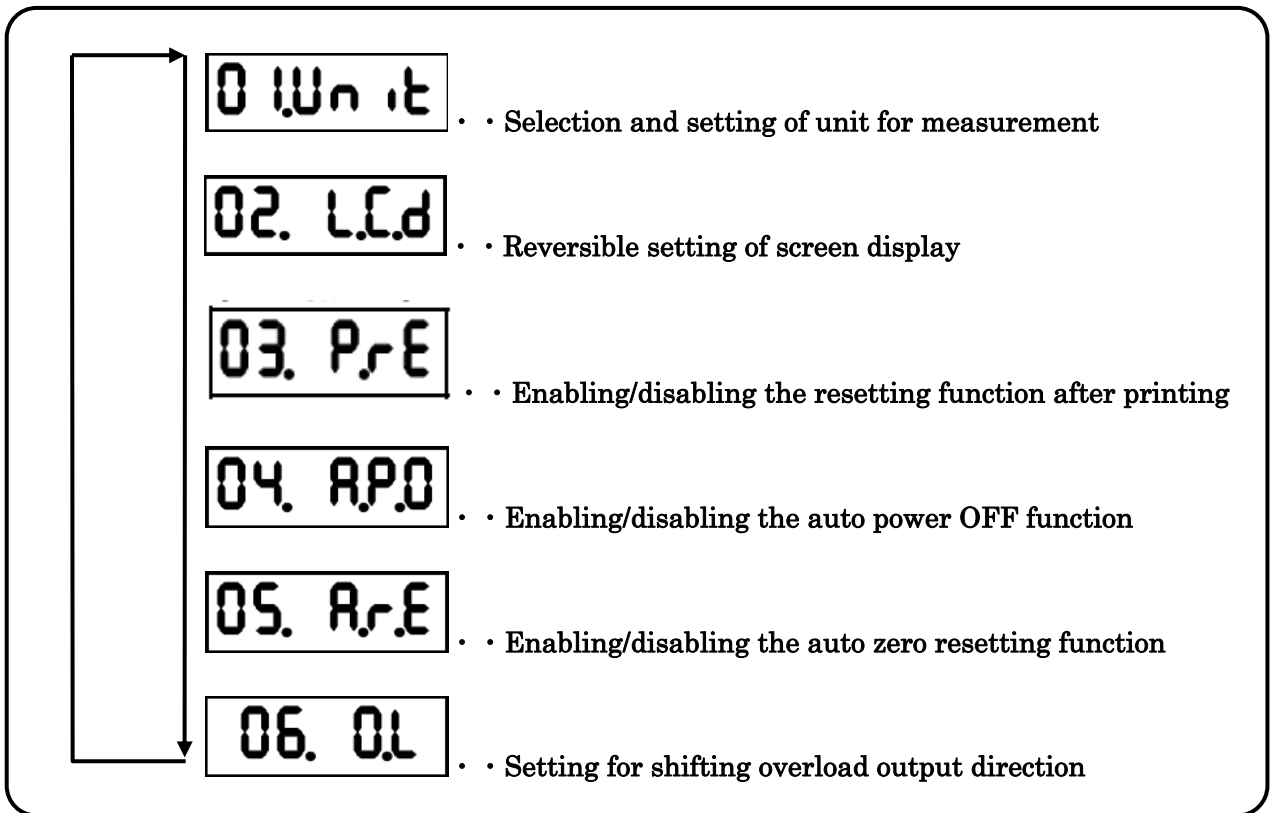
• • Items indicated on the main display are scrolled forward (downward) from 01.



• • Items indicated on the main display are scrolled in the reverse order (upward) from 01.



• • The selected function is determined and set.



Item display



Item No.



