

# Non-contact Thickness Meters / Displacement Meters

## VT/VE/CL series



Non-contact displacement meters

### VT Series



Gap detectors

### VE Series

- Further advances have been made in capacitance type displacement meters and thickness meters that have a reputation for high precision and stability.
- Non-contact measurement can now be performed in nanometer resolution, and a frequency response of 10 kHz has been achieved.
- They meet a wide range of applications, including the measurement of the thickness of conductors and semiconductors, and of the axial runout of rotating objects.
- They can be incorporated into production lines, and used for applications such as quality control and testing in a wide variety of fields.

Non-contact thickness meters

### CL Series



# Electrostatic capacitance type thickness meter/displacement meter

## System configuration

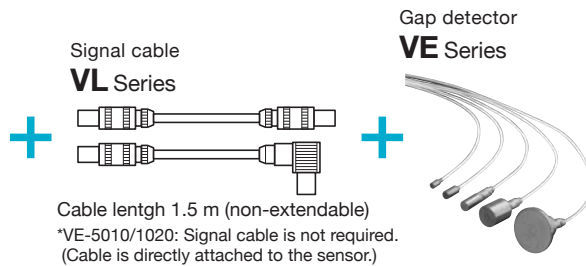
### Electrostatic capacitance type non-contact thickness meter CL-5610 Series

#### CL-5610

Buil-in amplifier type

Standard type for desktop measurement or measurement by installing into a small equipment

CL-5610



#### CL-5610S

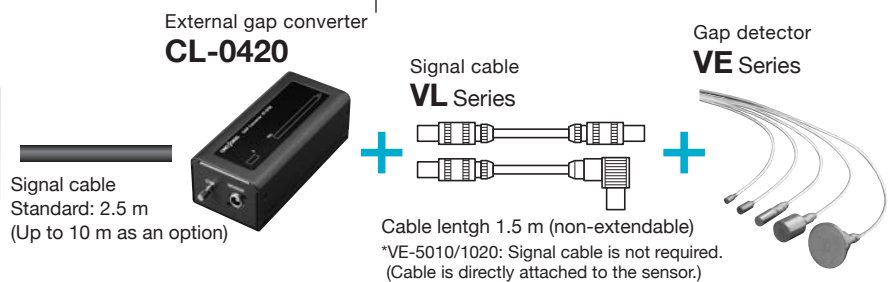
Gap converter separate type

Useful for measurement on a large equipment incorporated the main unit into.

\*Distance between a main unit and a sensor : up to 11.5 m (standard:4 m)

CL-5610S

Display/calculation unit



### Electrostatic capacitance type non-contact displacement meter VT-5200/5700 Series

#### VT-5200 Series

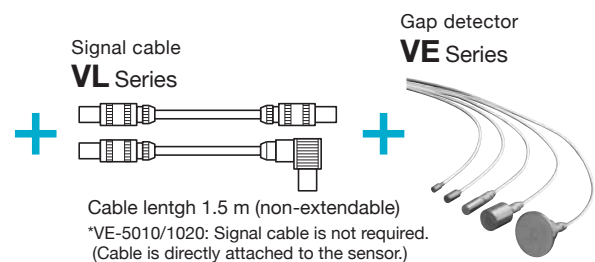
Standard type with AC powered operation

**VT-5210** (Response frequency 4 kHz)

**VT-5220** (Response frequency 10 kHz)

- Output offset function
- 20-segment level meter
- AC 100 to 240 V powered operation

Main unit



#### VT-5700 Series

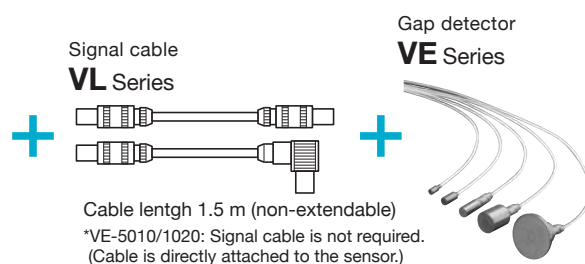
Compact type with DC powered operation

**VT-5710** (Response frequency 4 kHz)

**VT-5720** (Response frequency 10 kHz)

- Compact body
- Suitable for the use in an incorporated structure
- DC ±15 V powered operation

Main unit



## Feature

Electrostatic capacitance type non-contact measurement system can measure the gap between a target and VE sensor with high accuracy without contact. It is used in a combination with the VT series (electrostatic capacitance type non-contact displacement meter) and CL series (electrostatic capacitance type non-contact thickness meter). This system also can measure the thickness of a target with the function for gap measurement.

- **Non-contact measurement**

Thickness of objects having a dislike of contact, such as semiconductor wafers, soft films, and easy to be damaged glass can be measured with non-contact detection. Also suitable for the measurement of motor shaft deviation, that is dangerous with a contact detection.

- **No need to calibrate for each target material**

Calibration for each of material to be measured is not required for electrostatic capacitance type system, although required for eddy current type. Conductors can be measured with the same setting without recalibration, such as iron, aluminum, stainless steel, etc.

## Measurement principle

The VE series gap detectors measure the gap between the sensor bottom surface and the target using each of electrostatic capacitance. Relation among the electrostatic capacitance  $C$ , the electrode area  $S$ , and the gap  $D$  is expressed as the right formula. Electrostatic capacitance type non-contact measurement system measures and displays the gap ( $D$ ) by measuring electrostatic capacitance.

To measure the capacitance, the following conditions of the measurement object are required;

- Conductor (a substance that conducts electricity)
- Electrically connected to the sensor case (sensor outer-shell)

- **Measuring thickness of conductors**

For measuring the thickness of conductors, the electrostatic capacitance type non-contact thickness meter (LC-5610 series) and 2 gap detectors (VE series) are used.

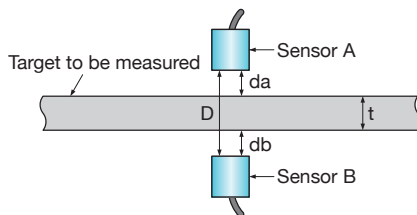
Install two sensors in parallel to sandwich the measurement target. At this time, the sensor can directly measure the gap "da" and "db" from the sensor to the target surface. When the distance  $D$  between both sensors is known in advance, the thickness of the target can be obtained by the following formula [1].

$$[1] t = D - da - db$$

In practice, it is difficult to accurately measure the distance  $D$  between both sensors, so a master piece of a conductor which thickness is already known is used to calculate the distance  $D$  between the two sensors as follows.

$$D = da + db + tr$$

This distance  $D$  between the two sensors can be used to measure the thickness of the target.



Note: The sensor case and the material are assumed to have equal potential.

## Object that can be measured

- **Conductor:**

Low resistance, carrying electricity. No limitation on the type.

- **Semiconductor:**

Silicon wafers etc. For low ground impedance targets, high impedance ground mode CL-0210 (option) may be required.

- △ **Insulator:**

Thickness of thin insulator can be measured. CL-0300 (Insulator measurement function: option) is required.

·Plastic ·Sapphire ·Glass ·Plastic film ·Crystal etc.  
Gap measurement is not available.

- △ **Carbon:**

Graphite or amorphous can be measured. However, it may not be measured if diamond (insulator) is included in the material.

