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CATALOGUE-H01-0005-2 '15.04.3000D

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GENERAL CATALOGUE Vol.2

Voltage detector

Voltage detector checker

Auxiliary device for voltage detection

Phase tester

Grounding hook

Discharge stick

Discone hook stick

Illuminator

Measuring instrument

Railway products

Relay

HASEGAWA ELECTRIC CO.,LTD.

<http://www.hasegawa-elec.co.jp>



REGISTERED ORGANIZATION
No.0921-ISO 9001
No.E635-ISO 14001



Special high voltage Exceeding 7000 VAC

Voltage detector P.21 to 23
Portable live part detector P.30
Phase tester P.33 to 34
Grounding hook P.35 to 40
Discone hook rod P.43

For electric substation equipment

Extra-High Voltage Detecting System(VOLTECT) P.46

Hydroelectric power plant

Wind force power generation system

Special high voltage substation

154kV~187kV

Primary substation

275kV~500kV

Nuclear power plant

Thermal electric power plant

For photovoltaic power generation system (DC)

Voltage detector P.15 to 16, 19

Low voltage 600 VAC or less, 750 VDC or less

Voltage detector P.13 to 16
Phase tester P.32
Leakage current measuring device P.45

For electric vehicle (DC)

DC Voltage Checker for
Electric Vehicle P.32

High voltage Exceeding 600 VAC and 7000 VAC or less

66kV~77kV

Substation for electric power distribution

6.6kV

Electricity distribution lines

6.6kV~22kV

Factories

6.6kV~22kV

Buildings

Voltage detector P.19 to 23
Phase tester P.33 to 34
Hot line proximity alarm P.29
Portable live part detector P.30
Live-part display unit P.31
Non-live-part display unit P.31

Grounding hook P.35 to 40
Discharge stick P.42
Discone hook stick P.43

100~200V

Shopping street

Residences

Common

Voltage detector checker
P.27 to 28

Illuminator P.44

LED working light (rechargeable type)
EWL-3 Ecopika-kun

Flashing LED
SPL-Y/R/B/W

For railways (conventional railroad lines, bullet train, monorail)

Voltage detector P.24 to 26
Induction voltage detector P.26
Grounding hook P.41

High voltage hot line proximity
alarm P.47

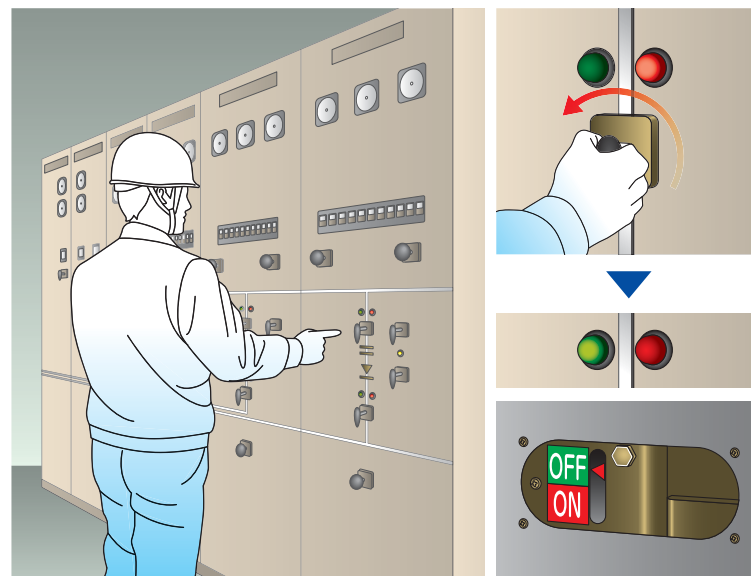
For receiving plant equipment

Extra-High Voltage Detecting System
(VOLTECT) P.46

Confirming Power Cut Operation

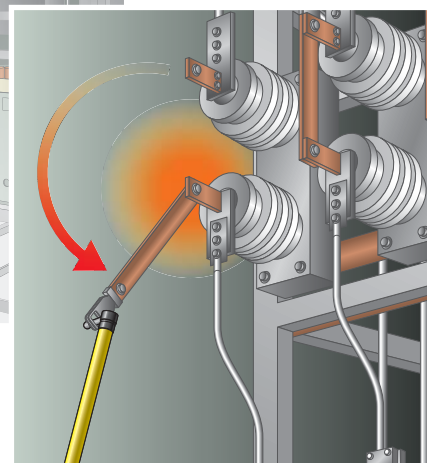
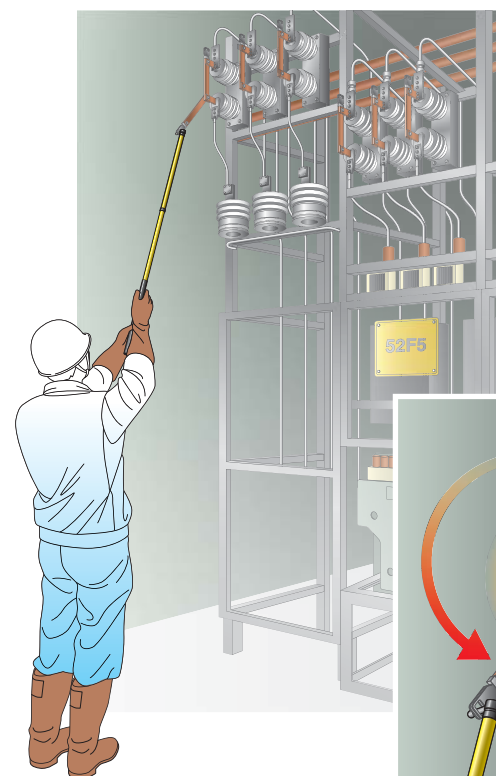
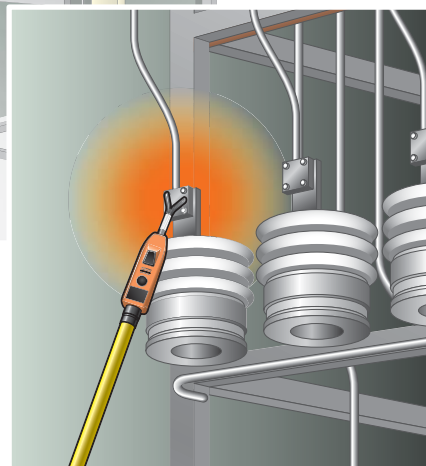
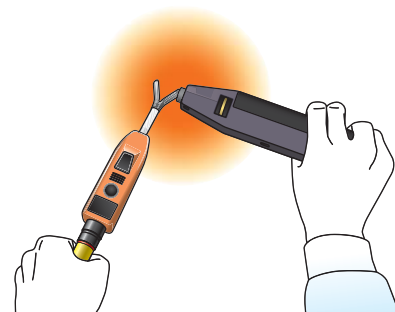
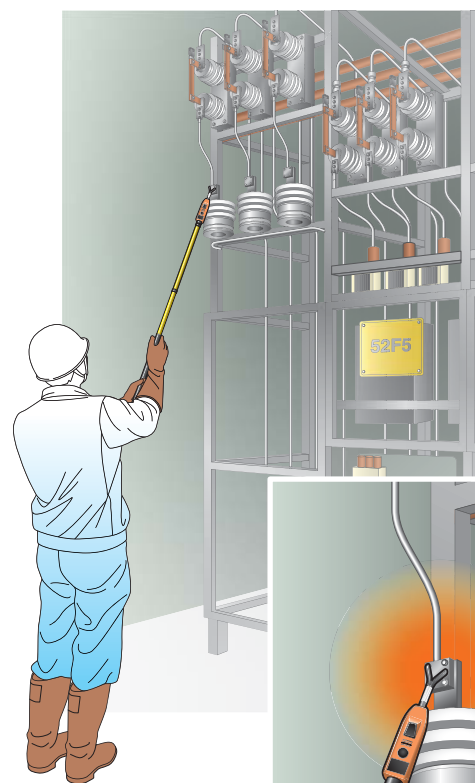
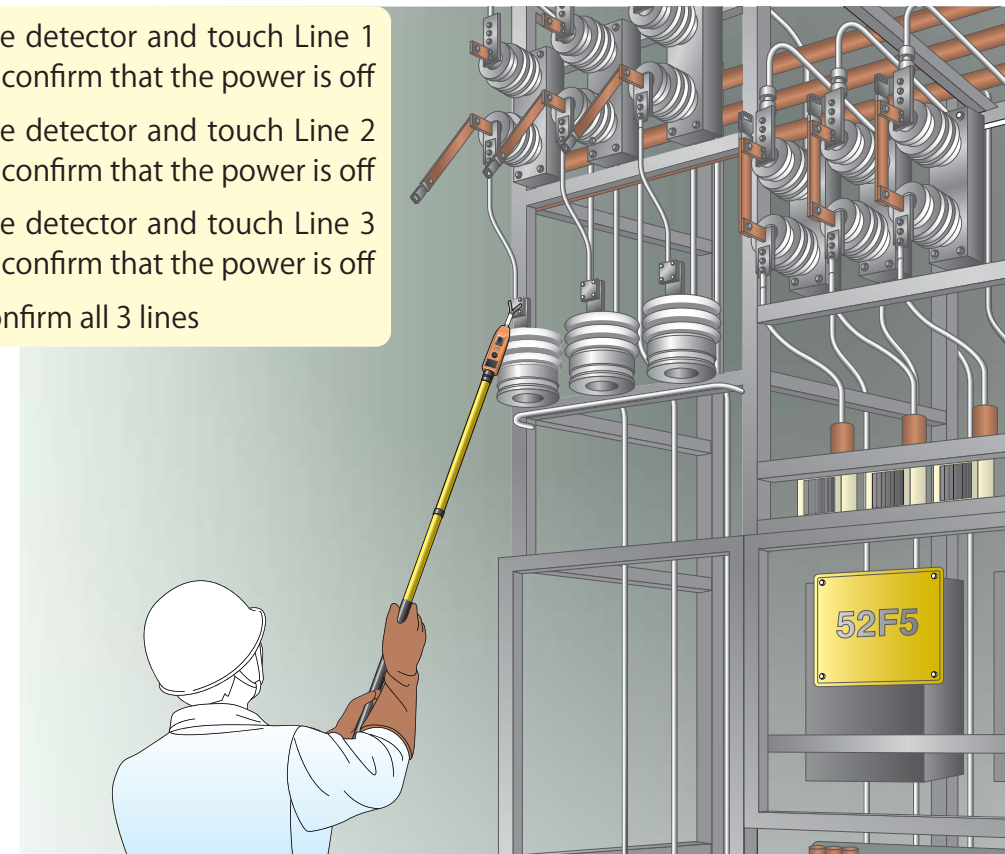


- ① Visual check of appearance and layout for any abnormalities
Use test button for battery check



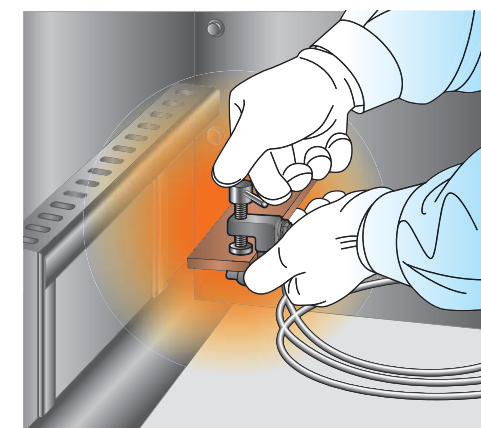
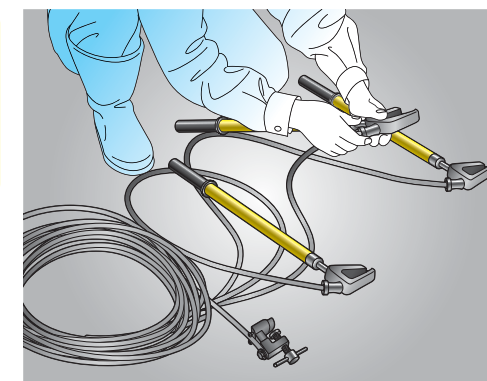
- ③ Turn Circuit Breaker OFF
Turn disconnecter OFF