Item name

Item No. • • Sequence of appearance on the main display

Item name • Indicating setting details

01 [Meas. Unit Alternation] MODE

0 1.0n it

SELECT

ZERO or PEAK

n.0n it

3.0n it

3.0n it

SELECT

lb k gf m **N**

lb k gf m N

lb **k** gf m N

lb k **gf** m N

FUNC Shifting

Default

n.0n it

02 [Screen Disp. Reversal] MODE

02. L.C.d

SELECT

ZERO or PEAK

UP

dn

SELECT

UP: Recognition with the sensor facing upward.

dn: Recognition with the sensor facing down.

Default

UP

03 [Resetting after printout] MODE

03. P.r.E

SELECT

ZERO or PEAK

On

OFF

SELECT

Automatic zero resetting of the display after printout.

Default

OFF

04[Auto Power Off]MODE

04. A.P.O

SELECT

ZERO or PEAK

0n

OFF

SELECT

Automatic power OFF when no operation starts after 5 minutes or more.

Default

0n

05[Auto Zero Reset]MODE

05. A.r.E

SELECT

ZERO or PEAK

0n

OFF

SELECT

0n

Automatic zero resetting of the zero display at intervals of about two seconds when the displayed value is within one digit.

Default

OFF

06[Overload Shift]MODE

06. O.L

SELECT

ZERO or PEAK

U.0n

L.0n

SELECT

L.0n

SELECT

L.0n

—Blinking—

Artificial overload signal output to pin 3of CN110-2 of the 10P connector for about one second to check the stop signal output to the tester.

Default

L.0n

MEASUREMENT SETTING MODE

• • Necessary function for measurement is set.



+



• When it is pressed for three seconds or more in the standby for measurement, the functional setting mode is set.



OR



• • Items indicated on the main display are shifted alternately between 01 and 02.



• • The selected function is determined and set.

01[Sampling switching]MODE

01.Fr9

SELECT

ZERO or PEAK

10

30

100

400

SELECT

Response freq. changeover
Unit is [Hz]

Default

10

02[Disp. Cycle changeover]MODE

02.d.5P

SELECT

ZERO or PEAK

1

2

5

10

20

SELECT

Disp. Cycle changeover
Unit is times/sec.

Default

5

DETAILS OF FUNCTIONS

External Contact Hold Function

This function is to hold the numeric value when the contact signal is input to the input/output connector.

Pin assignmentCN214: 10 · · External hold input (HOLD IN)
 13 · · Digital ground (GND)
 (*See the “External Input/output Connector List”.)

- Connect contact point securely using the optional cable (SX-OP-2).
 Upon connection from the contact open state, H in the display block comes on to fix the value displayed on the main display. Upon contact opening after shorting, H blinks and the displayed value on the sub display is fixed.
- This function is alive even in the peak mode.
- To cancel the held value, use the [ZERO] key or the external zero-resetting function.
- Resetting after printing occurs when the standard setting mode 03 [Resetting after printing] is set.

External Zero-reset Function

This function is the external zero resetting when the signal is input to the input/output connector.

Pin assignmentCN214: 11 · · External zero reset input (ZERO IN)
 13 · · Digital ground (GND)
 (*See the “External Input/output Connector List”.)

- The display is reset to zero upon shorting between the pins above using the optional cable (SX-OP-2)
- This function is effective for all of [Track mode], [Peak hold mode], and [External contact hold mode].

External Printer Function

This function is the external printing out when the signal is input to the input/output connector.

Pin assignmentCN214: 12 · · External printing input (PRINT IN)
 13 · · Digital ground (GND)
 (See the “External Input/output Connector List”.)

- The display is printing upon shorting between the pins above using the optional cable (SX-OP-2).
- This function is effective for all of [Track mode], [Peak hold mode], and [External contact hold mode].
- Use the thermal printer BL2-58 or BL-58RS II.

Overload Output Function

When the input load exceeds the maximum measurement load, this function is to connect the optional cable (SX-OP-1) to output the signal via the optional cable (SX-OP-1) to the external input/output connector.

*For use by connecting our motorized measurement stand, be sure to use this function to protect the load detection sensor.