- △ **Composite materials:**

Composites using multiple materials with different relative permittivity can not be measured. (Excluding the case of conductors)

- △ **Painted, surface-treated material:**

When it is a material coated with insulation paint on the surface or with alumite treatment, the measurement error will be larger than the value in specification.

- △ **Materials with rough surface or curved surface:**

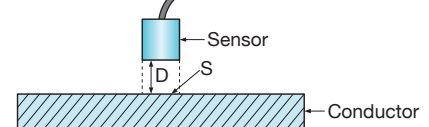
Almost the average of the unevenness of the surface is measured by VE series sensor, to the measurement principle. The same is true for curved surfaces.

- × **Materials containing moisture:**

The measured value will be changed when the amount of moisture changes during measurement. Dirt or oil adhesion to the surface of the material may also be a measurement error.

○ : Able to measure    △ : With restriction on measurement    × : Unable to measure

$$C = \frac{\epsilon \cdot S}{D} \quad \epsilon : \text{Electric permittivity}$$



- **Measuring thickness of insulators**

For measuring the thickness of insulators, the electrostatic capacitance non-contact type thickness meter (LC-5610 series) and 1gap detector (VE series) are used.

Install the gap detector VE series at a distance  $D$  opposite to the standard floor conductor. When the insulator to be measured is inserted between the sensor and the conductor serving as the reference floor, the output from the sensor changes to a value different from the output corresponding to the distance  $D$ .

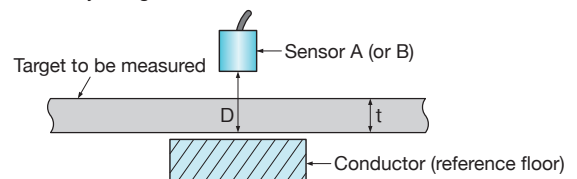
This is due to the change in the relative permittivity between the sensor and the conductor, which is the reference floor, due to the insertion of the specific inductive capacity  $\epsilon r$  insulator. (value for air  $\rightarrow$  composite value of air and insulator)

At this time, if the relative permittivity  $\epsilon r$  of the insulator is known, the thickness  $t$  of the insulator can be obtained by the following formula [2].

$$t = \left( \frac{\epsilon r}{1 - \epsilon r} \right) \times (\Delta D) \dots [2] \quad \Delta D: \text{change in apparent distance}$$

In practice, it is difficult to accurately measure the relative permittivity, so a master piece (thickness  $tr$ ) which is made with material same as the measurement target is used to obtain the relative permittivity of the target using the formula [2].

When you do not know the thickness of the object "  $t$  ", you can obtain the thickness by using  $\epsilon r$  and  $\Delta D$  obtained earlier.



Note: The sensor case and the conductor installed oppositely are assumed to have equal potential.

\*A guide of the thickness of conductor to be measured is about 1/3 or less of the gap value between the sensor and the reference floor.

# CL-5610 Series

## Electrostatic capacitance type non-contact thickness meter



Items subject to List Control on export cargoes

CL-5610/5610S Series use the VE series electrostatic capacitance type gap detectors to measure conductors, semiconductors and insulators. Max. two VE series detectors can be connected to.

The CL-5610 incorporates a sensor amplifier in the main unit, and uses a VE sensor directly connected to the main unit of thickness meter. Suitable for offline measurement on desktop. (Cable between the sensor and the main unit: 1.5 m, not available extension)

With the CL-5610S, the sensor amplifier can be isolated externally, and the VE sensor and thickness meter can be installed away from the measurement point, it is suitable for online measurement.

(Cable length between the main unit and the external amplifier: 2.5 m as a standard / extendable up to 10 m as an option)

### Feature

- Many measurement items**  
 Thickness and gap can be measured. For each, the calculated value of deviation, maximum, maximum range (maximum-minimum) can be obtained.
- Thickness measurement of insulators as well as conductors and semiconductors (with CL-0300: option)**  
 The thickness of insulators such as thin plastic films and glass plates can be measured by the CL-0300 Insulator measurement function option. (\*Composite materials cannot be measured. \*Some insulators cannot be measured according to the amount of the relative permittivity.)
- Stable thickness measurement even for samples that can not have completely conduction (with CL-0210: option)**  
 Even if it is difficult to establish electrical continuity with the sample (such as when holding the sample on a table coated with a fluorine-based film, that requires wide area contact for stable electrical continuity), CL-0210 High-impedance grounding mode achieves stable electrical continuity with a small contact area between the sample and the table.
- Saving the calibration values for six sensor types max.**  
 VE series sensors need to be calibrated one-to-one with the CL-5610 series due to have individual differences in characteristics. The CL-5610 series can store the calibration information up to six sensors, so according to the measurement range and resolution, you can select and use the most suitable sensor from among the stored.  
\*Output accuracy of SENSOR A and SENSOR B in CL-0110 output function (option): available only the combination with one sensor
- Control of main unit from a PLC or PC, import of measurement data**  
 Remote terminal, RS-232C terminal and BCD output terminal (option) are provided as external interface.  
 Can be used incorporating into production line, and data can be read and controlled. Measurement data every 20ms can also be acquired from the BCD output terminal.

### Measurement range and displayed resolution

Sensor model name	Measurement range (μm)	Displayed resolution (μm)	
		Standard	With CL-0200
VE-2011	20 to 200	0.1	0.02
VE-5010	50 to 500		0.05/0.02*1
VE-5011	/20 to 200*1		
VE-1020	100 to 1000		0.1
VE-1021			

Sensor model name	Measurement range (μm)	Displayed resolution (μm)	
		Standard	With CL-0200
VE-1520	150 to 1500	0.5	0.2
VE-3020	300 to 3000	1	0.5
VE-8020	800 to 8000	2	1
VE-8021			

\*1: Display resolution when the CL-0200 is installed and the measurement range is specified as 20 to 200 μm by the CL-0201 (measurement range change option).

\* A guideline of the thickness of conductors to be measure: about 1/3 or less of the measurement range (e.g.) Measurement using VE-1020: about 350 μm or less for the thickness of the insulator

