

JFT-S100

Static Gripping Tester

Operation Manual



- This Operation Manual has been written for experienced production engineers and maintenance personnel who operate the Static Gripping Tester. A beginner to use the meter must first be instructed in how to use it by an experienced engineer, a distributor, or by personnel at Kitagawa Iron Works.
- Before you use the meter, carefully read and understand all the Warnings described herein.
- Be sure to follow all the instructions and Warnings described herein.
- Keep this Manual carefully in a place within your easy reach. Read it again whenever necessary, and keep it as long as you use the meter.
- Please contact us if you have any question or inquiry about this Manual.

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Preface

This Operation Manual is intended to provide detailed information on the Static Gripping Tester JFT-S100, to help you understand its performance and functions and safely use it correctly.

Before you use the meter, be sure to read through this Operation Manual and learn how to correctly use the Static Gripping Tester. Also, always follow all the instructions and Warnings described in “**Important Warnings for Safety**” early in this Manual as well as “**Instructions for Use**” and some other places. Any failure to follow any of them might result in a serious accident that causes injury or death.

What the warning terms mean

In this Manual, the notes and instructions that are considered to be important as you use the meter are categorized and indicated as follows, depending on their seriousness of the risk involved (the extent and seriousness of the damage that might arise as a result of ignorance or violation of one of those notes and instructions.) For yours’ and your co-workers’ safety, please learn the terms below and follow the instructions.

Warnings



A failure to follow an instruction indicated by this symbol can result in death, serious injury, etc.



A failure to follow an instruction indicated by this symbol could result in death, serious injury, etc.



A failure to follow an instruction indicated by this symbol could result in injury of a light to medium seriousness.



This is the safety alert symbol, used to draw your attention to a potential danger that could invite injury of humans. Be sure to follow all the safety-related instructions that follow a safety alert symbol, to prevent a possible death and/or injury.

Things to note



A failure to follow instructions indicated by this symbol could result in the meter going out of order or being damaged; shorten its life, and/or the equipment around the meter being damaged.

Disclaimer

Kitagawa Iron Works Co., Ltd. is not to be held responsible in any way for any problem, accident, etc. that has taken place as a result of failure to follow any of the Warnings contained in this Operation Manual.

This Operation Manual does not cover all of the potential dangers that can exist with running, operating, inspecting, or maintaining the meter under all the possible environmental conditions. Since no one can give an exhaustive account of what one cannot or must not do with the meter, this Manual is not able to list all the possible dangers.



Therefore, please consider that you “should not” or “must not” do anything that is not explicitly described in this Manual as something you “can” or “may” do. In the case that you run, operate, inspect, or maintain the meter in a way not described in this Manual, you are required to consider all the safety provisions for yourself and take all the responsibilities for what could happen as a result of such running, operation, inspection, or maintenance

On Warranty

The meter’s warranty period is a single year following its delivery to you.

All of the parts to use, other than the battery, are to be supplied by Kitagawa Iron Works. In the case that using any part not supplied by Kitagawa Iron Works has resulted in a problem and/or an accident, Kitagawa is not to be held responsible in any way for such a problem/accident. Also, in the case that any part that is not a genuine part manufactured by Kitagawa Iron Works is used, the whole warranty becomes invalid.

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1. Structural Drawings and List of Parts