- ④ Use detector and touch Line 1 to confirm that the power is off
Use detector and touch Line 2 to confirm that the power is off
Use detector and touch Line 3 to confirm that the power is off
* Confirm all 3 lines



- ② Confirm operation by using voltage detector at the known energized part

- ⑤ Check the layout and appearance of grounding hook

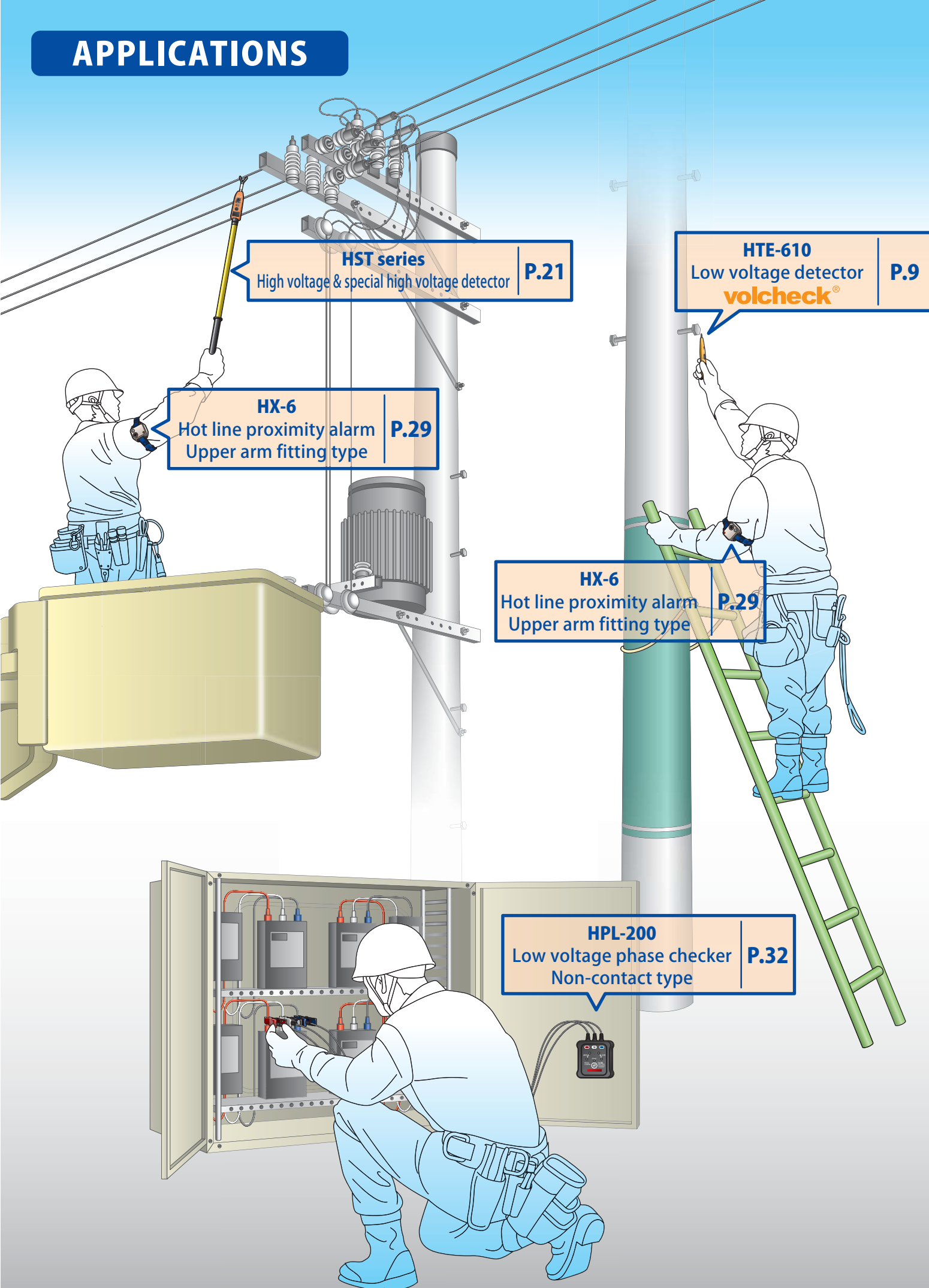


- ⑥ Connect ground metal fitting to electrical port

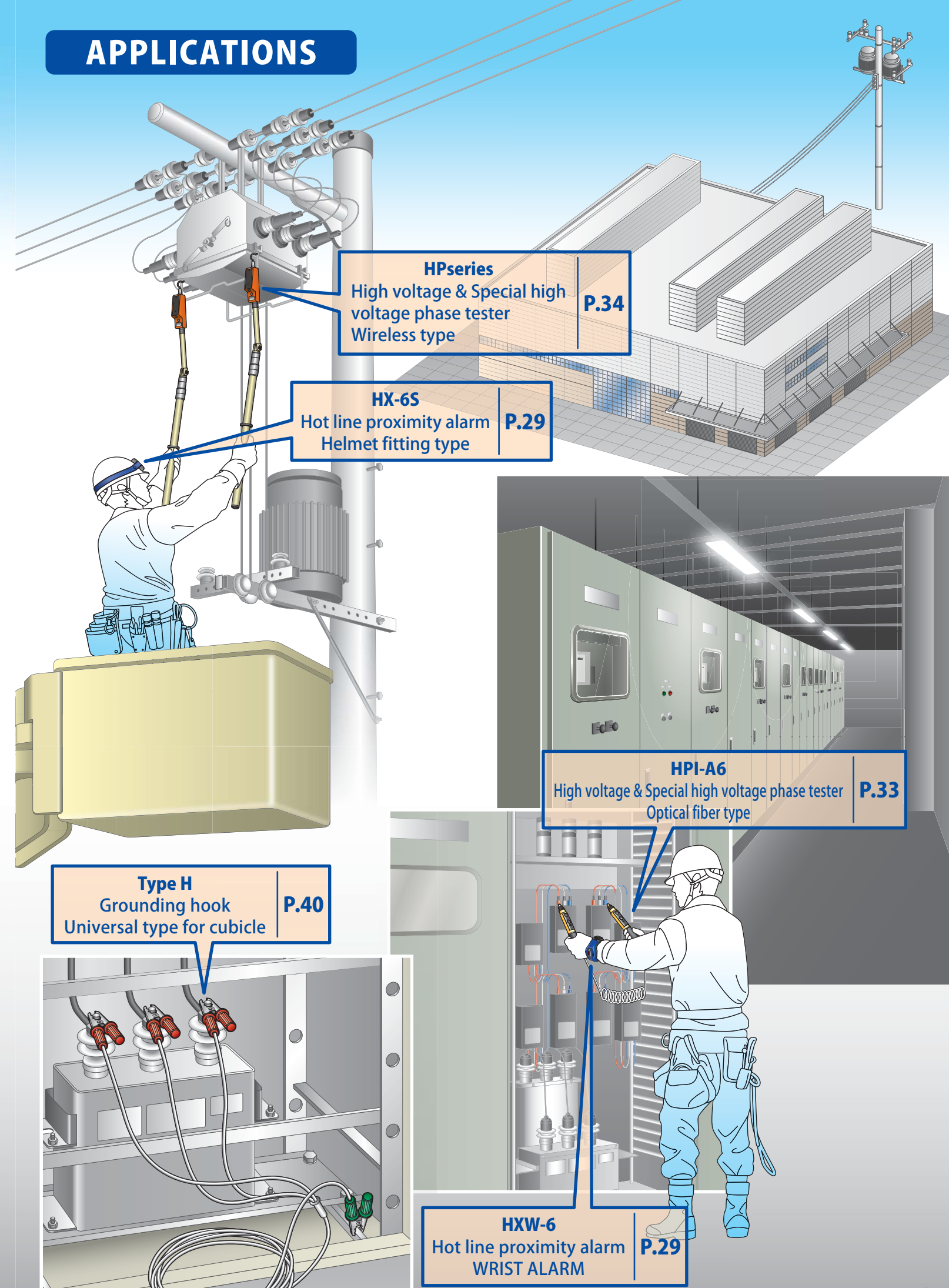


- ⑦ Connect tip metal fitting to Line 1
Connect tip metal fitting to Line 2
Connect tip metal fitting to Line 3
* Connect all 3 lines