## Specification

	CL-5610	CL-5610S
Target	Conductor, semiconductor, insulator*1	
Item	Gap A between sensor A and the target (conductor/semiconductor) Gap B between sensor B and the target (conductor/ semiconductor) Thickness of the target (conductor, semiconductor, and insulator*1)	
Display	Fluorescent display tube Display of measurement results can be selected from 1-line display (SINGLE) or 2-line display (DUAL).	
Display mode	Gap, thickness Calculation value: (measured value - measured value)/MAX (maximum value)/ MIN (minimum value), or Range (MAX-MIN from calculation start time)	
Resolution	Depends on the sensor combination 0.1, 0.5, 1.2 μm (0.02, 0.05, 0.2, 0.5, 1 μm*2)	
Accuracy (10 to 100 %, at F.S)	±0.15 %/F.S. (standard) ±0.12 %/F.S.*2 (When the optional CL-0200 High-resolution measurement function is installed.)	
Sampling time	20 ms	
Averaging	Moving average: 1 to 64 times	
Interface	RS-232C (connection cable: AX-5022 2 m option) BCD output (CL-0120 option required to install) External remote function: 5 commands operations (start, stop, thickness calibration etc.) SYNK function: Synchronized operation of several units of CL-5610/5610S*3	
Printer	DPU-414 (signal cable provided as standard, exclusive AC adapter: PW-C0725-W2-U)	
Power supply	100 to 240 VAC 50/60 Hz	
Operating temperature range	0 to +40 °C (guaranteed accuracy range: 23±2 °C)	
Operating humidity range	20 to 80 %R.H. (with no condensation)	
Option	CL-0110	Output function
	•Analog output	SENSOR A, SENSOR B terminals •Output item: GAP output*4 for each sensor •Output voltage: 5 V/F.S. (with offset [-5 to 0 V] function) •Output accuracy: ±0.25 % F.S.*4 A-OUT terminal •Output item: Selectable from THICK, GAP-A, GAP-B, or A-B •Output voltage: -5 to 0 to +5 V (output scale: can be specified freely) •Output accuracy: ±0.25 % F.S.
	•Comparator output	COMP1, COMP2, COMP3 •Individual mode: Operated as window comparator by setting thresholds the UPPER and LOWER respectively •ALL mode: Using comparator 1/2/3 for judgment of UPPER/OK/LOWER.
	CL-0120	BCD output function Output method: 6-digit parallel BCD, open collector output Update time: 20 ms Applicable cable: AA-8207 (3 m, one end open)
	CL-0200	High-resolution measurement function Function: Improve display resolution and accuracy Resolution·accuracy: See "Measurement range and displayed resolution" on page 4.
	CL-0210	High-impedance grounding mode Measurement can be performed stably under the condition with great grounding resistance.
	CL-0300	Insulator measurement function Thickness measurement of insulators by calculating the relative permittivity. (Some insulators may not be measured according to the amount of the relative permittivity.)
Outer dimensions	210 (W) x 99 (H) x 275 (D) mm (not including protruded section)	210 (W) x 99(H) x 275(D) mm (not including protruded section) CL-0420: 56 (W) x 42.4 (H) x 122 (D) mm (not including protruded section)
Weight	approx. 4.2 kg	approx. 4.2 kg CL-0420: approx. 0.5 kg x 2
Accessory	Power supply cable x 1 Instruction manual x1 Remote connector x 1	Power supply cable x 1 Instruction manual x1 Remote connector x 1 Exclusive connection cable (2.5 m) x 2

\*1:The CL-0300 Insulator measurement function (option) is required for insulator measurement.

\*2:The CL-0200 High-resolution measurement function (option) is required.

\*3:Up to two units can be synchronized to one master unit. To use the SYNC function, coordination between the devices is required. Please contact your nearest distributor or Ono Sokki sales office nearby for more details.

\*4:Output accuracy of SENSOR A and SENSOR B: valid only the combination with one registered sensor for each. The output accuracy when connecting other than registered sensors is not guaranteed.

# Interface

## BCD IN/OUT

Measurement value is selectable for BCD output such as “Thickness data”, “Gap between sensor A and measurement target”, or “Gap between sensor B and measurement target”. Data is updated every 20 ms of measurement.

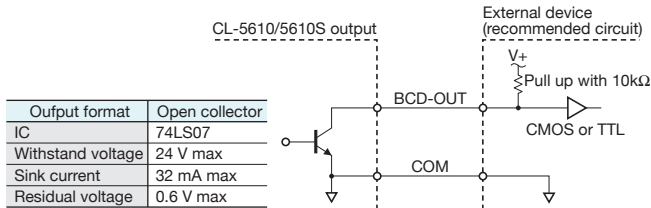
- Applicable connector: HDRA-E36MA (Honda Tsushin Kogyo Co., Ltd.)
- Ono sokki standard cable: AA-8207 (3 m: one end open)

Pin	I/O	Signal	Function
1	0	1	10 <sup>0</sup> data output
2	0	2	
3	0	4	
4	0	8	
5	0	1	10 <sup>1</sup> data output
6	0	2	
7	0	4	
8	0	8	
9	0	1	10 <sup>2</sup> data output
10	0	2	
11	0	4	
12	0	8	
13	0	1	10 <sup>3</sup> data output
14	0	2	
15	0	4	
16	0	8	
17	0	1	10 <sup>4</sup> data output
18	0	2	
19	0	4	
20	0	8	

Pin	I/O	Signal	Function	
21	0	1	10 <sup>5</sup> data output	
22	0	2		
23	0	4		
24	0	8		
25	0	-	SIGN	Output sign
26	0	0	DP0	Output decimal point position of measured value
27	0	1	DP1	
28	0	2	DP2	
29	0	0	UNIT0	Output unit of measured value
30	0	1	UNIT1	
31	0	2	UNIT2	
32	0	-	START	Output H level in calculation mode
33	0	-	ERROR	H level is output in the following situations.
				1. When measured value of GAP A / B exceeds 130% of sensor rating
				2. When the calculated value of THICK is negative
				3. When the calculated value exceeds the number of displayed digits
34	I	#HOLD	Hold BCD data externally	
35	0	DAV	BCD data is valid at High level	
36	-	COM		

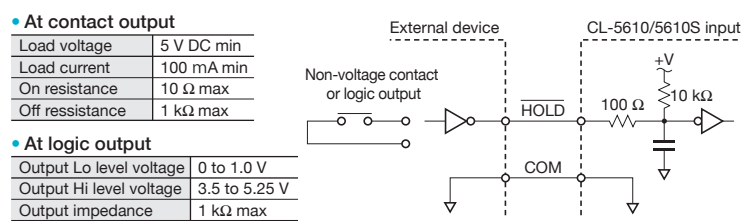
### Output of BCD signal

The following circuit is recommended for the external device side to be connected to the output signal of CL-5610.



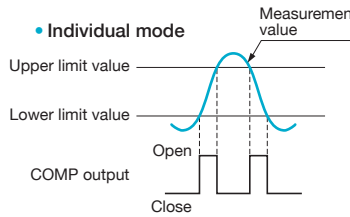
### Input of Hold signal

The following circuit is recommended to input hold signals to the CL-5610 series.



## Comparator Output

- Individual mode: Operated as window comparator by setting thresholds the UPPER and LOWER respectively
- ALL mode: Using comparator 1/2/3 for judgment of UPPER/OK/LOWER.



The comparator contact output is closed at the following setting

- Set upper limit value (UPPER) <set value
- Set lower limit value (LOWER) > set value

### ALL mode

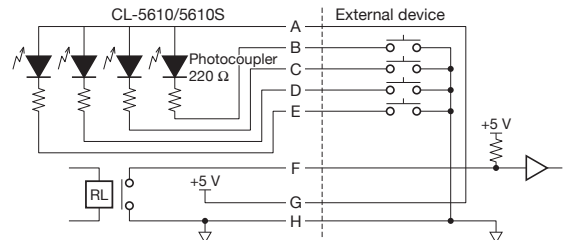
COMP1	Upper limit value over
COMP2	OK
COMP3	Lower limit value over