Pin assignmentCN110: 1 · · OVER LOAD UP
 2 · · OVER LOAD DOWN
 3 · · Common ground (OVER LOAD COM)

(*See the “External Input/output Connector List”.)

*Outputs are all open collector outputs.

- CAUTION -

- Be careful since the output signal operation varies with the overload output selection setting. Use with incorrect setting does not stop the measurement stand if the overload signal is output.



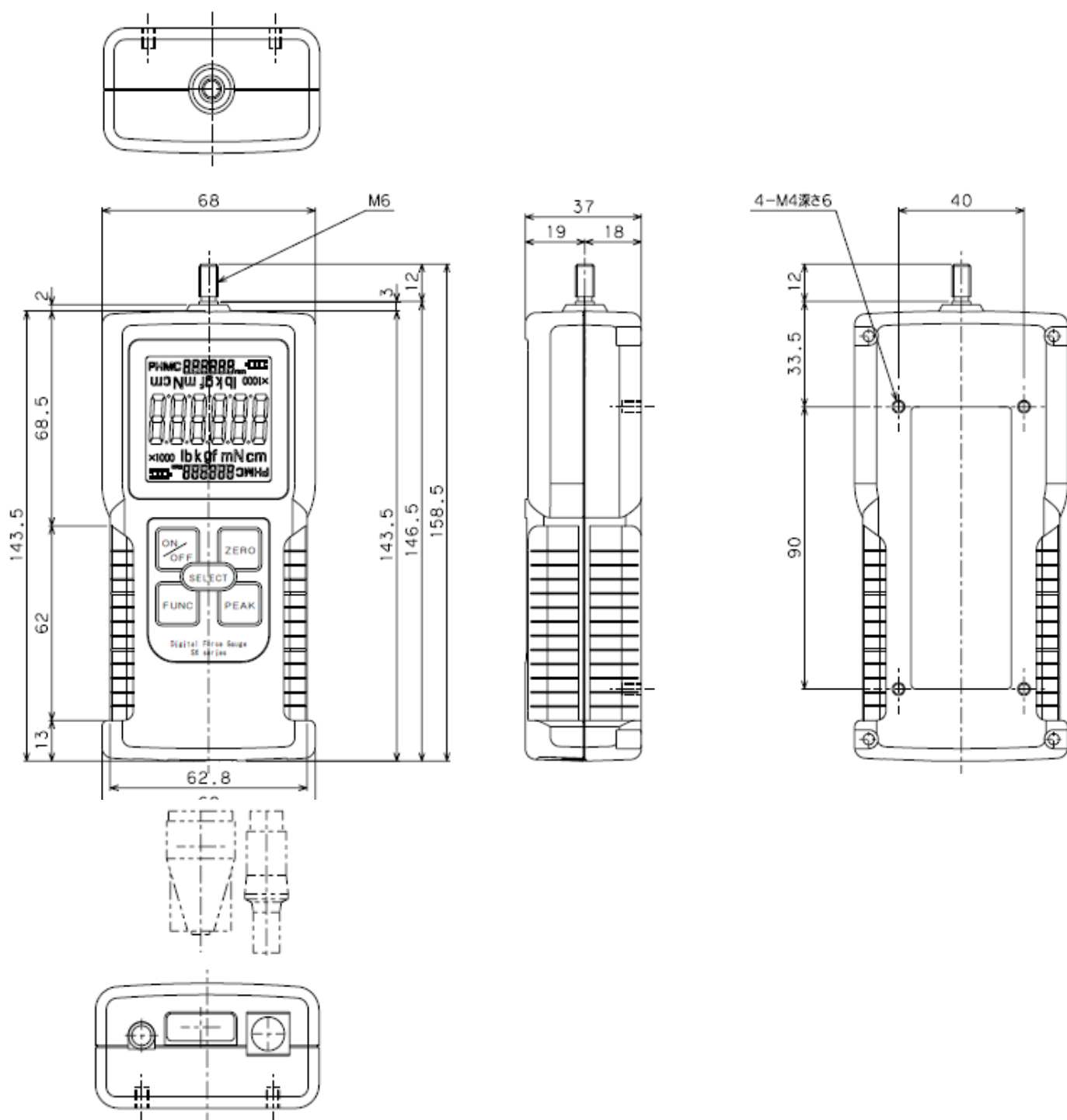
Since incorrect setting will cause damage, be sure to set correctly with careful setting.