APPLICATIONS

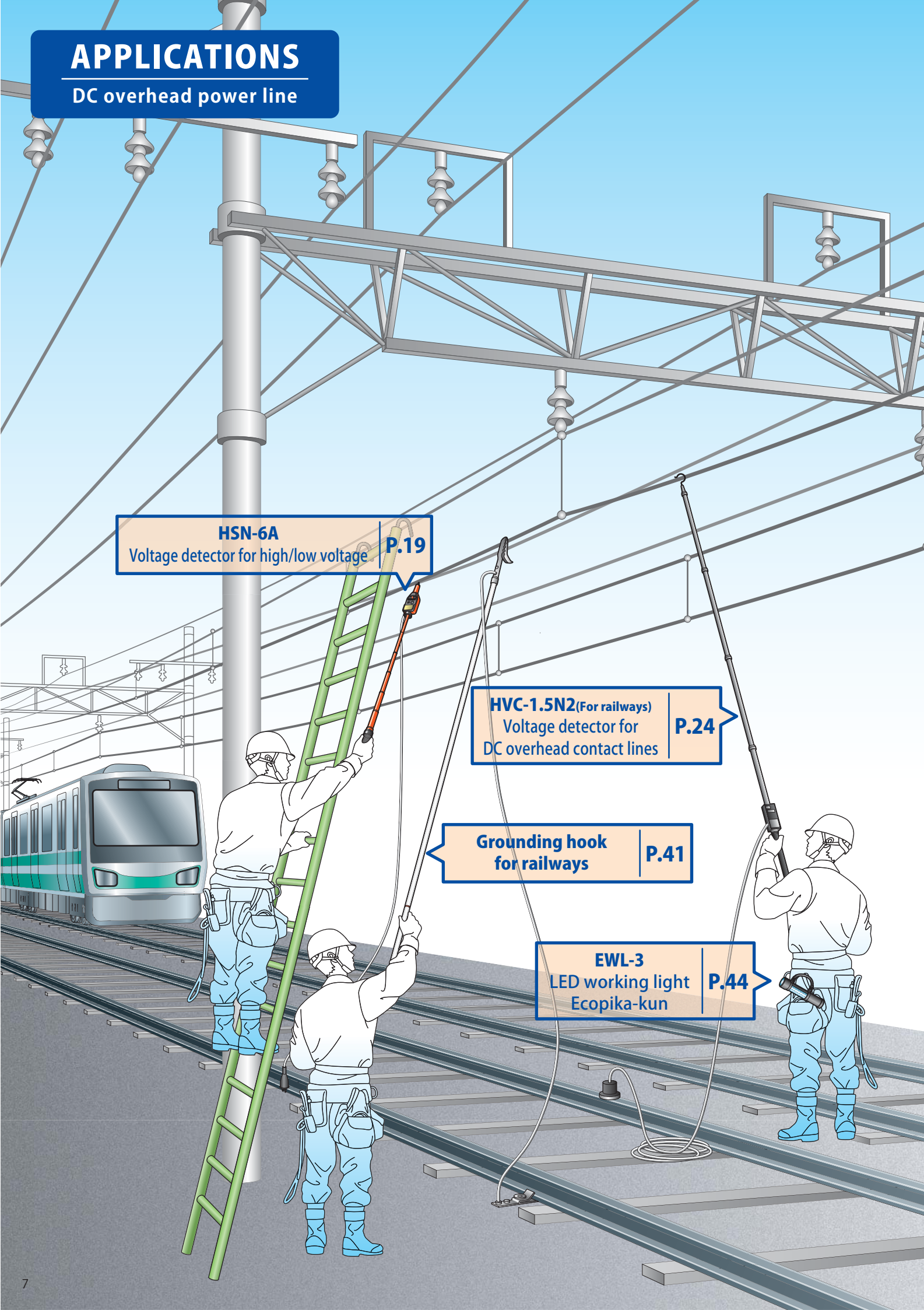


APPLICATIONS



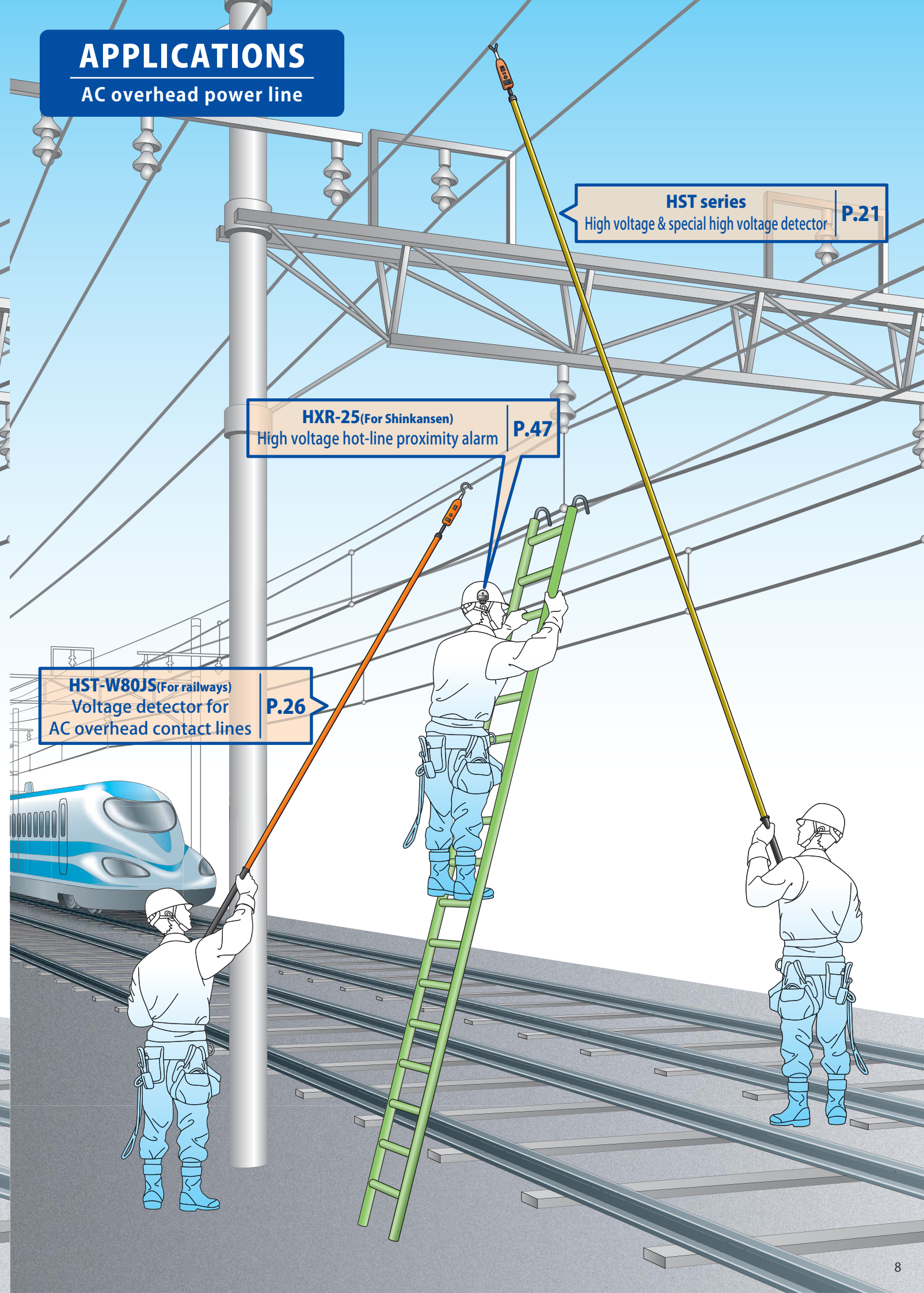
APPLICATIONS

DC overhead power line



APPLICATIONS

AC overhead power line



①

HTE-610-Y/M/I

②

Low voltage detector

volcheck[®]

③

AC 50~600V

④

Audio signaling and light emitting

Contact tip Conductive rubber

Sensitivity adjustment

Voltage detection through covering (sheath)

CE

RoHS

Color code

HTE-610-□

Y: Yellow/M: Marine blue/I: Ivory

■ Features

• Conductive rubber provides a high level of safety

Conductive rubber is adopted for Contact tip, which prevents accidents due to a short-circuit.

• It is possible to adjust sensitivity.

It is possible to use it according to the intended purpose, by adjusting the sensitivity volume knob.

• A detector with minimum sensitivity variance between bare and covered parts is adopted.

■ Dimensions

130

22

23

Contact tip

Light indicator

Sound emission part

Test button

Clip(grip)

⑤

■ Specifications

Working voltage range	50 VAC to 600 VAC common use for 50/60 Hz
Operation starting voltage (Voltage to ground)	Adjustable detection sensitivity At shipment from the factory (default): 40 VAC ± 10 VAC (In state with detector making contact with the company's standard insulated wire (600 V – IV, 2 mm2))
Battery	LR44(1.5V) × 2 pcs
Life of the battery	New battery : In continuous operation About 10 hours : In storage 1.5 years
Weight	22g (including batteries)

* Without the casing

HTE-610-M (Marine blue)

HTE-610-Y (Yellow)

HTE-610-I (Ivory)

①Product type

②Product name

③Working voltage range

④Sign

Audio signaling and light emitting

Action is notified by sound and light.

AC DC

AC DC

The product accepts AC and DC.

Telescopic type

The operating rod is telescopic.

CE

This marking is for products for the European unified market, and conforms to the New approach directive.

Contact tip Conductive rubber

Detector made of conductive rubber prevents accidents due to short-circuits.

Voltage detection through covering (sheath)

Voltage can be detected through insulating sheath. (However, it is not possible with shielded cables.)

Waterproof

It has a water-resistant structure.

RoHS

The product conforms to the RoHS directive.

Contact tip Replaceable

Individual detectors are sold as options, and are replaceable.

*AC only

Voltage detection through the cover *AC only

Voltage detection of DC is not possible through the cover.

Battery-less

No battery is used for operation.

Sensitivity adjustment

Sensitivity can be adjusted by turning the volume knob.

LED lighting

LED light is turned on for illumination, and it is possible to light the target of voltage detection.

Auxiliary device for voltage detection

This product can be used to assist voltage detection work, but is not used as a voltage detector.

⑤Life of the battery ----- Because the battery attached to the product is only for testing purposes, this shall not apply.

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Retrieving voltage detector (for each voltage range)

For low to high voltages

Model	Feature	Voltage						Listed page
		0V	50V	100V	600V	7000V	20000V	
HTE-610				AC50~600V				13
HTE-610L	With LED lighting			AC50~600V				13
HT-680D/DS				AC50~600V				15
				DC50~600V				
HT-680DB/DBS				AC50~600V				15
				DC12~600V				
HT-670	Voltage discrimination function of 100 V-200 V (* When option is used)			AC50~600V				15
				DC50~600V				
HSF-7				AC80~7000V				17
HSE-7G				AC60~7000V				20
HSE-7T1				AC80~7000V				17
HSS-25B	Telescopic type			AC 80 ~ 25,000V				18
HSG-6	Telescopic type			AC80~7000V				18
HSN-6A	Telescopic type			AC100~7000V		~AC10.5kV*	* Applied only at withstand voltage test	19
				DC50~7000V		~DC21kV*		
HST-1.5N					AC600~7000V			19
					DC600~7000V			

For high voltage to special high voltage

Model	Feature	Voltage							Listed page
		3kV	6kV	22kV	66kV	154kV	275kV	500kV	
HST-30	Telescopic type	AC3kV~34.5kV							21
HST-70	Telescopic type			AC20kV~80.5kV					21
HST-170	Telescopic type				AC60kV~195.5kV				21
HST-250	Telescopic type					AC150kV~287.5kV			21
WM-22	Pinwheel type /Telescopic type		AC6.6kV~22kV						22
WM-33	Pinwheel type /Telescopic type		AC6.6kV~33kV						22
WM-77A/B/C	Pinwheel type /Telescopic type			AC11kV~77kV					22
WM-154A/B	Pinwheel type /Telescopic type			AC11kV~154kV					22
WM-275	Pinwheel type /Telescopic type				AC33kV~275kV				22
HS-500							AC250kV~550kV		22
HST-20N		AC3kV~25kV							23
		DC3kV~25kV							
HS-90N			AC6kV~90kV						23
			DC6kV~90kV						

For railways (for overhead contact line)

Model	Feature	Voltage				Listed page
		0V	600V	7000V	20000V	
HVC-1.5N2	Digital display Function for checking earth wire disconnection			DC1500V * Measurement range is 0 to 1999 V		24
HS-1.5NJ				AC6600V		25
				DC600~7000V		
HS-1.5NR	Residual electric charge checking function Standby display function			AC6600V		25
				DC1000~7000V		

Model	Feature	Voltage							Listed page
		3kV	6kV	22kV	66kV	154kV	275kV	500kV	
HST-W80JS	Telescopic type/ Standby display function			AC20kV~80.5kV					26

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HTE-610-Y/M/I

Low voltage detector

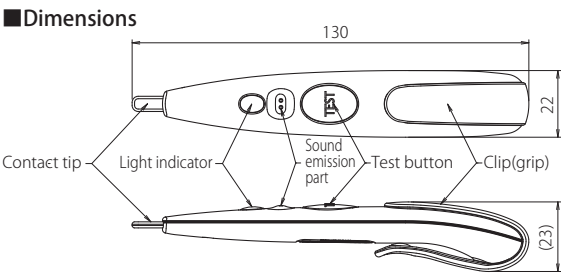
volcheck®

AC 50~600V



Color code HTE-610-□
Y: Yellow/M: Marine blue/I: Ivory

- Features
- Conductive rubber provides a high level of safety
Conductive rubber is adopted for Contact tip, which prevents accidents due to a short-circuit.
 - It is possible to adjust sensitivity.
It is possible to use it according to the intended purpose, by adjusting the sensitivity volume knob.
 - A detector with minimum sensitivity variance between bare and covered parts is adopted.



Standard Model of the Low Voltage Detector



■Specifications

Working voltage range	50 VAC to 600 VAC common use for 50/60 Hz
Operation starting voltage (Voltage to ground)	Adjustable detection sensitivity At shipment from the factory (default): 40 VAC ± 10 VAC (In state with detector making contact with the company's standard insulated wire (600 V – IV. 2 mm2))
Battery	LR44(1.5V) × 2 pcs
Life of the battery	New battery : In continuous operation About 10 hours : In storage 1.5 years
Weight	22g (including batteries)

* Without the casing

HTE-610L-R

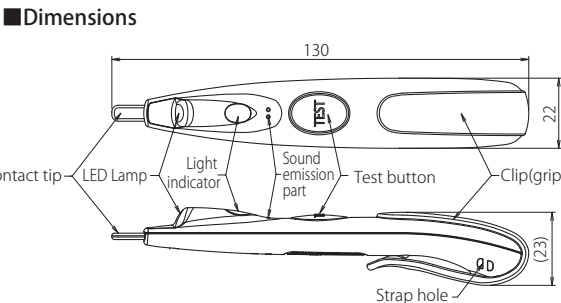
Low voltage detector

volcheck®

AC 50~600V



- Features
- The LED light is provided with an auto power-off function.
There is no risk of the battery draining if the user forgets to turn off the instrument.
 - The LED light can also be used to check the residual life of the battery.
When the residual life of the battery becomes low, the LED lamp does not light. Therefore, replace the battery.



■Specifications (Those relating to LED light portion; The basic specification is same as that of HTE-610.)