## Input/Output of external control terminal

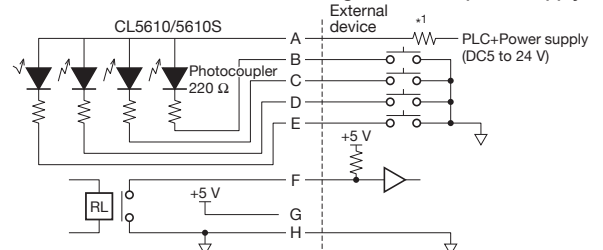
Applicable connector	R03-PB8M (Tajimi Electronic Co., Ltd.)
Output format	Semiconductor relay (Photo-Mos) non-voltage contact (1a)
Load voltage	AC/DC 60 V
Load current	400 mA
ON resistance	2 Ω or less

Pin	Signal	Description
A	Power supply	Input DC5 to 24 V (See "Recommended Interface") •Insert a resistor when supplying DC 6 V or more externally.
B	START	Same function as START key
C	STOP	Stop the calculation mode
D	PAUSE	Same function as PAUSE key
E	CALIB	Calibrated with the reference material data of the registered measurement target •Only for conductor measurement •The thickness of the reference material cannot be changed.
F	START STATUS	Switch to active in Calculation mode and Calculation suspend mode
G	+5 V	Output +5 V (MAX:0.3 A)
H	COMMON	Connect to 0 V

### Recommended interface (When using the internal power supply)



### Recommended interface (When using the external power supply)



\*1:Insert 47 Ω of resistor when using at 12 VDC, and 1 kΩ of resistor when using at 24 VDC.

# Electrostatic capacitance type non-contact displacement meter VT series

Electrostatic capacitance type non-contact displacement meter VT series is a displacement meter that detects a gap with a conductor as an analog voltage in combination with the VE series (gap detector). It is useful for detecting deflection of a rotating shaft, and for controlling the position adjustment on a stage at a minute level. The cable length between the non-contact displacement meter and the external device is max.10m in length. VT-5200 series is operated on AC power, VT-5700 series is operated on DC power. The VT-5210 / 5710 has 4 kHz of response frequency, and the VT-5220 / 5720 has 10 kHz of response frequency.

## •VT-5200 series



Model name	VT-5210	VT-5220
Output	0 to 5 V/ 0 to 100 % F.S.	
Output offset range	-5 to 0 V of offset voltage can be set to the output.	
Linearity (at 10 to 100 %F.S.)	±0.2 %F.S.	±0.25 %F.S.
Temperature characteristics	Within ±0.05 % F.S./°C	
Response frequency	DC to 4 kHz	DC to 10 kHz
Monitor display	20-segment LED, analog output offset function	
Operating temperature range	0 to +40 °C (guaranteed accuracy range:23±2 °C)	
Power requirement	AC100 to 240 V /10 VA	
Outer dimensions	95 (W) x 150 (H) x 195 (D) mm (not including protruded section)	
Weight	approx. 2 kg	
Accessory	AC power cable x 1, instruction manual x 1	

F.S.: Sensor's maximum measurement range

## •VT-5700 series

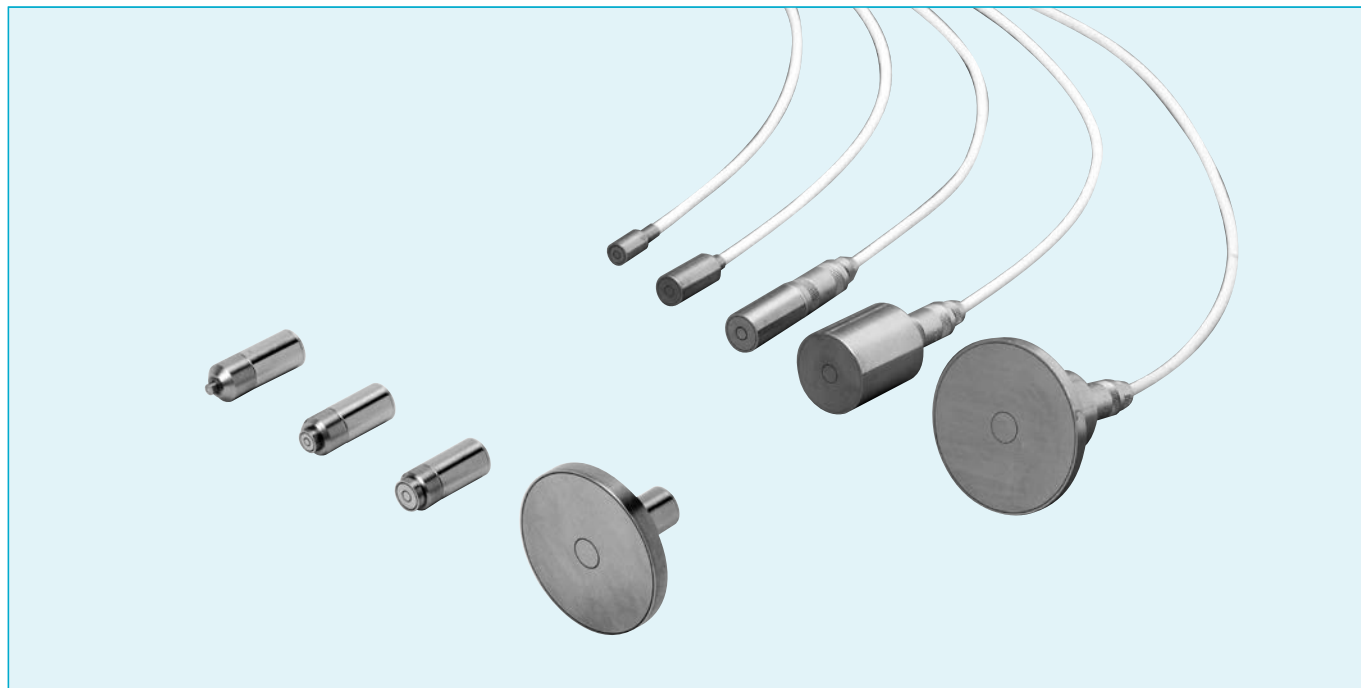


Model name	VT-5710	VT-5720
Output	0 to 5 V/ 0 to 100 % F.S.	
Linearity (at 10 to 100 %F.S.)	±0.2 %F.S.	±0.25 %F.S.
Temperature characteristics	Within ±0.05 % F.S./°C	
Response frequency	DC to 4 kHz	DC to 10 kHz
Monitor display	10-segment LED	
Operating temperature range	0 to +40 °C (guaranteed accuracy range:23±2 °C)	
Power requirement	DC±15 V (within ±0.5 V)/100 mA	
Outer dimensions	56 (W) x 42.4 (H) x 122 (D) mm (not including protruded section)	
Weight	approx. 0.5 kg	
Accessory	Connector for voltage output/ power connection (R03PB8M) x 1, instruction manual x 1	

F.S.: Sensor's maximum measurement range

# Gap detector VE series

The VE series gap detector is a displacement sensor that detects the gap from the sensor to the measurement target with high accuracy. Useful for measuring vibration and surface deflection of rotating shafts such as turbines, motors, compressors and machine tool spindles, and thickness and shape of targets by combining with the VT series electrostatic capacitance type non-contact displacement meter and the CL series electrostatic capacitance type non-contact thickness meter.