External Input/Output Connector List

HRS 10P Connector (112-2009-4-74)		
PIN	CN110	
1	OVER LOAD LIMITER	OVER LOAD UP (OUT)
2	OVER LOAD LIMITER	OVER LOAD DOWN (OUT)
3	OVER LOAD LIMITER	OVER LOAD COM
4	NC	
5	NC	
6	NC	
7	NC	
8	NC	
9	NC	
10	NC	

HRS 14P Connector (CL226-0023-6-60)		
PIN	CN214	
1	RS-232C(PrintOut)	RD
2	RS-232C(PrintOut)	RTS
3	RS-232C(PrintOut)	TD
4	RS-232C(PrintOut)	CTS
5	RS-232C(PrintOut)	D.GND
6	NC	
7	NC	
8	NC	
9	NC	
10	EXT HOLD	HOLD (IN)
11	EXT ZERO RESET	ZERO (IN)
12	EXT PRINT	PRINT(IN)
13	GND	GND
14		

Size (Unit: mm)

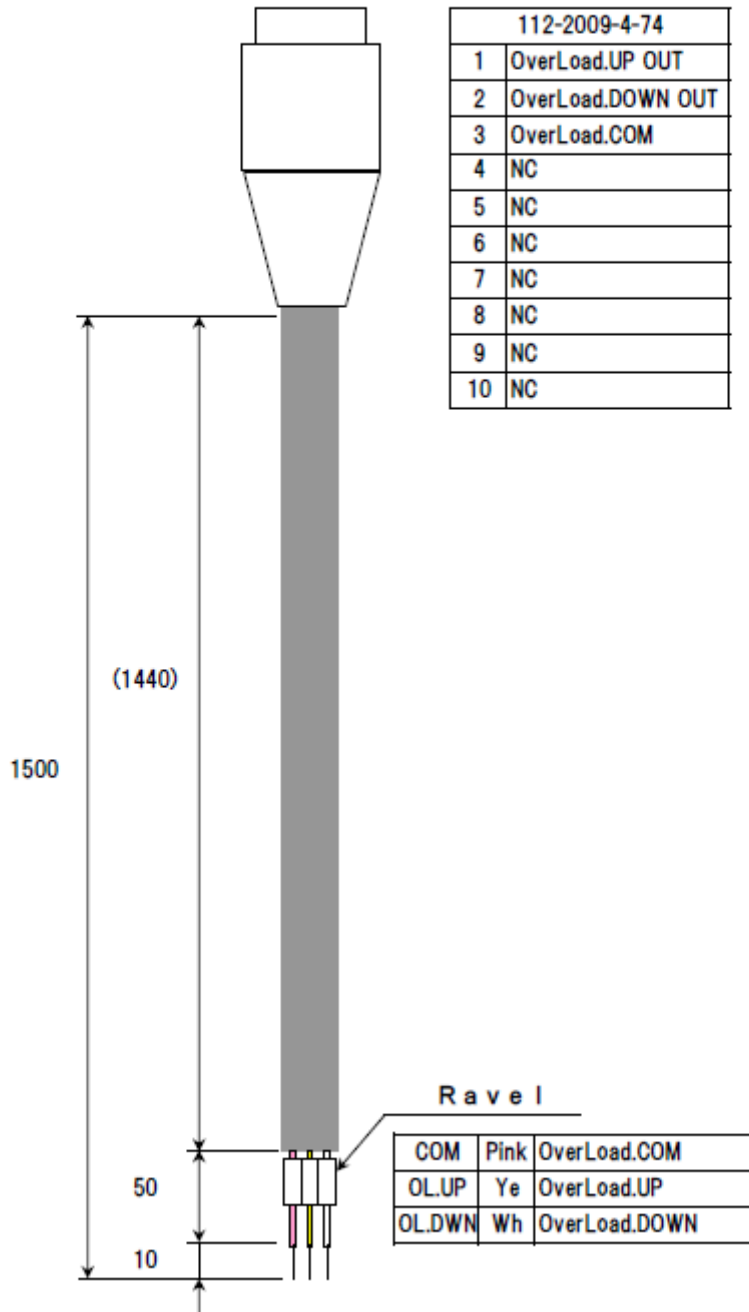


OPTIONAL PRODUCTS

Optional cables

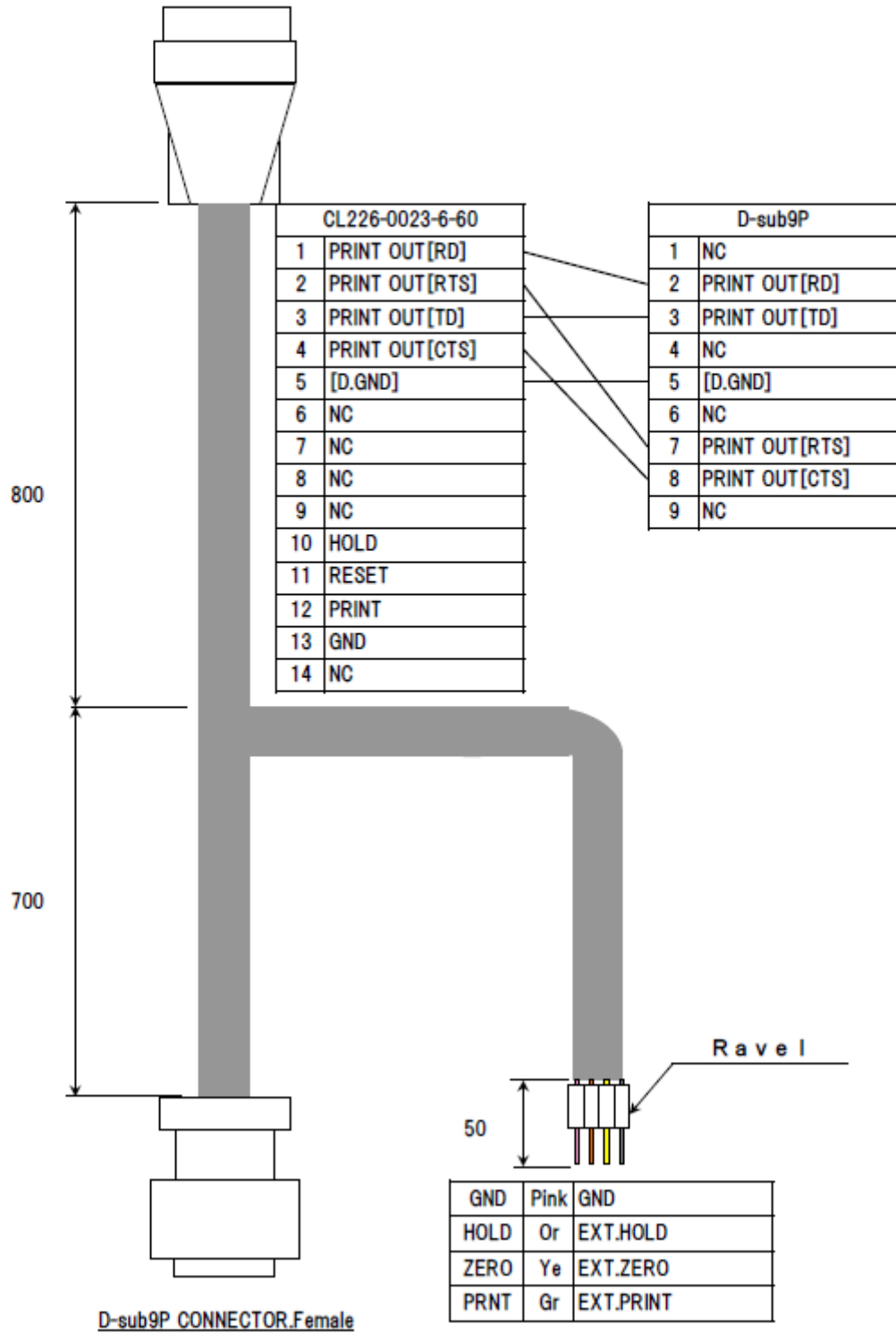
- Option Cable
SX-OP-1 (OVER LOAD CABLE)