1-1. Structural drawings

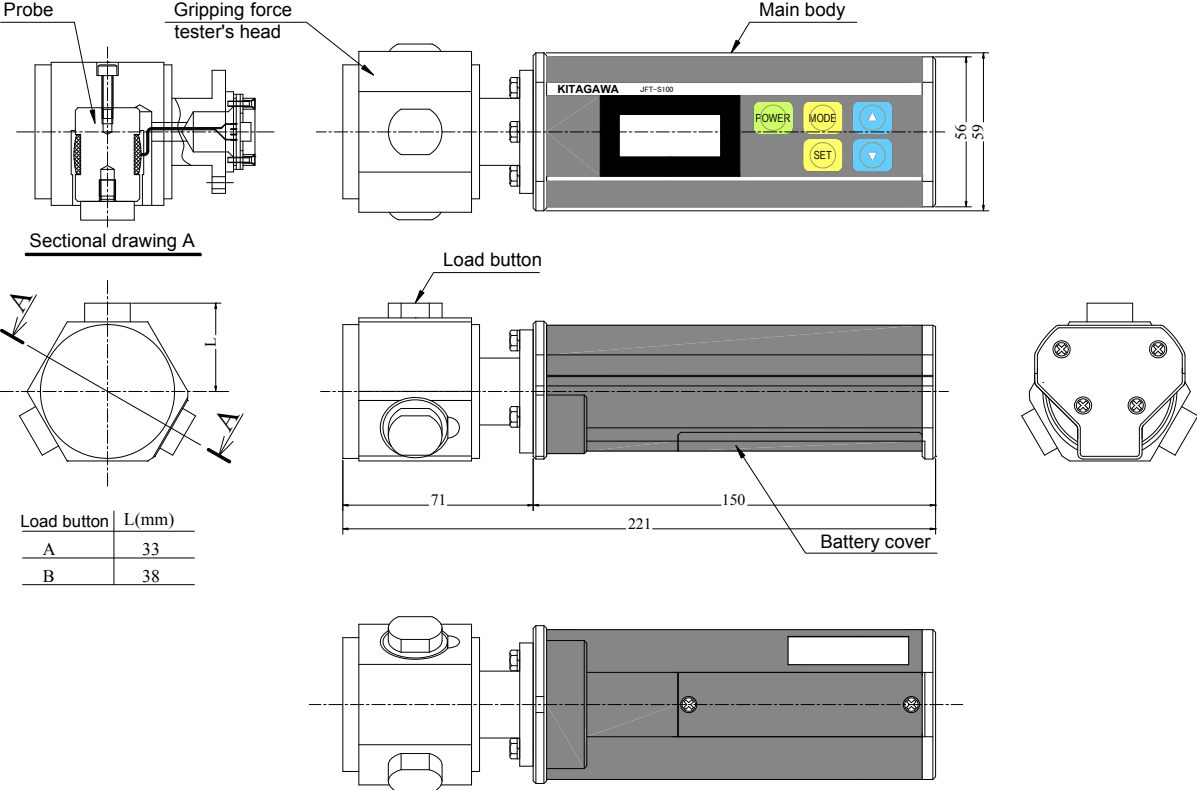


Fig 1-1-1

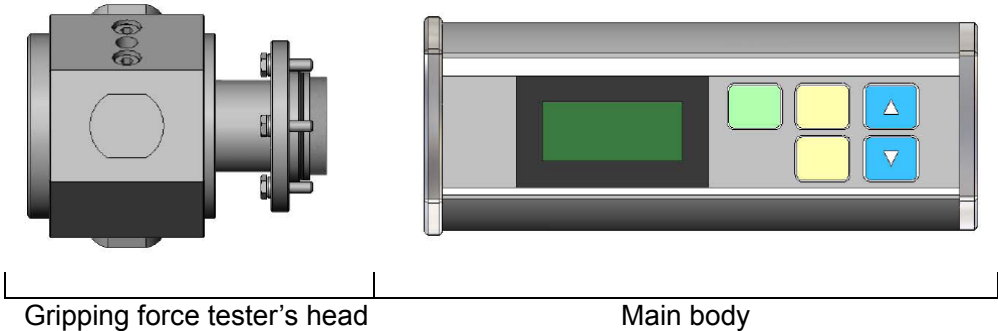


Fig 1-1-2

1-2. List of parts

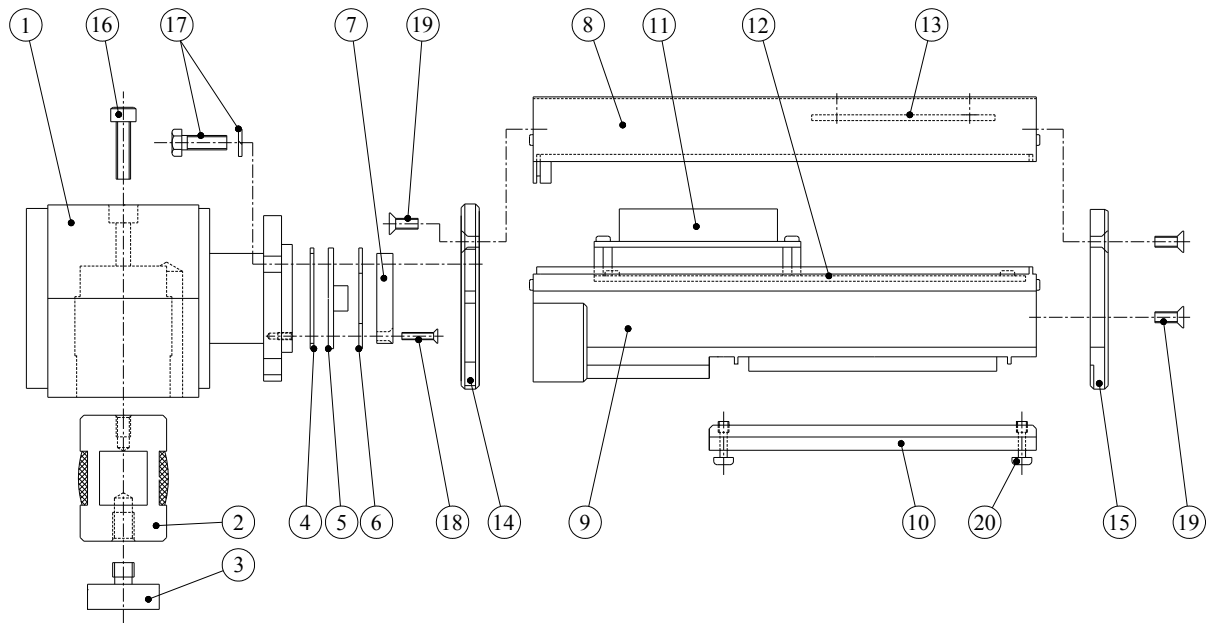


Fig 1-2-1




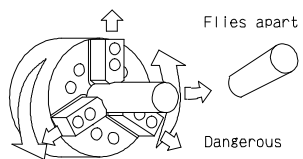
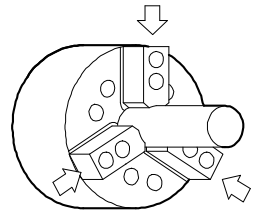
Table 1-2-1




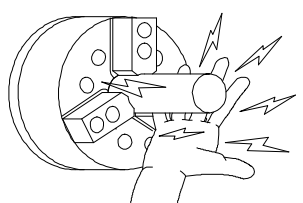
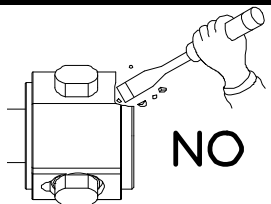
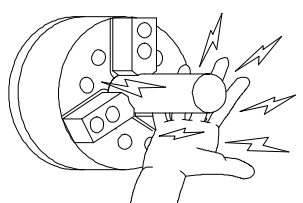



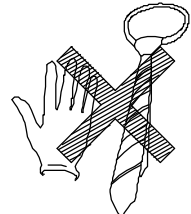
No.	Name of part	Qty.	No.	Name of part	Qty.
1	Frame	1	11	LCD display	1
2	Probe	1	12	Main substrate	1
3	Load buttons (attachments)	3+3	13	Panel substrate	1
4	Packing rubber	1	14	Frame side plate	1
5	Connector substrate	1	15	Back side plate	1
6	Packing rubber	1	16	Probe mounting bolts	2
7	Connector guard	1	17	Frame mounting bolts and washers	3 pairs
8	Upper part of the case	1	18	Small flat-head Phillips screws	4
9	Lower part of the case	1	19	Small flat-head Phillips screws	4*2
10	Battery cover	1	20	Battery cover mounting screws	2

This Static Gripping Tester has attached to it three of both Load Buttons A and B, as shown above at 3.

2. Important Warnings for Safety

Be sure to read this whole page before you use the Static Gripping Tester. This page contains some of the most important warnings for your safety, which you are asked to take special heed of and follow.

 Danger		A failure to follow an instruction indicated by this symbol could result in death, serious injury, etc.	
	Do not clamp the Static Gripping Tester onto a rotating body and rotate it.		Input value into the Static Gripping Tester must not exceed its maximum input allowed.
<ul style="list-style-type: none"> If you clamp the Static Gripping Tester onto a rotating body and rotate it, the meter will fly apart and be very dangerous. 		<ul style="list-style-type: none"> Never let the gripping force applied to the Static Gripping Tester exceed its maximum input allowed Excessive force input destroys or damages the Static Gripping Tester. 	