	VE-2011	VE-5011	VE-1021	VE-8021
Measurement range (μm)	20 to 200	50 to 500	100 to 1000	800 to 8000
External diameter (mm)	ø3 (holding part:ø10)	ø6 (holding part:ø10)	ø8 (holding part:10)	ø40 (holding part:ø10)
Cable connection method*1	Connector (use with exclusive cable)			
Display resolution (μm)*2	0.1	0.1	0.1	2
Linearity	Depends on the displacement meter and thickness meter to be connected. Please check the specifications for each sensor.			
Operating temperature range*3	0 to +80 °C			
Exclusive cable (1.5 m)	LV-1520/VL-1521			

	VE-5010	VE-1020	VE-1520	VE-3020	VE-8020
Measurement range (μm)	50 to 500	100 to 1000	150 to 1500	300 to 3000	800 to 8000
External diameter (mm)	ø6	ø8	ø10	ø20	ø40 (holding part:ø20)
Cable connection method*1	Cable direct attached (1.5m)		Connector		
Display resolution (μm)*2	0.1	0.1	0.5	1	2
Linearity	Depends on the displacement meter and thickness meter to be connected. Please check the specifications for each sensor.				
Operating temperature range*3	0 to +80 °C				
Exclusive cable (1.5m)	Cable direct attached		LV-1520/VL-1521		

\*1: Only the exclusive cable can be used (not extendable).

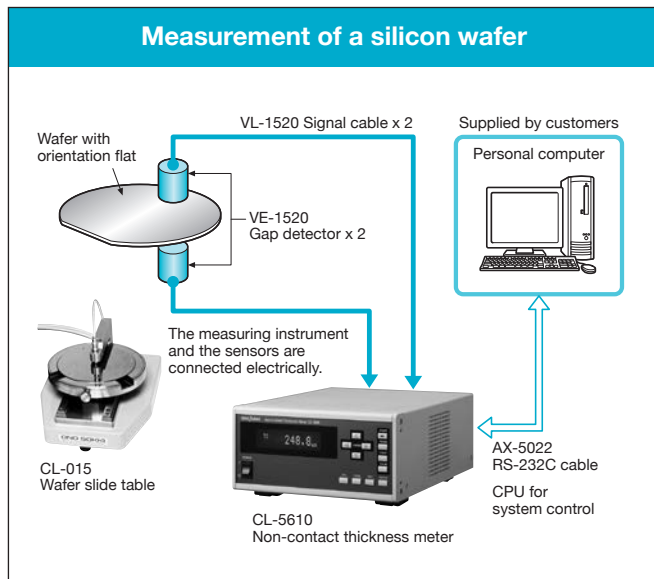
\*2: Display resolution when measuring in conductor mode and standard mode connecting to CL-5610/5610S.

\*3: Temperature range that operates without damage to the sensor. The display resolution and linearity are guaranteed in the range of 23 ±2 °C.

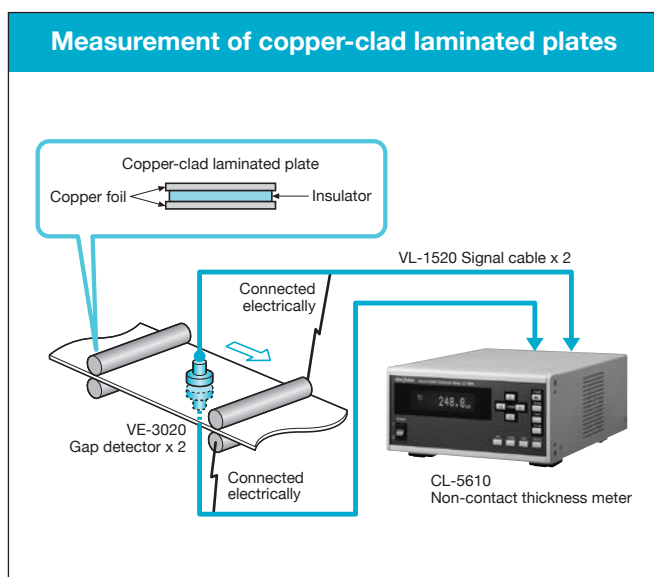
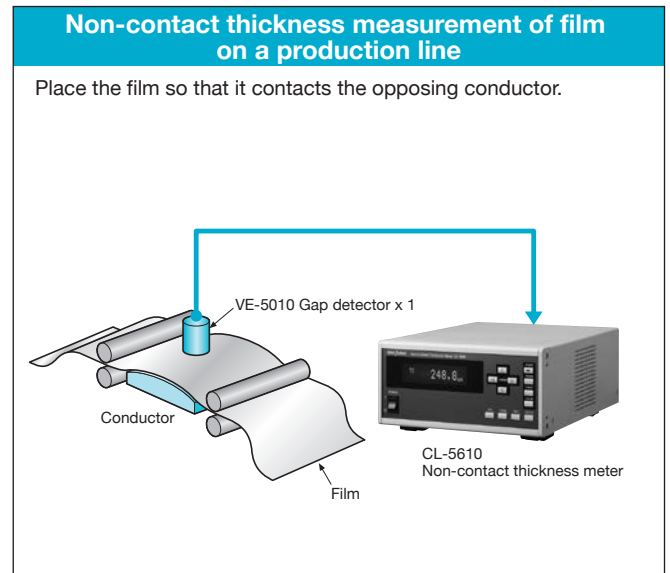
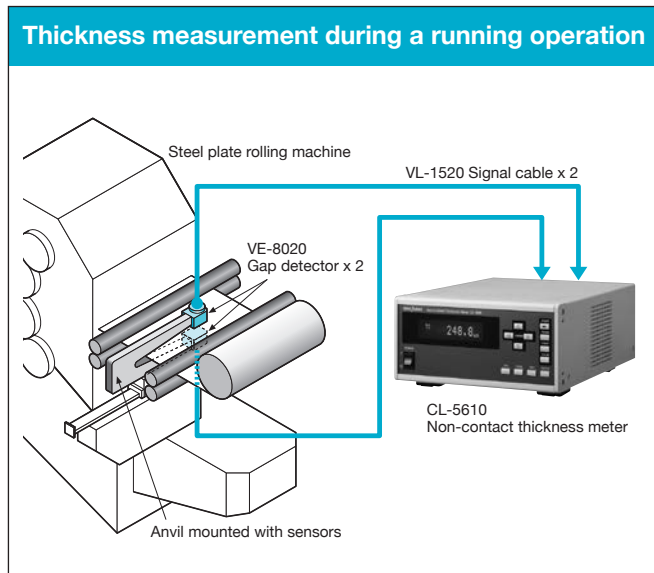
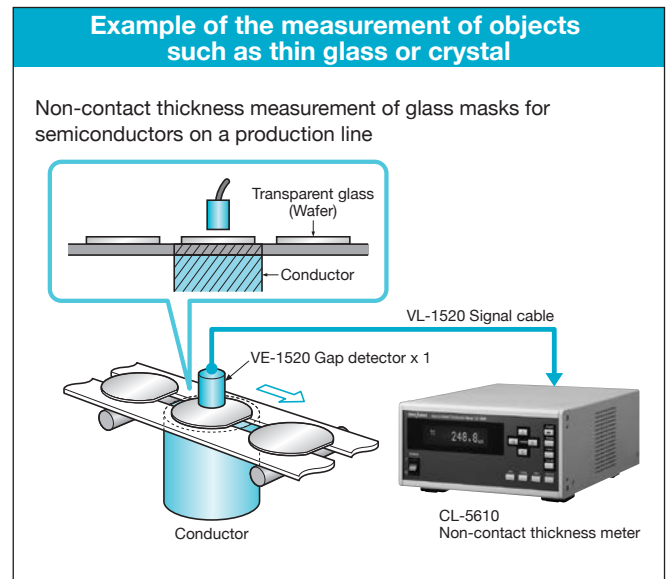