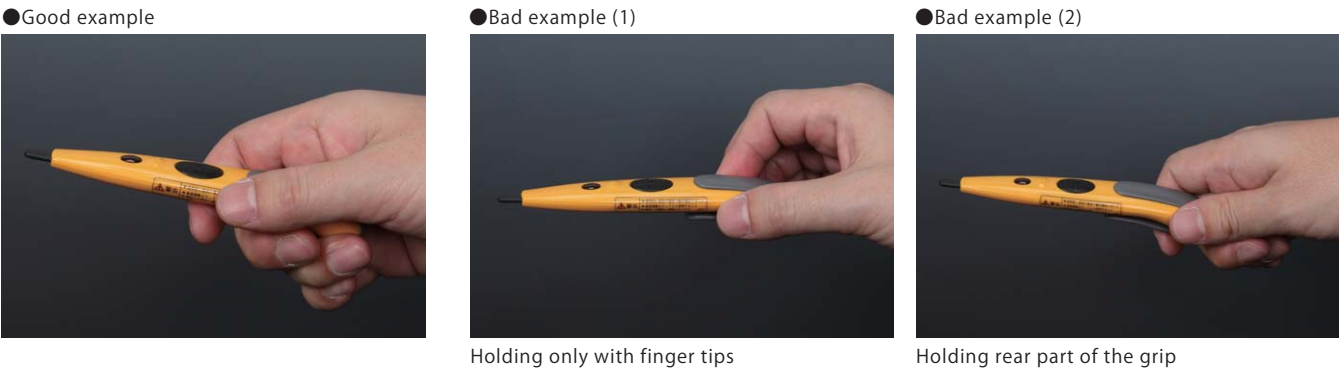
Lighting	Each time the test button is pressed, the light repeats ON and OFF operation. It turns off automatically after approx. 30 sec (auto power-off function). * The voltage detector operates regardless of whether or not the light is ON/OFF.
Life of the battery	New battery : In continuous operation About 10 hours (with LED OFF) About 5 hours (with LED ON) : In storage 1.5 years
Weight	22g (including batteries)

* Without the casing

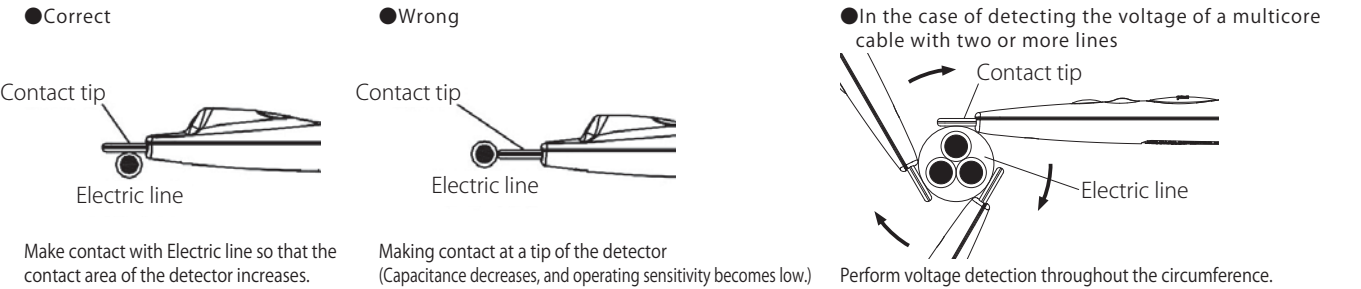
How to use the voltage detector for AC low voltages

■Perform voltage detection while holding the grip firmly.

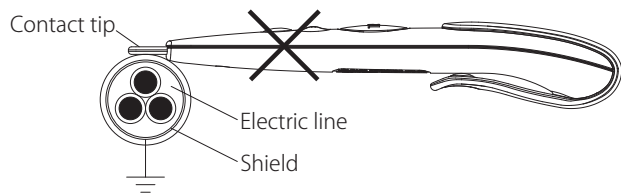
The contact area with the hand affects the sensitivity of the low voltage detector. So, appropriate sensitivity cannot be obtained unless it is held firmly.



■How to make contact with the detector



■Voltage detection for shielded cables is not possible.



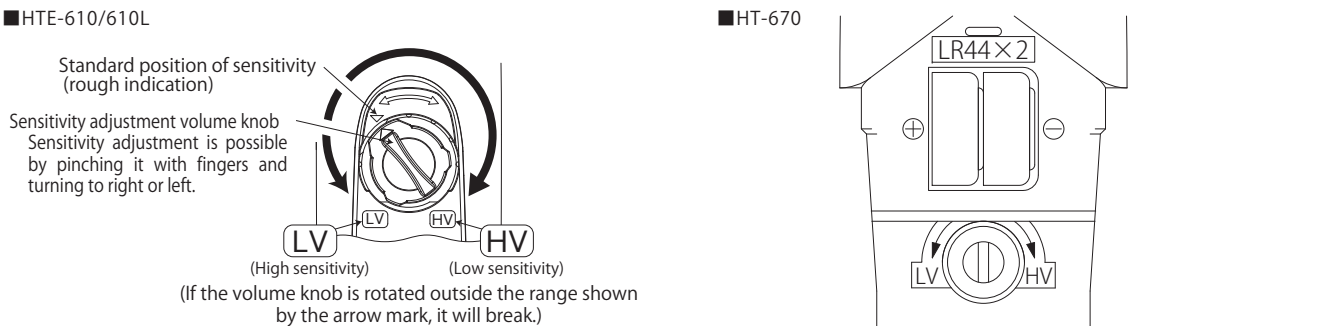
The voltage detector does not operate because the shielding (conduction shielding layer) is grounded.

■Sensitivity adjustment (Applicable products: HTE-610, HTE-610L, HT-670) * Sensitivity adjustment is to be done with the volume knob after detaching the clip.

The products are adjusted to the standard sensitivity at shipment (as default). However, if sensitivity adjustment is required, such as: “Although confirmation of voltage from outer surface of the cable is required, the product does not operate,” “It is required to reduce the influence of induction voltage,” etc., perform the adjustment.

When the volume knob is turned to the LV side (left turn), sensitivity increases (responds with lower voltage), and when turned to the HV side (right turn), sensitivity decreases (responds with higher voltage).

* The volume knob can be turned only about half a rotation. Overturning may cause damage.
* Pay attention to excessively high or low sensitivities. If it is excessively high, there is a risk that an accurate judgment will not be possible, because the product responds to miniature voltage, static electricity, etc.



HT-680D/DS/DB/DBS

Low voltage detector

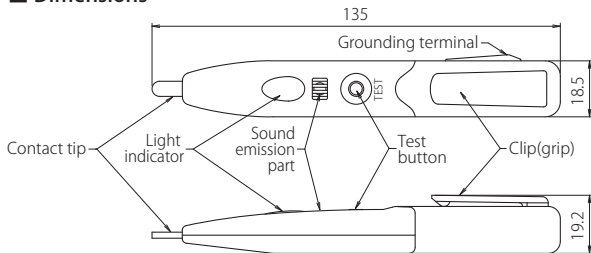
AC 50~600V

DC HT-680D/DS: 50~600V
HT-680DB/DBS: 12~600V



- Features
- Contact tip is available in of two types: conductive rubber and metal.
 - Operation starting voltage at DC consists of two types: from 12 V and from 50 V.

■ Dimensions



AC/DC Low Voltage Detector (exclusively for use with bare wires)



■ Specifications

Model		HT-680D	HT-680DS	HT-680DB	HT-680DBS
Working voltage range	AC	50~600V			
	DC	50~600V		12~600V	
Contact tip		Conductive rubber	Metal	Conductive rubber	Metal
Frequency		50/60Hz			
Operation starting voltage (Voltage to ground)	AC	30±10V		15±5V	
	DC	35±10V		6±3V	
Operation status display	Light emission	Continuous light emission in red; Verifiable at 8000 Lx			
	Sound volume	Continuous sound; 50dB or more (10cm apart)			
Battery		LR44(1.5V) × 2 pcs			
Life of the battery		About one year with normal use			
Weight		27g(including batteries)			

* Without the casing

HT-670

Low voltage detector

AC 50~600V

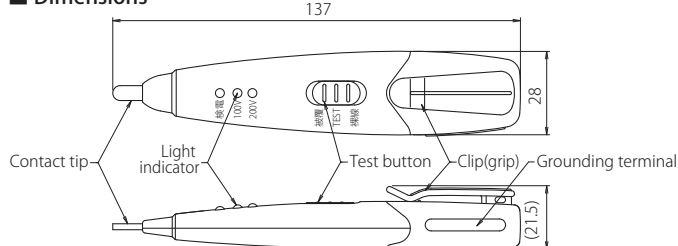
DC 50~600V



- Features
- Sensitivity can be switched depending on the purpose use with the slider switch (bare wire/coated wire switching type)

- Option Grounding wire/DF01027 (open price)
- Possible issues when using the optional grounding wire:
- Voltage discrimination function (discrimination of 100 V, 200 V)
 - Prevents unnecessary operation due to reverse induction voltage (Grounding wire is to be grounded.)

■ Dimensions



Ideal for Installation Work for Photovoltaic Facilities



■ Specifications

			Without lead wire	With lead wire		
Working voltage range		AC	50~600V			
		DC				
Frequency			50/60Hz			
Operation starting voltage (Voltage to ground)	Coated wire (sheathed wire)	AC	40 V with insulated wire (IV. 2 mm2) (intermittent operation)			
		DC	—			
	Bare wire	AC	30 ± 15 V (continuous operation)			
		DC				
	(At connection of lead wire)	AC	—	100 V LED light	30 V ± 20 V (continuous operation)	
		DC		200 V LED light	140 V ± 30 V (continuous operation)	
Battery			LR44(1.5V) × 2 pcs			
Life of the battery			About one year with normal use			
Weight			26g (except for lead wire)			

* Without the casing

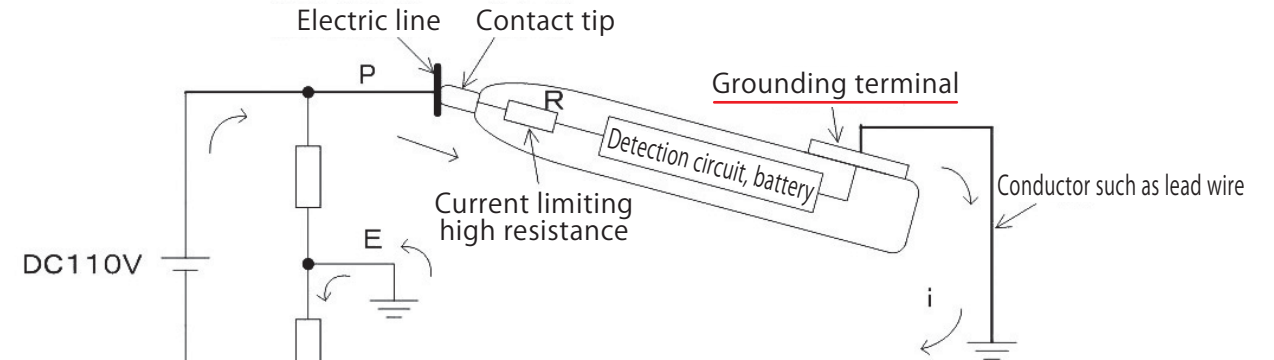
How to use the voltage detector for a DC low voltage

(For AC, refer to P.8.)

■ Points to note for DC voltage detection

When carrying out voltage detection with a DC circuit, the current does not flow through the capacitance, unlike the case of an AC circuit. Therefore, voltage detection becomes possible by making the detector contact an exposed part of the cableway (* (1)), then creating a closed circuit (* (3)) by connecting the earth terminal to the ground (* (2)) and applying direct current.