 Warning		A failure to follow an instruction indicated by this symbol could result in death, serious injury, etc.	
	When making a chuck grip the Static Gripping Tester, be careful not to let the chuck grip your finger.		Do not alter any part of the Static Gripping Tester, unless permitted by the manufacturer.
	<ul style="list-style-type: none"> Such an alteration destroys or damages the Static Gripping Tester and invites danger. Alteration of the load buttons is permitted only to the section where further processing is allowed. 		
	Do not drink alcoholic beverage or take a drug before you operate the Static Gripping Tester.		Never wear a tie or gloves when you operate the Static Gripping Tester.
<ul style="list-style-type: none"> Alcohol or drugs disturb your judgment and invite erroneous operations. 		<ul style="list-style-type: none"> The meter could catch and pull in your tie or glove, which is very dangerous. 	

3. Specifications






Table 3-1

Basics	
Rated capacity	100 kN (per jaw)
Overload permitted	150%
Bridge power	2.5 V/10mA
Number of input points	1
Range measurable	0.5 to 100.0 kN
Unit of measurement displayed	0.1 kN
Maximum value indicated	110.0 kN
General precision	Within 2% (including the load cell)
Operation switches	Silicon seat switch panel (5 contacts)
Display section	LCD character display (8 x 2 lines, with a back light)
Functional	
Automated zero setting	Settings available with the automated zero-point adjustment function <ul style="list-style-type: none"> ◆ None: The automated zero-point adjustment function not used ◆ B mode: The zero-point is set when the power is turned on. ◆ R mode: The zero-point is set to real time.
Automatic power shutoff	Shut off after the specified time length. The time length is chosen from 3, 10, and 30 minutes. This function can also be set to "off."
Number of measured values stored in the memory	3
Warning message display	The warning messages that can appear: <ul style="list-style-type: none"> ◆ *: The battery voltage is too low ◆ zErr: Problem with zero-point adjustment ◆ OL.: Input too large to measure
Others	
Power	Lithium battery (CR123A x 2)
Operating temperature range	0 to 50 °C
Operating humidity range	Within 80% RH (No condensation)
Attachments	Load button A (3 buttons), Load button B (3 buttons) Battery to be used for confirmation of correct operation (2 batteries)

4. How to Operate and Use

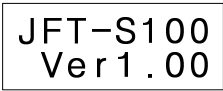
4-1. Operations

4-1-1. Operation switches

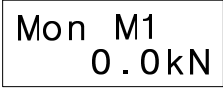
Power switch		Turns the Static Gripping Tester's power on/off.
MODE switch		Lets you select the mode of your choice for the screen.
SET switch		Used to set up the zero-point and to clear the measurement memory.
Selection switches	 	Used to choose an item and switch between screens.

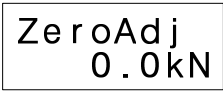
4-1-2. Operation screens


4-1-2-1. Startup screen

	Displays the Model and Version. Appears for around 2 seconds and then gives way to the Gripping Force Display Monitor screen.
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4-1-2-2. Measuring Enabled screens

	<u>Gripping Force Display Monitor screen (MONITOR)</u> Displays the current gripping force. A number appears in the upper right corner of the screen, "M1," "M2," or "M3," to indicate the number corresponding to the measured value memorized. Pressing the <SET> switch stores the measured value in the memory and displays the Measurement Memory screen. Pressing the <↑> switch brings up the Measurement Memory screen. Pressing the <↓> switch changes the upper number corresponding to the memorized measurement value.
---	---

	<u>Manual Zero-point Adjustment screen (ZERO ADJUST)</u> In this screen, you manually set up the zero-point. Pressing the <SET> switch for 1 second stores the measured value as the zero point and brings up the Gripping Force Monitor screen. * Pressing the <↑> switch for 3 seconds alternately changes the measured value display between the load display and the AD value display.
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	<u>Automated Zero-point Adjustment Function Setting screen (AUTO ZERO ADJUST FUNCTION)</u> Press either the <↑> or <↓> switch to choose from operational modes available for the automated zero-point adjustment function: [None]: The automated zero-point adjustment function not used [B mode]: The zero-point is automatically set right after the power is turned on.
---	---

[R mode]: The zero-point is automatically set right after the power is turned on and every 10 seconds afterwards.

- ※ * The automated zero-point adjustment requires that the difference between current measurement value of gripping force and the last value memorized is within 0.05 kN.