# Examples of measurement

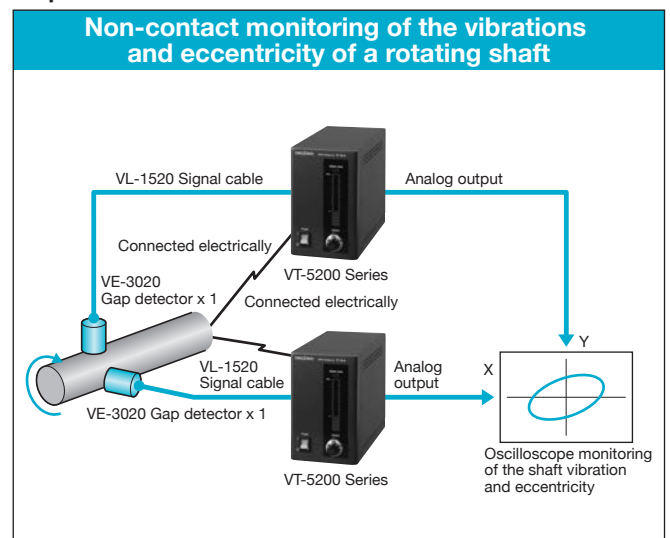
## Conductor/semiconductor thickness measurement



## Insulator thickness measurement (when the CL-0300 option is installed.)



## Displacement measurement of conductors/semiconductors



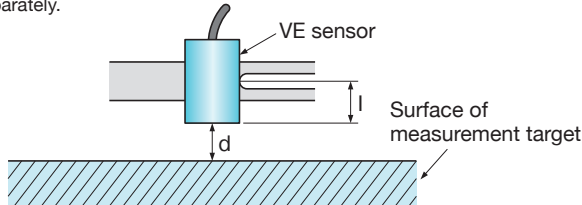
# For Stable Measurement

## Influence by temperature change

Temperature change during measurement causes the dimensions of the sensor or the jig that fixes the sensor will change, so that measurement errors occur.

The ambient temperature range for measurement accuracy specified in this system is  $23 \pm 2$  °C. When using the sensor outside the range, make corrections with reference to the influence of the temperature change of the sensor shown below.

\* Please make correction for the dimensional change of the jig fixing the sensor separately.



$$\Delta d \doteq (k_1 \times l + k_2 \times d) \times \Delta t$$

- K1 : Linear expansion coefficient of the sensor housing ( $1.7 \times 10^{-5}$ )
- K2 : Coefficient of area expansion of the sensor electrode material ( $3.4 \times 10^{-5}$ )
- l : Distance from sensor surface to the fixed point
- $\Delta t$  : Change in temperature
- d : Measurement gap
- $\Delta d$  : Change in the output of the converter

## Calibration of sensor and display unit

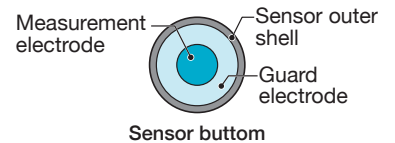
A displacement meter and a thickness meter connected to a sensor should be adjusted one-on-one in electrostatic capacitance measurement system.

When ordered CL series (electrostatic capacitance type non-contact thickness meter) and VE series (gap detector) at the same time: up to two sensors are adjusted for free.

When ordered VT series (electrostatic capacitance type non-contact displacement meter) and the VE series (gap detector) at the same time: one sensor is adjusted for free.

## Note on measurement

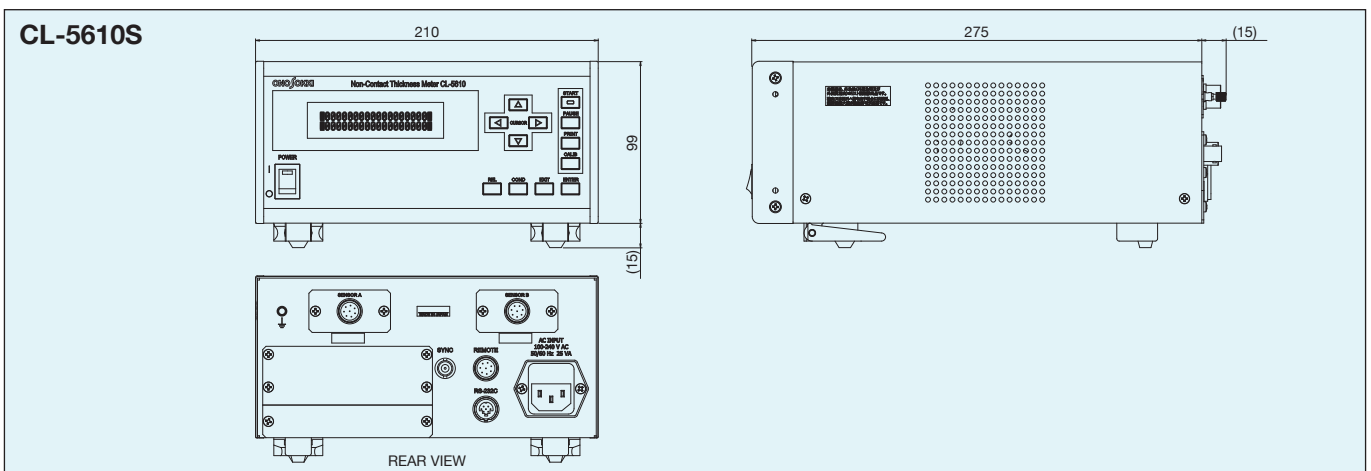
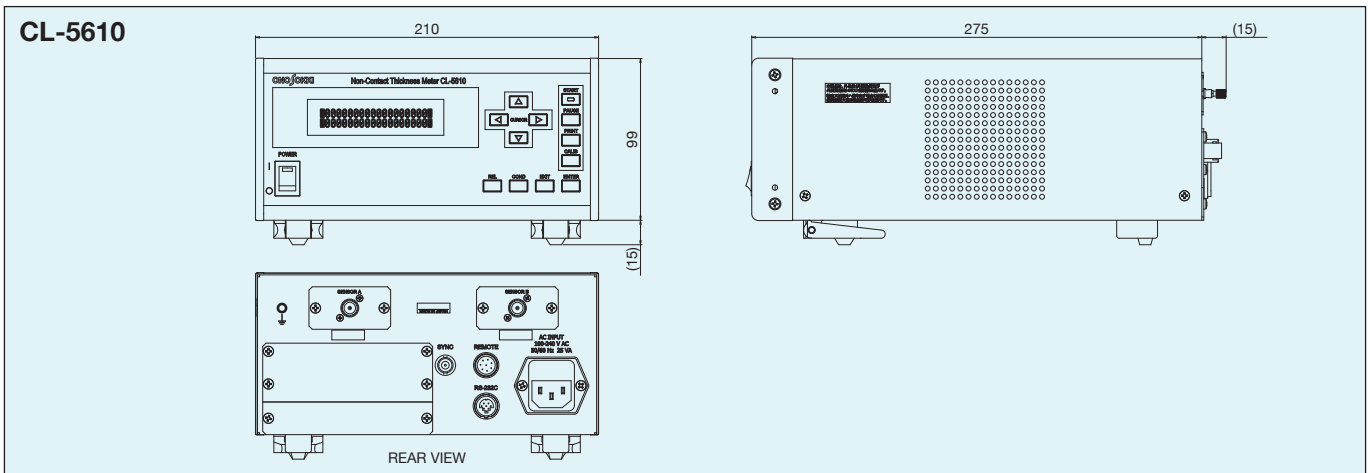
- Do not contact the measurement electrode of the sensor with the target to be measured in electrostatic capacitance type measurement system to avoid damage of the amplifier. Also, for the same reason, make sure not to be charged the measurement target with static electricity.