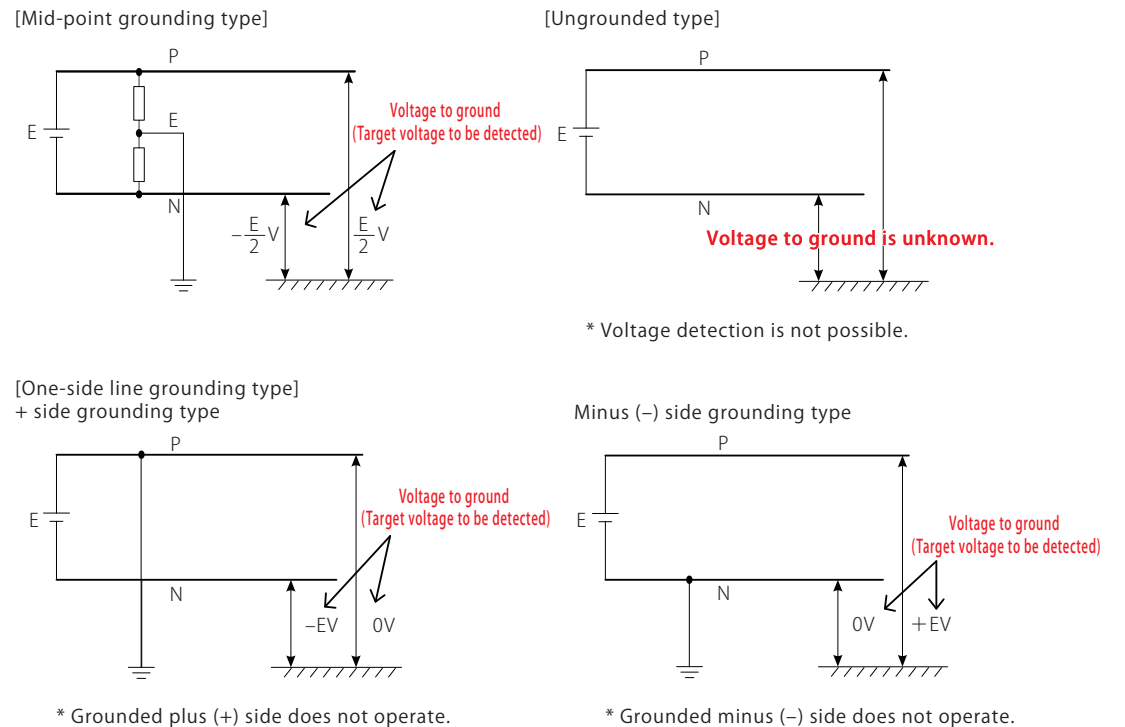
- (1) Voltage detection is not possible through the covering. (Direct contact of detector with exposed live part is necessary.)
- (2) It is necessary to ground the detection terminal with a conductor, such as a lead wire (option of HT-670) and/or the hand not holding the voltage detector, etc.



The contact tip makes contact with the exposed live part, and the grounding terminal is connected to the ground. A closed circuit is formed, and a miniature direct current flows.

- (3) Because the voltage to the ground (target voltage to be detected) differs depending on the wiring and grounding method, it is necessary to securely hold the cableway whose voltage is to be detected. Voltage detection with an ungrounded circuit is not possible.

* However, when the lead wire of HT-670 is used, the line voltage can be detected.
(Pay sufficient attention to the handling of lead wires. If they come off during use, there is a risk of electric shock and/or short-circuit.)



Index etc.

Voltage detector

Voltage detector for high/low voltage

AC 80~7000V

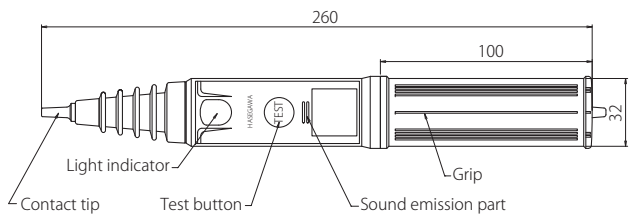


- Features
- High voltage and low voltage can be discriminated with the operating (sound, light) indication.

Operation at low voltage is indicated by intermittent sound & light, and at high voltage by continuous sound & light.

• Feeling of stable grip

■ Dimensions



Standard Model for High Voltage of 6 kV



■ Accessory



Storage case

■ Specifications

Working voltage range	AC80~7000 V	
Operation starting voltage (Voltage to ground)	Low voltage	Exposed live part 80 V (in contact with live part)
	High voltage	Exposed live part 400 V (in contact with live part)
	Insulated wire	(φ 5 mm2 OE wire) 3,000 V
Frequency	50/60Hz	
Insulation resistance	100 MΩ or more between detector and grip	
Dielectric strength	20 kV for 1 min between contact tip and grip	
Leakage current	1 mA or more at dielectric strength test	
Battery	R03(1.5V) × 2 pcs	
Life of the battery	About 6 hr. under continuously operating state (with new battery)	
Operating temperature range	- 10℃ ~ + 40℃	
Weight	About 150 g	

HSE-7T1

Voltage detector for high/low voltage

AC 80~7000V



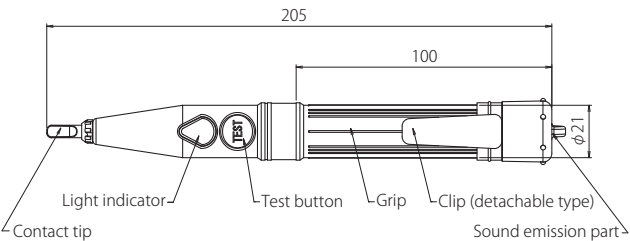
- Features
- Size allows it to be kept in a breast pocket of a working uniform

• The contact tip made of conductive rubber is replaceable.

• High voltage and low voltage can be discriminated with the operating (sound, light) indication.

Operation at low voltage is indicated by intermittent sound & light, and at high voltage by continuous sound & light.

■ Dimensions



Compact, Lightweight, and Convenient to Carry



■ Option



Storage case (DA04003)



Contact tip for replacement (UH05004)

■ Specifications

Working voltage range	AC80~7000 V	
Operation starting voltage (Voltage to ground)	Low voltage	Exposed live part 80 V (in contact with live part)
	High voltage	Exposed live part 400 V (in contact with live part)
	Insulated wire	(φ 5 mm2 OE wire) 3,000 V
Frequency	50/60Hz	
Dielectric strength	20 kV for 1 min between contact tip and grip	
Leakage current	0.5 mA or less at dielectric strength test	
Battery	LR44(1.5V) × 2 pcs	
Life of the battery	3 hr. in continuously operating state; about 2 years in unused state	
Operating temperature range	- 10℃ ~ + 40℃	
Weight	About 55 g	

HSS-25B

Voltage detector for high/low voltage

AC 80~25000V

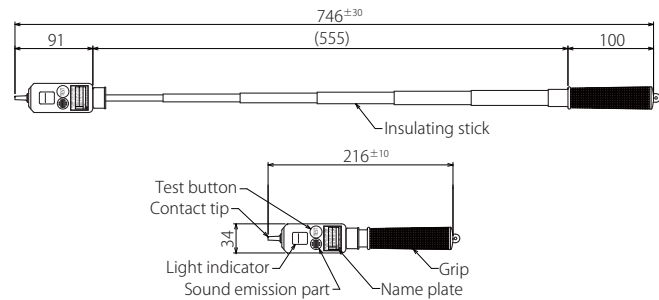


■ Features

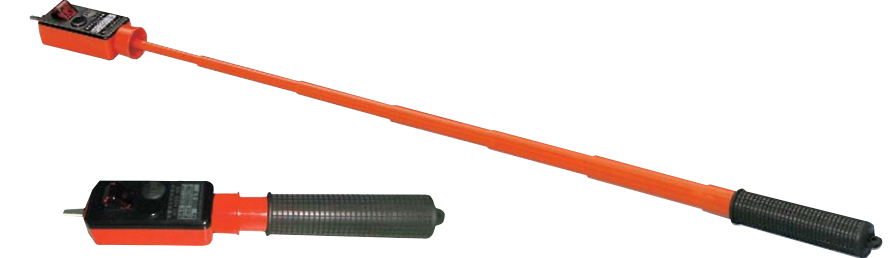
- Voltage detection from a remote place is possible by extending it

* Low voltage cannot be detected in the extended state.

■ Dimensions



Standard Model of Telescopic Type for High Voltage



■ Accessory



Storage case

■ Specifications

Working voltage range	AC80~25000 V	
Operation starting voltage (Voltage to ground)	Low voltage	Bare wire : AC 80V or below (Detect holding nameplate portion)
	High voltage	Bare wire (φ 3mm) : AC 250V ± 50V OC wire (φ 5mm) : AC 1000V ± 200V (Detect holding the grip)
Frequency	50/60Hz	
Dielectric strength	Between contact tip and grip: Shortened state 20 kVAC, 1 min Between contact tip and name plate portion: 4 kVAC, 1 min	
Leakage current	0.1 mA or less at dielectric strength test	
Battery	LR44(1.5V) × 2 pcs	
Life of the battery	8 hr. in continuously operating state; about 1.5 years in unused state	
Operating temperature range	- 10℃ ~ + 40℃	
Weight	About 130 g	

HSG-6

Voltage detector for high/low voltage

AC 80~7000V



■ Features

- Ultra-compact and lightweight, weighing 85 g

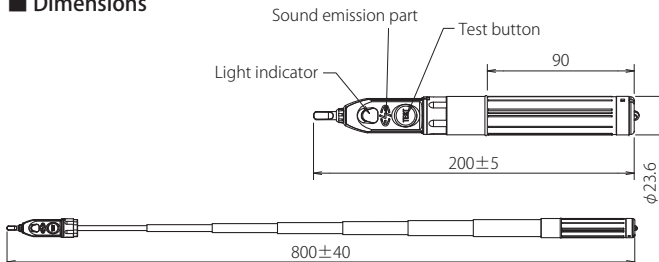
• The contact tip made of conductive rubber is replaceable.

• High voltage and low voltage can be discriminated with the operating (sound, light) indication.

Operation at low voltage is indicated by intermittent sound & light, and at high voltage by continuous sound & light.

* Low voltages cannot be detected at the extended state.

■ Dimensions



Lightweight and Compact Telescopic Type



■ Option



Storage case (DA04003)



Contact tip for replacement (UH05003)

■ Specifications

Working voltage range	AC80~7000 V	
Operation starting voltage (Voltage to ground)	Low voltage	Exposed live part 80 V (Operating rod is at a shortened state.)
	High voltage	Exposed live part 400 V (Operating rod is at a shortened state.)
	Insulated wire	(φ 5 mm2 OC wire) 3,400 V
Frequency	50/60Hz	
Dielectric strength	Between contact tip and grip: Shortened state 20 kVAC, 1 min	
Leakage current	0.5 mA or less at dielectric strength test	
Battery	LR44(1.5V) × 2 pcs	
Life of the battery	8 hr. in continuously operating state; about 1.5 years in unused state	
Operating temperature range	- 10℃ ~ + 40℃	
Weight	About 85 g	

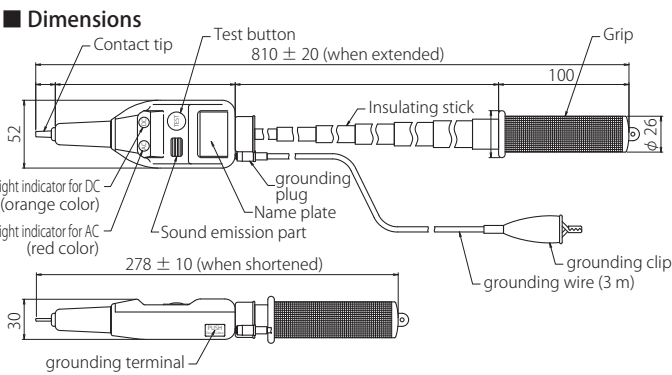
HSN-6A

Voltage detector for high/low voltage

AC 100 to 7000 V (at withstand voltage test of 10.5 kV)
DC 50 to 7000 V (at withstand voltage test of 21 kV)

Audio signaling and light emitting
Telescopic type
AC DC
Waterproof

- Features
- It can be used for withstand voltage tests with high-voltage equipment. It can be used up to 10.5 kVAC, 21 kVDC, only for application of withstand voltage test.
 - Discrimination function between AC and DC
 - Checking residual electric charge and electric discharge are possible. (Refer to P.50.)