Power Off
[10]min

Automatic Power Shutoff Time Setting screen
(AUTO POWER OFF TIME)

Press either the <↑> or <↓> switch to choose the time length before the automatic power shutoff out of [3], [10], [30], and [OFF] in minutes.

4-1-2-3. Memory Display screen

Memory 1
0.0 kN

Measurement Memory Display screen (MEMORY DISPLAY)

The value memorized by the Gripping Force Display Monitor is displayed.

Pressing the <SET> switch for 3 seconds clears the memory of measured value.

Pressing the <↑> switch changes the screen to the Gripping Force Display Monitor.

Pressing the <↓> switch changes the number corresponding to a memory of a measured value, and the memorized value for each number appears.

4-1-2-4. Warning messages

Mon M1 *
0.0 kN

The battery voltage is too low

In the Gripping Force Display Monitor and the Manual Zero-point Adjustment screens, if the battery voltage becomes too low for the meter to operate normally, the "*" blinks in the upper right corner of the screen.

Mon M1
zErr kN

Problem with zero-point adjustment

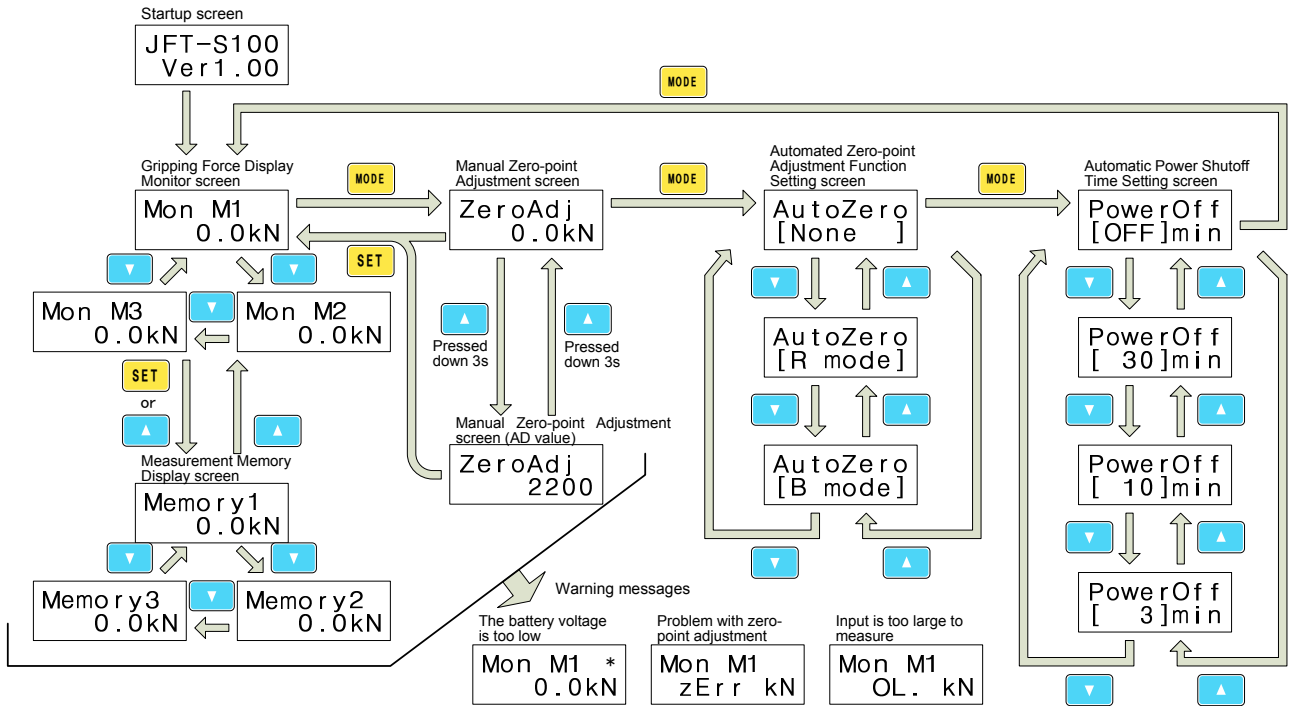
In the case that a manual adjustment or automated zero-point adjustment following power-on fails, "zErr" appears on the screen. This warning display of a problem with zero-point adjustment disappears after 3 seconds.