- The outer shell of the sensor and the measurement target (reference floor for insulator measurement) must be electrically connected. If conduction is not sufficient, stable measurement cannot be performed.

## Outer dimensions (unit: mm)

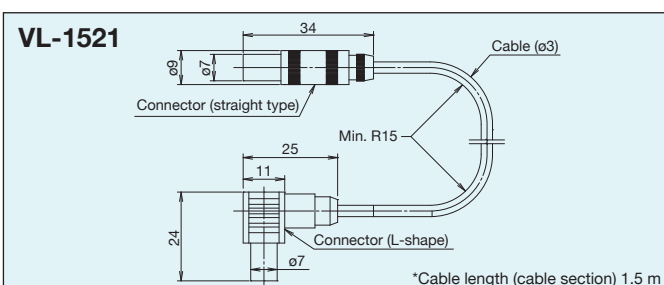
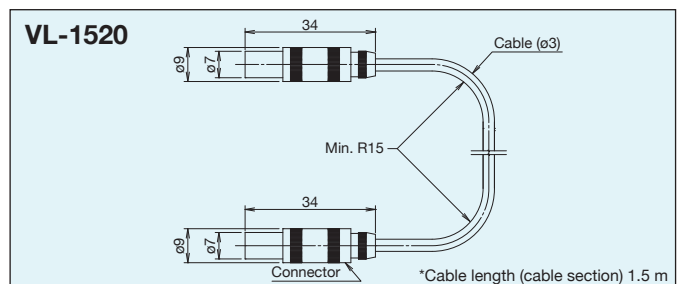
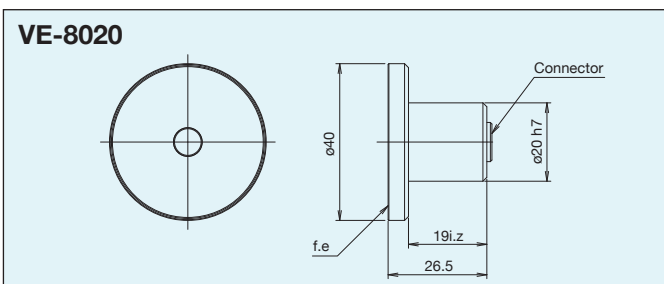
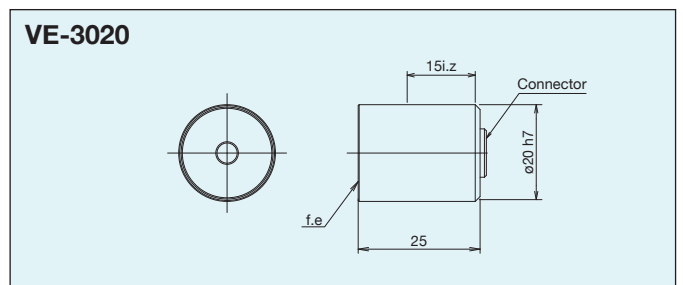
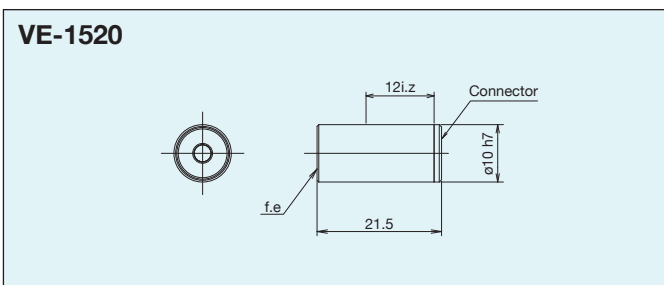
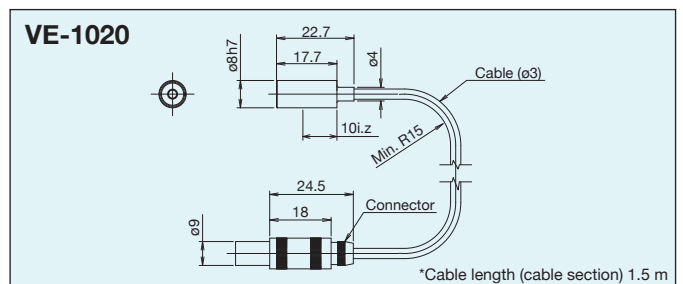
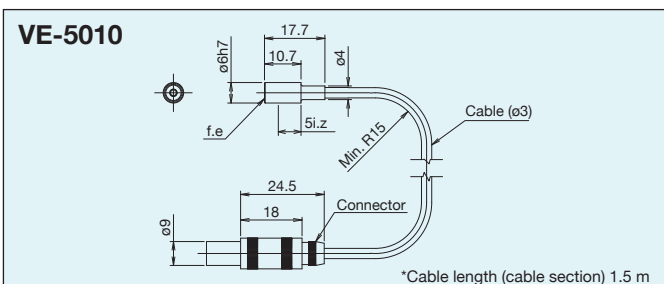
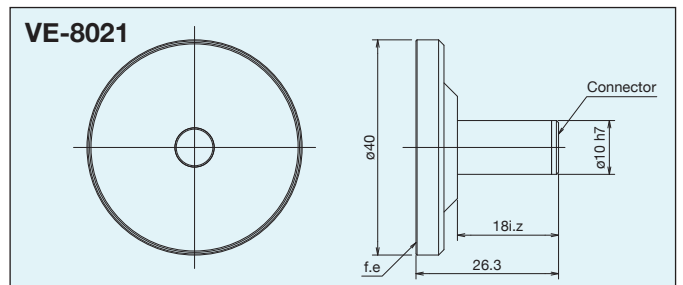
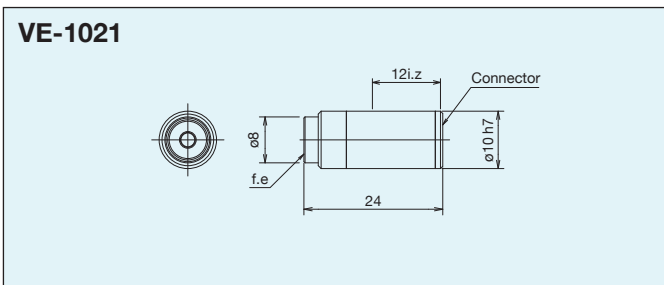
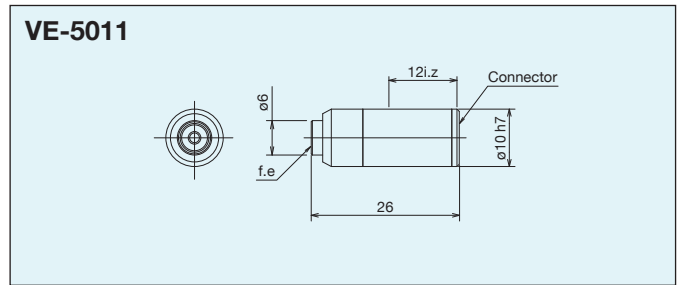
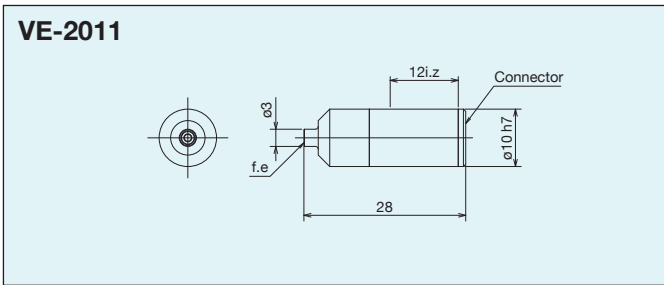
### Electrostatic capacitance type non-contact thickness meter