Suitable for the Work of Withstand Voltage Test

■ Accessory



■ Specifications

Working voltage range	Without grounding wire	AC	100 V to 600 V (Voltage detection by touching the name plate with a hand)
	With grounding wire	AC	3 kV to 7 kV (With extended insulating stick)
		DC	50 V to 7000 V (Usable up to 10.5 kV for withstand voltage test)
		DC	50 V to 7000 V (Usable up to 21 kV for withstand voltage test)
Frequency (AC)	50/60Hz		
	Between contact tip and name plate	4 kVAC, 1 min, 1 mA or less	
	Between contact tip and grip	(Insulating stick: Shortened) 20 kVAC, 1 min, 100 μA or less	
	Between contact tip and grip	(Insulating stick: Extended) 50 kVAC, 1 min, 100 μA or less	
Leakage current	Between contact tip and grounding clip	26 kVAC, 1 min, 1 mA or less	
	Between core of the grounding plug and outside the covering	22 kVDC, 1 min	
Battery		LR44(1.5V) × 2 pcs	
Operating temperature range		-10°C ~ +50°C	
Weight		About 290 g	

HST-1.5N

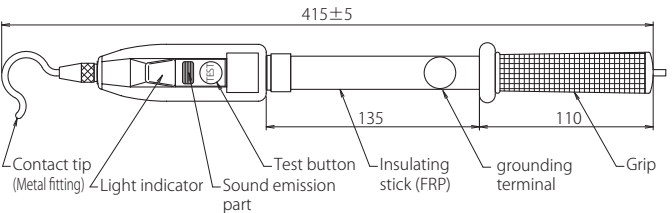
High voltage detector

AC 600~7000V
DC 600~7000V

Audio signaling and light emitting
AC DC
Waterproof

- Features
- With 7-m earth wire

■ Dimensions



Robust and Lightweight Design Using FRP for Insulating Stick

■ Accessory



■ Specifications

Working voltage range	AC	600V~7000V
	DC	
Frequency		50/60Hz
Dielectric strength		Between contact tip and grounding terminal 14000 VAC, 5 min
Leakage current		1 mA or less at dielectric strength test
Battery		LR44(1.5V) × 2 pcs
Life of the battery		4 hr. under continuously operating state
Operating temperature range		-10°C ~ +40°C
Weight		About 340 g (main body only)

HSE-7G

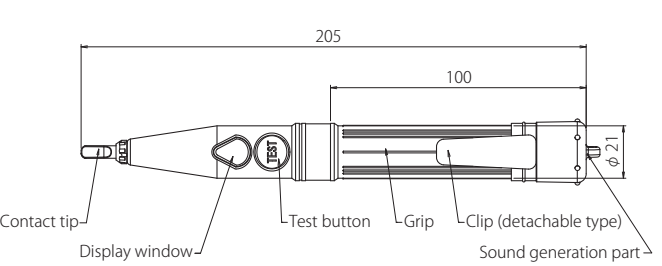
Voltage detector for high/low voltage

AC 60~7000V

Audio signaling and light emitting
Contact tip Conductive rubber
Contact tip Replaceable
Waterproof

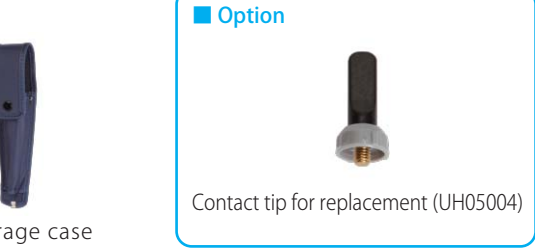
- Features
- Specification for communication; can be used from a working voltage range of 60 VAC
 - It is the successor of HSC-7G (certified product of NTT's specification)

■ Dimensions



Suitable for Work when Climbing Telecommunication Masts.

■ Accessory



■ Specifications

Working voltage range		AC60V~7000V
Operation starting voltage (Voltage to ground)	Low voltage	Exposed live part 60 V (in contact with live part)
	High voltage	Exposed live part 400 V (in contact with live part)
Frequency		50/60Hz
Dielectric strength		20 kV for 1 min between contact tip and grip
Leakage current		0.5 mA or less at dielectric strength test
Battery		LR44(1.5V) × 2 pcs
Life of the battery		3 hr. in continuously operating state; about 2 years in unused state
Operating temperature range		-10°C ~ +40°C
Weight		About 55 g

HSN-6N

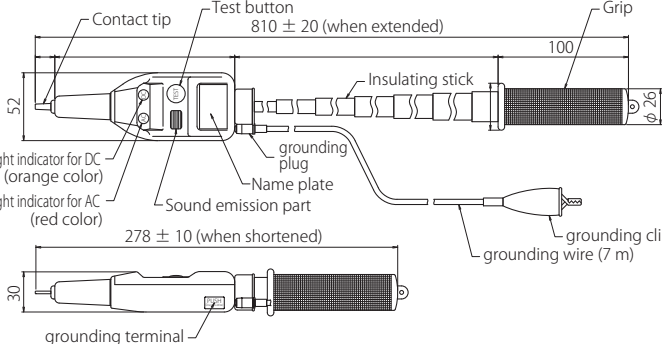
Voltage detector for high/low voltage

AC 60~7000V

Audio signaling and light emitting
Telescopic type
Waterproof

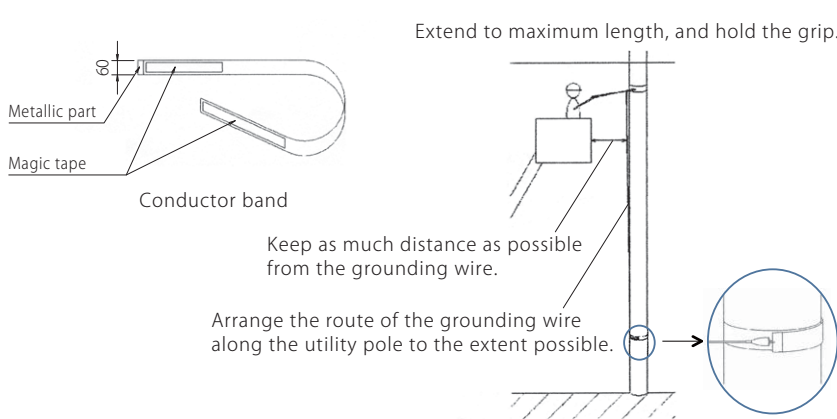
[Precaution]
This is a product supports special applications.
For details, please inquire at our sales department.

■ Dimensions



Voltage Detector to Be Used on Bucket Cars

■ Accessory



■ Specifications

Working voltage range		AC60V~7000V
Operation starting voltage		35 VAC ± 7 V (in the state with grounding clip connected to the ground)
Frequency		50/60Hz
Dielectric strength		20 kV for 1 min between contact tip and grip
Leakage current		100 μA or less at dielectric strength test
Battery		LR44(1.5V) × 2 pcs
Operating temperature range		-10°C ~ +50°C
Weight		About 290 g (main body only)

For low voltage

For high & low voltage

For high voltage

For high & special high voltage

For special high voltage

For AC

For DC

For AC & DC

For communication

For railways

Index etc.

Voltage detector

Voltage detector checker

Auxiliary device for voltage detection

Phase tester

Grounding hook

Discharge stick

Discone hook stick

Illuminator

Measuring instrument

Railway products

Relay

Information materials

HST series

HST-30/HST-70/HST-170/HST-250

High voltage & special high voltage detector

AC

HST-30

3kV~34.5kV

HST-70

20kV~80.5kV

HST-170

60kV~195.5kV

HST-250

150kV~287.5kV

Audio signaling and light emitting

Telescopic type

Waterproof

■ Features

• FRP is used for the insulating stick. It is of lightweight and has outstanding operability.

• Tip metal fitting consists of a shock-absorbing spring.

■ Dimensions

Variable up to 50° in all directions

312

846

512

HST-30

Variable up to 50° in all directions

2,260

1,325

695

HST-70

Variable up to 50° in all directions

3,145

1,290

717

HST-170

Variable up to 50° in all directions

5,055

1,295

HST-250

■ Accessory

Bag for housing

HST-30

(Shortened state)

HST-170

(Shortened state)

■ Operating rod can be changed to a longer one. (* Changing to a shorter one is not possible from the viewpoint of safety.)

	Standard product	Model after changing the operating rod		
		Changed to operating rod of HST-70 (2,260 mm)	Changed to operating rod of HST-170 (3,145 mm)	Changed to operating rod of HST-250 (5,055 mm)
Model	HST-30	HST-30G	HST-30H	HST-30J
	HST-70	—	HST-70H	HST-70J
	HST-170	*	—	HST-170J

■ Specifications

Model	HST-30	HST-70	HST-170	HST-250
Working voltage range	AC 3kV~34.5kV	20kV~80.5kV	60kV~195.5kV	150kV~287.5kV
Operation starting voltage (Voltage to ground)	Bare wire 500V±20% φ5 mm2-OC wire 3 kV or less	3kV±20%	10kV±20%	20kV±20%
Frequency	50/60Hz			
Dielectric strength	Contact tip – Grip 70 kVAC, 1 min	Insulating stick 75 kVAC/300 mm, 1 min (following positions except for the electrode and joint portions)		
		3 locations	6 locations	8 locations
Leakage current	100 μA or less at dielectric strength test/1 position			
Battery	LR44(1.5V) × 2 pcs			
Life of the battery	About 4 hr. under continuously operating state			
Operating temperature range	-10℃~+50℃			
Weight	About 340 g	About 530 g	About 600 g	About 1030 g

Serialized from High Voltage to Special High Voltage

Lightweight and Easy to Use

Because the angle at the detector is adjustable, it can be set up so that the light emission is easy to see. (HST-70、HST-170、HST-250)

For low voltage

For high & low voltage

For high voltage

For high & special high voltage

For special high voltage

For AC

For DC

For AC & DC

For communication

For railways

Index etc.

Voltage detector

Voltage detector checker

Auxiliary device for voltage detection

Phase tester

Grounding hook

Discharge stick

Discone hook stick

Illuminator

Measuring instrument

Railway products

Relay

Information materials

HS-500

Special high voltage detector

AC

250k~550kV

Audio signaling and light emitting

Telescopic type

Waterproof

■ Features

• This voltage detector can handle the maximum voltages used in Japan

• Sound and light indications can even be confirmed outdoors in daytime, and when there are high levels of ambient noise.