Mon M1
OL. kN

Input is too large to measure (out of the range)

If the load to measure exceeds 110 kN, "OL." appears in the Gripping Force Display Monitor and the Manual Zero-point Adjustment screens.

4-1-3. Screen transition



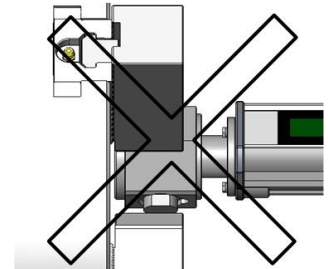
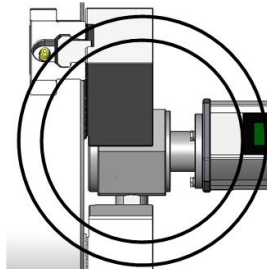
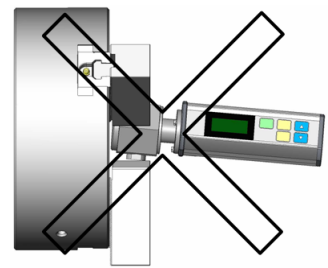
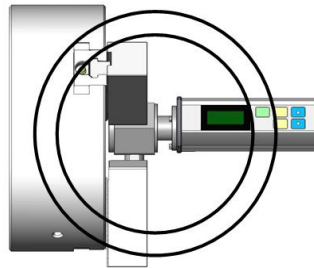
4-2. How to use

Things to Note

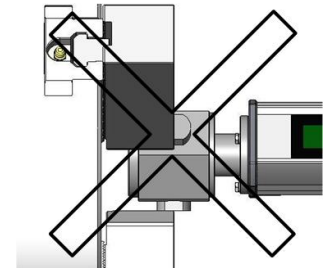
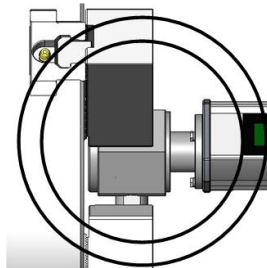
- The Static Gripping Tester measures the gripping force working on a single jaw. Therefore use the formula below to obtain the gripping force of the whole chuck.

$$\underline{\text{Chuck's gripping force}} = \text{Measured value} \times \text{No. of jaws}$$

Set up the Static Gripping Tester in a way that applies the force to the probe (measuring section) at right angles.



Make the whole of the probe (measuring section) subject to the load.



5. Shape Forming of the Static Gripping Tester's Head

To enable the chuck to grip the Static Gripping Tester with its jaws, you need to form the meter's head into a shape that matches those of the chuck's jaws.

5-1. Removing the Static Gripping Tester's head

- ① To form the shape of the meter's head, first remove it from the meter's main body.
- ② Remove the ⑰ Frame mounting bolts and washers shown at 1-2 List of parts. Next, pull the main-body-side connector off the connector substrate. Then remove the Static Gripping Tester's head from the main body.

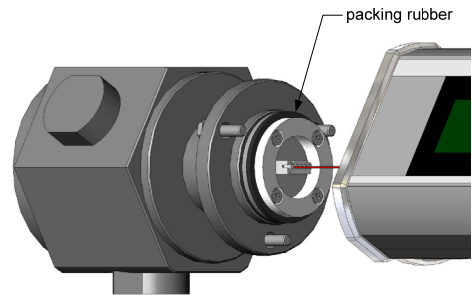


Fig 5-1-1

Things to note

- The meter's head is connected to the main body through wiring. Therefore, do not pull the head too hard.
- There is packing rubber at the joint combining the head and the main body. Be careful not to lose the rubber when and after you remove the head from the main body.

5-2. Forming the Static Gripping Tester's head

1. Protect the Static Gripping Tester's connector.

To form the shape of the load buttons of the meter's head, carve those buttons. While you do this carving, cover up the head's connector with tape, etc. so that no chip could enter the connector.

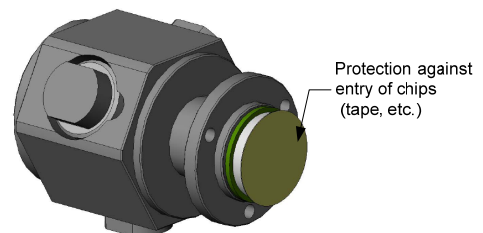


Fig 5-2-1

2. Grip the Static Gripping Tester's head.

Grip the edge of the meter's head.