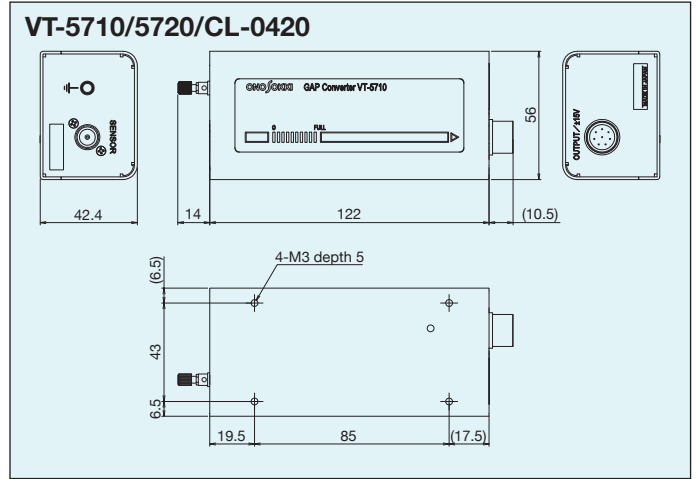
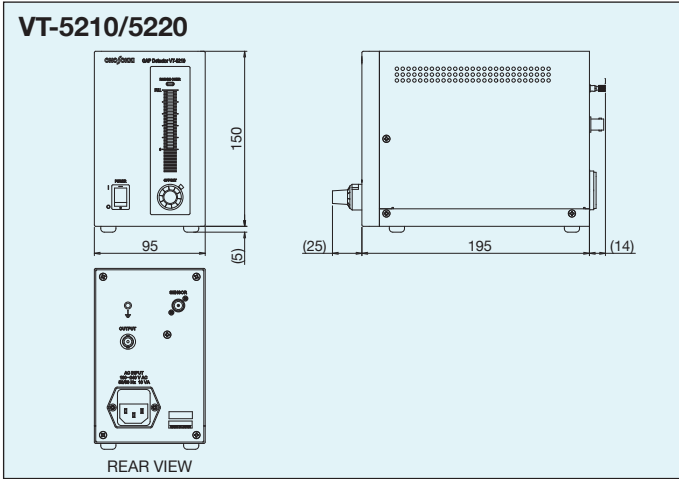
# Outer dimensions (unit: mm)

## Gap detector

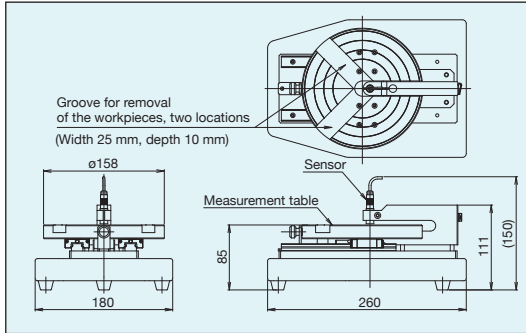
(Note) When fixing the sensor, fix it within the range of i.z (insert zone).



## ■ Non-contact displacement meters VT Series



## ■ Wefer slide table (made to order)



CL-015 is a simple type manual slide table that can be used together with the CL-5610 series to perform non-contact thickness measurements of conductive wafers such as silicon wafers.

Grooves have been provided in the table surface to facilitate use of the tweezers for vacuum adsorption.

### • Measurable wafer size

Outer diameter: 100 to 150 mm

Thickness : 0.1 to 1 mm

Other special tables for 200 mm and 300 mm wafers can also be manufactured to order.

Note: The sensors are required to set up and down of the table. (Please refer to the page 9 "Example of measurements".)

## ■ Product list

Gap detector	Measurement range (μm)	Outer diameter (mm)
VE-5010	500	ø6
VE-1020	1000	ø8
VE-1520*1	1500	ø10
VE-3020*1	3000	ø20
VE-8020*1	8000	ø40 (holding part: ø20)
VE-2011*1	200	ø3 (holding part: ø10)
VE-5011*1	500	ø6 (holding part: ø10)
VE-1021*1	1000	ø8 (holding part: ø10)
VE-8021	8000	ø40 (holding part: ø10)

\*1: Exclusive cable (VL-1520 or LV-1521) is required for each detector.

Non-contact displacement meter	Description
VT-5710	Power requirement DC±15 V/response frequency 4 kHz
VT-5720	Power requirement DC±15 V/response frequency 10 kHz
VT-5210	Power requirement AC100 to 240 V/response frequency 4 kHz
VT-5220	Power requirement AC100 to 240 V/response frequency 10 kHz

Signal cable	Description
VL-1520	1.5 m Straight connector at both ends
VL-1521	1.5 m L-shaped ↔ straight connector

Non-contact thickness meter	Description
CL-5610	Standard type
CL-5610S	Gap converter separate type (CL-0420: gap converter/ cable to connect the converter and display unit (2.5 m) is provided as standard.*3)
CL-0110*2	Output function (analog output, comparator output)
CL-0120*2	BCD output function
CL-0200*2	High-resolution calculation function
CL-0201	Measurement range change function for VE-5010/5011
CL-0210*2	High impedance grounding mode function
CL-0300*2	Insulator measurement function
CL-015	Wafer slide table (for 4 to 6-inch)
AX-5022	Exclusive RS-232C cable (2 m)
AA-8207	BCD output cable (3 m, one end open)
DPU-414	Printer (exclusive cable, provided as standard)
TP-0411	Recording paper for DPU-414 (28 m for 1 roll, containing 10 rolls)
PW-C0725-W2-U*4	AC adapter for DPU-414 (AC100 to 40 V)

\*2: Additional fees are required to add functions after shipment.

\*3: Change of cable length requires fees separately (up to 10m available).

\*4: Made by Seiko Instruments Inc. Please contact us for cables used in overseas.

\*CL-5610/5610S is a product subject to List Control by the Foreign Exchange and Foreign Trade Act.

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\*Outer appearance and specifications are subject to change without prior notice.  
**URL : <http://www.onosokki.co.jp/English/english.htm>**

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