■ Dimensions

7090

2490

1050

■ Accessory

Bag for housing

■ Specifications

Working voltage range	AC250kV~550kV
Operation starting voltage (Voltage to ground)	20 kVAC ± 20% (in contact with exposed live part)
Dielectric strength	Insulation pole 75 kVAC/300 mm, 5 min
Leakage current	100 μA or less at dielectric strength test/1 position
Battery	6R61 or 6F22(9V) × 1 pcs
Operating temperature range	-10℃~+50℃
Weight	About 4.5 kg

Voltage Detector for 500 kV Electric Power Transmission Lines

Contact tip (Metal fitting): Spring

WM series

WM-22/WM-33/WM-77A/WM-77B

WM-154A/WM-77C/WM-154B/WM-275

Pinwheel type voltage detector

AC

6.6k~275kV

Telescopic type

Waterproof

Battery-less

■ Features

• Battery-less voltage detector that operates by energy of the target of voltage detection

■ Specifications

Model	Working voltage range	Total length (when extended)	Contact tip (Metal fitting)
WM-22	AC6.6 ~ 22kV	1.3m	Spring
WM-33	AC6.6 ~ 33kV	1.9m	
WM-77A	AC11 ~ 77kV	1.9m	
WM-77B	AC11 ~ 77kV	2.3m	
WM-77C	AC11 ~ 77kV	3.4m	
WM-154A	AC11~154kV	2.8m	
WM-154B	AC11~154kV	3.7m	
WM-275	AC33~275kV	4.5m	

Made by Fukuden Seisakusho

21

22

HST-20N

High voltage & Special high voltage detector

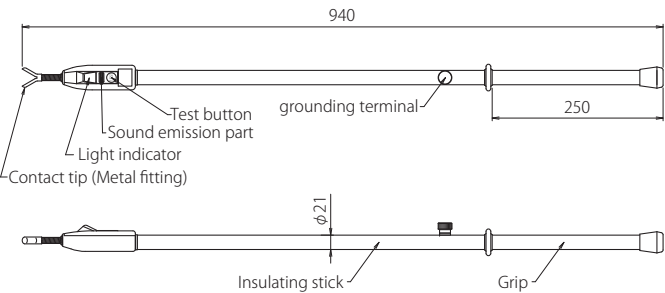
AC 3k~25kV
DC 3k~25kV



■ Features

- New model that is lightweight type of HS-20N

■ Dimensions



Voltage Detector of Dual Use for AC/DC



■ Accessory



Bag for housing



grounding wire (7 m)

■ Specifications

Working voltage range	AC	3kV~25kV
	DC	
Operation starting voltage (Voltage to ground)	AC	1000V±20%
	DC	
	Insulated wire	Unusable
Frequency	50/60Hz	
Dielectric strength	Between contact tip (metal fitting) and grounding terminal 50 kVAC, 1 min	
Leakage current	0.5 mA or less at dielectric strength test	
Battery	LR44(1.5V) × 2 pcs	
Life of the battery	About 4 hr. in a continuously operating state	
Operating temperature range	-10℃~+40℃	
Weight	About 610 g (main body only)	

HS-90N

High voltage & Special high voltage detector

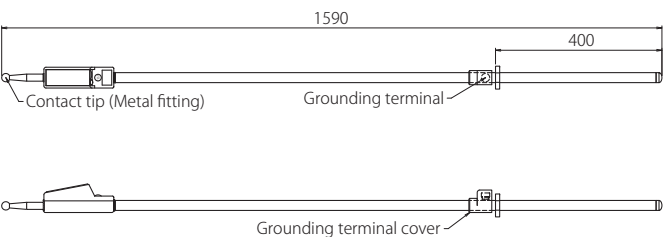
AC 6k~90kV
DC 6k~90kV



■ Features

- It operates over a wide range from high voltages to special high voltages

■ Dimensions



Wide Range Featuring Dual Use for AC and DC



■ Accessory



Bag for housing



grounding wire (7 m)

■ Specifications

Working voltage range	AC	6~90kV
	DC	
Operation starting voltage (Voltage to ground)	AC	1000V±20%
	DC	
	DC	3000V±20%
Frequency	50/60Hz	
Dielectric strength	Between contact tip (metal fitting) and grounding terminal 180 kVAC, 5 min	
Leakage current	1 mA or less at dielectric strength test	
Battery	6R61 or 6F22(9V) × 1 pcs	
Operating temperature range	-10℃~+50℃	
Weight	About 1,400 g (main body only)	

HVC-1.5N2

For railways

Voltage detector for DC overhead contact lines

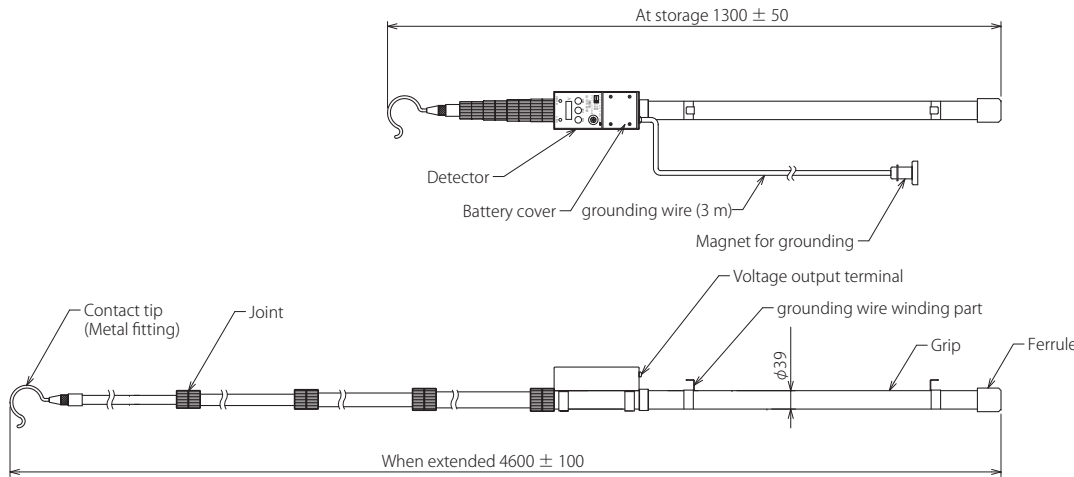
DC 1500V



■ Features

- Function checks for disconnected earth wire
- Voltage measurement function
- Rapidly discharges a residual electric charge
- Voltage detector checker is built in. Because there is a voltage-generating function inside the main body, the voltage detector checker does not require checks prior to use.
- The sound volume of the buzzer is adjustable (High → Medium → Low)
- Dimensions enable horizontal storage in the trunk of mid-sized car

■ Dimensions



■ Specifications

Working voltage range		1500 VDC * Voltage detection of negative potential is not possible.
Operation starting voltage (Voltage to ground)		DC750V±100V
Display	Operation display (charging)	Red LED and buzzer
	Check of earth wire (Earth wire is OK)	Green LED
	Voltage display	Range: 0 VDC to 1999 VDC Resolution: 1 V, Accuracy: Within ± 50 V
Volume adjustment for buzzer sound		Each time when the sound volume push-button switch is pressed, the cycle of High → Medium → Low → High ----- is repeated. Sound volume at a distance of 1 m High: 75 dB or more Medium: 55 to 70 dB, Low: 50 dB or less
Output voltage at test		DC1000V±200V
Dielectric strength		Contact tip (Metal fitting) – Grounded part 4 kVAC, 1 min
Leakage current		1 mA or less at dielectric strength test
Battery		R6 or LR6(1.5V) × 4 pcs
Operating temperature range		0℃～+50℃
Weight		About 4 kg

■ Accessory

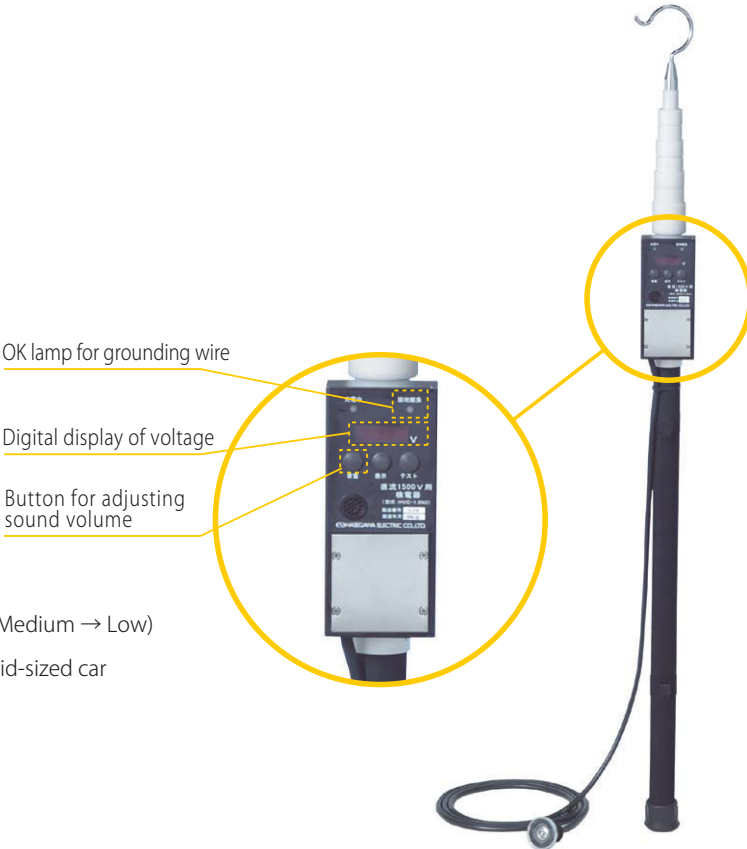


Bag for housing



Lead wire for test

Voltage Detector for 1500 VDC Overhead Contact Lines Visualizes Decreases in Residual Voltage



HS-1.5NJ
HS-1.5NR

High voltage detector

For railways

AC 6600V

DC HS-1.5NJ: 600~7000V
HS-1.5NR: 1000~7000V

Audio signaling and light emitting

Telescopic type

AC DC

■ Features

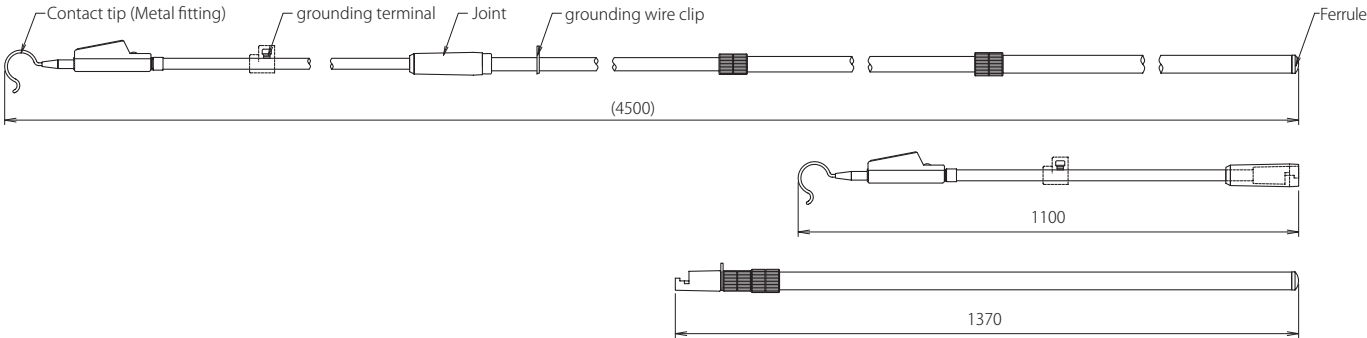
- Regarding the grounding system, HS-1.5NJ is a clip type, and HS-1.5NR is a magnet type.
- It can discriminate the discharge state of residual electric charge after electric power outage. (HS-1.5NR)

Operation display (HS-1.5NR)		Green LED		Red LED and buzzer	
DC	AC	Lighting	Flashing	Lighting	Sound generation
After test and after voltage detection (not charged)		○	—	—	—
Approx. 350 to Approx. 750 V	Approx. 1,000 to Approx. 2,000 V	—	○	—	—
Approx. 750 V or more	Approx. 2,000 V or more	—	—	○	○

- When the green LED is flashing, a residual electric charge within the range of working voltages is being discharged.
- A stand-by display function is provided. When the test button is pressed, the green LED lights for about 30 sec. (Voltage detection is possible, even if the green LED is turned off.)