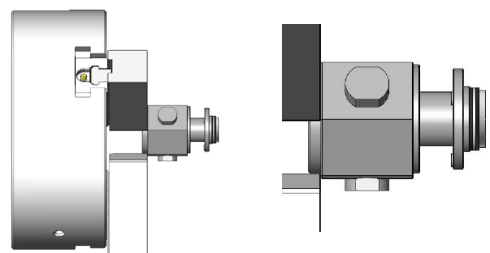


Fig 5-2-2

3. Form the load cell

While gripping the meter's head process the load cell (dimension: ϕA). Process the ϕA section to the size that fits the chuck's jaws. Also, process the section's surface to a roughness of 6 s or below.

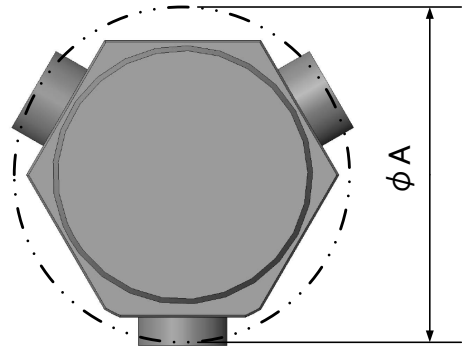


Fig 5-2-3

! Danger

- During the processing above, set the cutting (carving) torque and the gripping torque as below. Any torque other than the values specified below results in the meter's head flying apart, which is very dangerous.

Gripping torque = (Gripping force – Centrifugal force) x Friction resistance x Radius of the grip

Note) Friction resistance: 0.1 for a soft jaw. 0.2 for a hard jaw.

Cutting (carving) torque < Gripping torque x 1/2.5

6. Instructions for Use

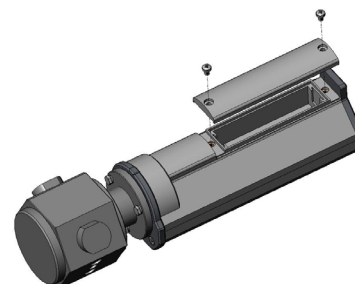
Warning

- Never let the load measure exceed 150 kN.
Any load above 150 kN results in a failure and incorrect measurement.
- Do not drop or apply an impact to the Static Gripping Tester. Such a shock damages the meter's electronic parts.
- Do not let the meter get in contact with oil or water. Any entry of water or oil into the meter's inside damages its electronic parts.
- Do not disassemble the meter, except for the disassembling specified above, which is necessary for forming the shape of the meter's head.
- Do not clamp the Static Gripping Tester onto a rotating body and rotate it.
- A radical change in the temperature, even within the operating temperature range, disturbs the meter's measuring.

7. Maintenance

7-1. Changing the battery

- ① Remove the battery cover mounting screws and take off the battery cover.
- ② Install the battery at the right polarity direction and attach the battery cover back on.



7-2. What to do in the case of a warning or a problem

“*” Warning: The battery voltage is too low

[Cause of the warning]	[How to fix]
The battery's voltage is below the minimum value required for the meter to operate correctly.	Replace the battery with a new one.

“zErr” Warning: Problem with zero-point adjustment

[Cause of the warning]	[How to fix]
Load of 10 kN or more is at work on the Static Gripping Tester during the automated zero-point adjustment following power-on or manual zero-point adjustment.	Release the meter from the chuck and try the zero-point adjustment again with no load applied.

“OL.” Warning: Input is too large to measure (out of the range)

[Cause of the warning]	[How to fix]
Excessive load (110 kN or above) is at work on the meter.	Use the meter at or below its rated capacity.

Automated zero-point adjustment is not conducted when starting up the meter.

[Cause of the warning]	[How to fix]
The load at the power on is exceeding + or – 0.5 kN.	<ul style="list-style-type: none"> ◆ Do not apply any load to the meter when turning its power on. ◆ In the case that the meter recognizes excessive load while in fact there is no load at work, manually adjust the zero-point.
The automated zero-point adjustment function is set to “None.”	Set the automated zero-point adjustment function to either “B mode” or “R mode.”

Automated zero-point adjustment is not conducted in the R mode.

[Cause of the warning]	[How to fix]
The difference is too large between the last zero-point memorized and the current point for the meter to have the automated adjustment.	Remove the load from the meter and manually adjust the zero-point.

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