HIROSE HR12 10P CONNECTOR(112-2009-4-74)



• **Option Cable**
 SX-OP-2 (PRINTER&EXT.IN CABLE)

HIROSE QM14PCONNECTOR(CL226-0023-6-60)



Specifications

Model	SX-2	SX-5	SX-20	SX-50
Measurement range (R.C.)	2kgf (20N)	5kgf (50N)	20kgf (200N)	50kgf (500N)
Measurement accuracy	±2.000kgf (±20.00N)	±5.000kgf (±50.00N)	±20.00kgf (±200.0N)	±50.00kgf (±500.0N)
Minimum display unit	0.001kgf/0.01N/1gf		0.01kgf/0.1N	
Measurement unit	Kgf-N-lb selectable			
Accuracy	±0.2% F.S.			
Allowable overload	150% R.O. (overload alarm at approx. 105%)			
Measurement item	Track/Peak/+peak/-peak selectable			
Display refreshing freq.	1, 2, 5, 10, or 20 times/second selectable			
Measurement time	20, 62, 200, or 800 times/second selectable.			
Display	Main characters, sub-characters, battery remaining charge alarm, measurement unit, up/down reversible display, overload alarm, peak-hold mode			
Functions	External print input, external contact hold input, external zero-reset input, thermal printer BL-58RS II/BL2-58 printer output, overload output, display update time output selectable in 5 levels, measurement time selectable in 4 levels, reset after printing (ON/OFF), automatic power off (ON/OFF), automatic zero reset (ON/OFF), both compressed peak and tensile peak display			
Power supply	Three exclusive AAA nickel hydrogen cells, exclusive AC adapter (5VDC.1200 mA) Recharging time: Approx. 4.5 hours (measurement possible during recharging) Battery life: 35 hours after full recharging			
Guarantee circuit	Stop recharging when the temperature of nickel hydrogen cells go out of bounds from 0 to +50°C Stop recharging when it cannot recharge over 4.5 hours.			
Use temperature	0 to +50°C			
Size	W68 x H157.5 x D37 mm			
Weight	Approx. 360g			
Standard accessories	6 attachments, exclusive AC adapter (100 to 240 VAC), and European specification plug			

WARRANTY

MODEL SX-

Serial No.

Warranty period: One year until

The contents herein promises no-charge repair.

1. When the product is damaged during normal use within the warranty period according to the instruction manual or caution sheet, please contact dealer where you purchased by attaching this warranty card or its copy.
2. The repair work will be charged in any of the following case within the warranty period:
 - (a) Fault and damage due to incorrect use, or by illegal modification or repair.
 - (b) Fault and damage caused by relocation or dropping during installation after purchase.
 - (c) Fault and damage caused by an external cause such as a fire, salty or gaseous atmosphere, earthquake, lightning, wind, flood, other acts of God, or an abnormal voltage.
 - (d) A defect of this products resulting from another device being connected.
3. If you want to us to do your repair work for the items attached with another instrument, please instrument us to do so after detaching such instrument.
4. This warranty is valid only when it is applied in Japan.

Dealer's name:

※ The retention period of functional parts for repair after the end of the warranty period is three years after the end of discontinuation of production.