○ : Operation
— : No operation

■ Dimensions

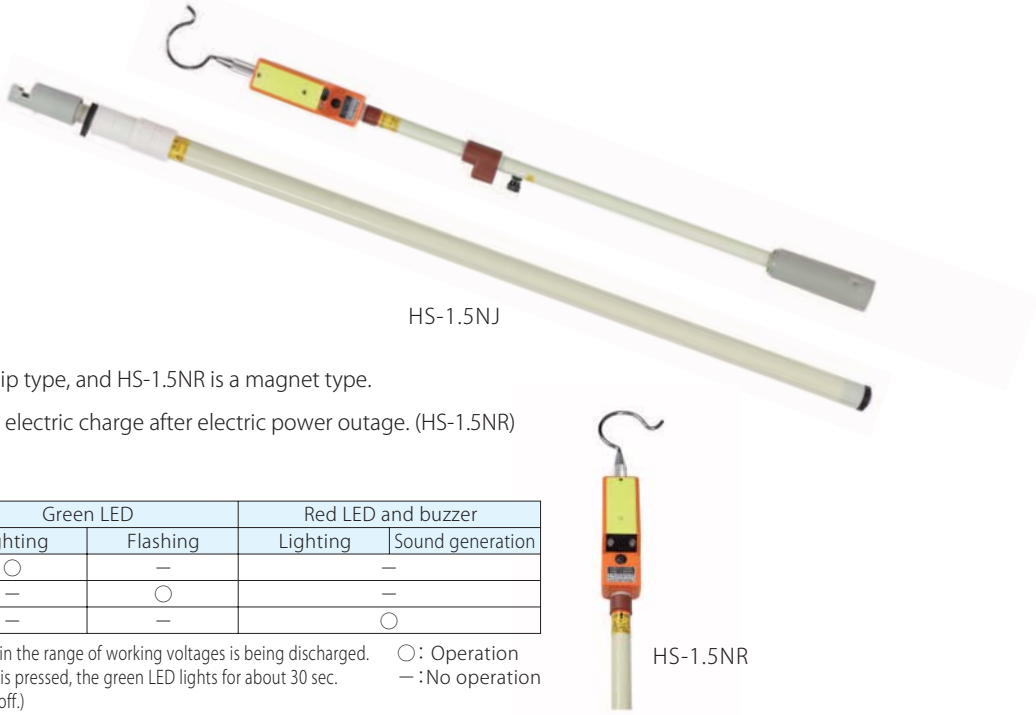


■ Accessory



■ Specifications					
Model		HS-1.5NJ		HS-1.5NJ1	HS-1.5NR
Working voltage range	AC	6600V			
	DC	600~7000V	1000~7000V		
Operation starting voltage (Voltage to ground)	AC	2000V±20%			
	DC	400V±20%	DC800V±100V		750 ±100 VDC (Red LED) 350 ± 80 VDC (Green LED flashes.)
Frequency (AC)		50/60Hz			
Grounding system		Clip			Magnet
Indication of operation	Light emission Sound generation	It shall be able to confirm in the luminance of 8,000 lux.			
		Intermittent sound			
Battery		6R61 or 6F22(9V) × 1 pcs			
Accessory		Clip type grounding wire (7 m)			Magnet type grounding wire (7 m)
		Bag for housing			
Weight		About 3,140 g			About 3,150 g
Dielectric strength		Between contact tip (metal fitting) and grounding terminal: 14,000 VAC, 5 min			
Leakage current		Leakage current at dielectric strength test: 1 mA or less			

Voltage Detector of Dual Use with DC Overhead Contact Line and 7 kVAC



HST-W80JS

Voltage detector for AC overhead contact lines

For railways

AC 20kV~80.5kV

Audio signaling and light emitting

Telescopic type

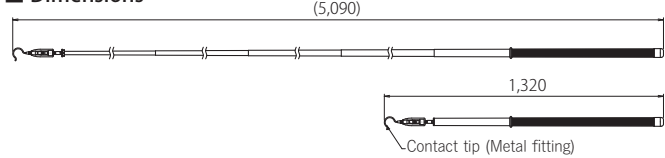
Waterproof

■ Features

- Standby display function is provided. The green LED lights when the test button is pressed and after detecting a voltage. * The green LED is turned off automatically after 1 to 2 min. Voltage detection is possible even after it is extinguished (when there is no problem related to remaining battery life).



■ Dimensions



HST-22JX

Induced voltage detecting instrument

For railways

AC 20kV

Audio signaling and light emitting

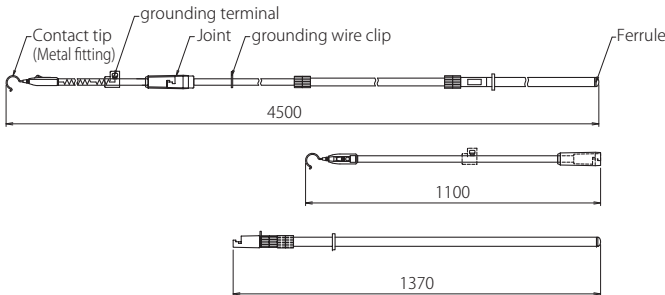
Telescopic type

Waterproof

■ Features

- The operating rod is of a separate type with a three-step telescopic pole and an operating rod with a detecting instrument.

■ Dimensions



Voltage Detector for AC Overhead Contact Lines of Existing Railways and Shinkansen



■ Specifications

Working voltage range	AC20kV~80.5kV
Operation starting voltage (Voltage to ground)	5 kV ± 20% (bare wire)
Frequency	50Hz/60Hz
Indication of operation	It shall be possible to confirm luminance of 8,000 lux.
	50 dB or more at a distance of 2 m
Dielectric strength	Insulating stick 75 kVAC/300 mm, 1 min (6 locations on the insulating stick, except for electrode and joints)
Leakage current	100 μA or less at dielectric strength test/1 location
Battery	LR44(1.5V) × 2 pcs
Life of the battery	About 4 hr. continuous operation
Operating temperature range	−10°C to +50°C (However, there shall be no dew condensation inside.)
Weight	About 1 kg

* HST-W80JS-Y1 (spec. with Y-type Contact tip (Metal fitting) also exists.

Check for Presence or Absence of Induced Voltage at Overhead Contact Line with No-voltage Application

【Attention】

This instrument is not a voltage detector. The product is to be used with a voltage detector by fitting the earth hook, after confirming electric power outage of overhead contact line.

■ Accessory



■ Specifications

Working voltage range	AC20kV
Operation starting voltage (Voltage to ground)	AC50V±20%
Indication of operation	It shall be possible to confirm luminance of 8,000 lux.
	50 dB or more at a distance of 3 m
Battery	LR44(1.5V) × 2 pcs
Operating temperature range	−10°C~+50°C
Leakage current	At dielectric strength test: 1.5 mA or less

* There is also a product for 25 kVAC (for Shinkansen). [Model: HST-25JX]

HLA-1A

Voltage detector checker

Handy Type with Built-in Battery



■Features

- Easy to use at the site
- Checking low/high voltage is possible.
- Compact size and lightweight make it convenient to carry

■Specifications

Output voltage	H terminal ----- 400 VAC L terminal ----- 100 VAC
Output frequency	55Hz ±10Hz
Short-circuit current	0.5 mA or less
Operating temperature range	— 10°C ~ +50°C
Battery	LR03(1.5V) × 4 pcs Life of the battery ----- Total operating time: About 1 hr.
Dimensions	65mm×120mm×40mm
Weight	430g

HLA-2G

Voltage detector checker

Handy Type with Built-in Battery



■Features

- Ideal for checking voltage detectors for communication use

■Specifications

Output voltage	H terminal ----- 1,200 VAC L terminal ----- 70 VAC
Output frequency	55Hz ±10%
Short-circuit current	0.5 mA or less
Operating temperature range	0°C ~ +50°C
Battery	6R61 or 6F22(9V) × 2 pcs Life of the battery ----- Total operating time: About 2 hr.
Dimensions	80mm×150mm×50mm
Weight	700g

HLL-1

Voltage detector checker

Wall Fitting Type for 100 VAC Power Supply



■Features

- Check of high/low voltage detector is possible.
- It is provided with two output terminals, 100 VAC & 400 VAC, and can check various voltage detectors: low voltage, high voltage, and for dual use of high & low voltages.

■Specifications

Output voltage	For low voltage 100 VAC (±10%) For high voltage 400 VAC (±10%)
Input voltage	AC100V
Dielectric withstanding voltage	2 kV, 1 min (between input and earth)
Short-circuit current	1 mA or less
Dimensions	110mm×140mm×46mm
Weight	640g

HLL-6D

Voltage detector checker

Wall fitting type for 100 VAC power supply, for AC/DC



■Features

- Either AC low voltage detector or DC low voltage detector can be checked with one unit.

■Specifications

Output voltage	AC50V (±10%) DC+50V ~ +60V DC-50V ~ -60V
Input voltage	AC100V
Dielectric withstanding voltage	2.0 kV, 1 min (between input and earth)
Short-circuit current	1 mA or less
Dimensions	110mm×140mm×46mm
Weight	600g

HLA-N2

DC voltage detector checker

Handy Type with Built-in Battery



■Features

- Exclusive use for DC high voltage detector (Optimum for HS-1.5NR & HS-1.5NJ voltage detectors)

■Specifications

Output voltage	DC1000V
Load resistance	50 MΩ or more
Short-circuit current	0.5 mA or less
Operating temperature range	— 10°C ~ +50°C
Battery	LR03(1.5V) × 4 pcs
Dimensions	72mm×114mm×45mm
Weight	280g

CL-1-06

Voltage detector checker

Handy Type of Piezoelectric System



Adjusting dial

■Features

- Compact, lightweight, pocket type
- Battery-less type
- The product was developed in a collaboration between France and Japan, with the French company CATU and Hasegawa Electric Co., Ltd.

■Specifications

Specifications	The adjusting dial (10 to 30) is provided. 10. Output voltage: Approx. 3,500 V 20. Output voltage: Approx. 7,000 V 30. Output voltage: Approx. 11,500 V
Dimensions	190mm×65mm×32mm
Weight	300g
Accessory	Lead wire for connection, bag for housing

■Correspondence table of voltage detector checker

◎:Optimum ○:Suitable

Product model	Voltage detector checker model					
	HLA-1A	HLA-2G	HLL-1	HLL-6D	HLA-N2	CL-1-06
HTE-610/610L	○	○	○	○		
HT-680D/DB/DS/DBS	AC	○	○	○		
	DC			○		
HT-670	AC	○	○	○		
	DC			○		
HSF-7	◎	○	◎			○(10,20)
HSE-7T1	◎	○	◎			○(10,20)
HSS-6B	◎	○	◎			○(10,20)
HSG-6	◎	○	◎			○(10,20)
HSN-6A	AC	○	○	○		○(10,20)
	DC			○	○	
HST-1.5N	AC	○			○	○(10,20)
	DC					
HSE-7G	◎	○	◎			○(10,20)
HST-30						○(10,20)
HST-70						○(20)
HST-170						○(30)
HST-250						○(30)
HS-500						○(30)
HST-20N	AC					○(10,20)
	DC					
HS-90N	AC					○(10,20)
	DC					
WM-22~275						○
HVC-1.5N2						
HS-1.5NJ/NR	AC	○				○(10,20)
	DC				○	
HST-W80JS						○(30)

Inspection before use

Regarding a voltage detector, It is required by "Article 352 of Occupational Safety and Health Regulation (OSH Regulations)" that, "No abnormality shall exist on external appearance by visual check" and "Voltage detection performance shall be checked" before use. A test button is provided on the voltage checker for checking the internal electronic circuit and battery voltage. It is not for checking operation starting voltage, wiring from detector to electronic circuit, etc. Therefore, it is necessary to check voltage detection performance using a voltage detector checker or well-known power supply during the inspection before use.

Hot line proximity alarm

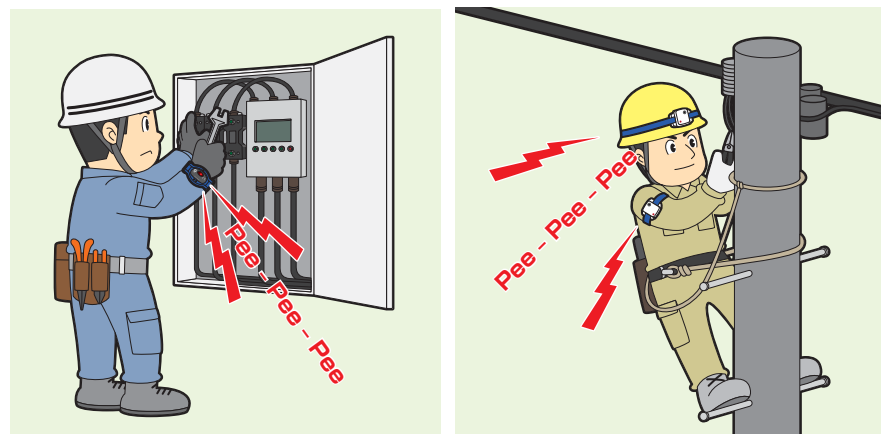
AC 6.6kV



■Features

- It generates an alarm with an electronic buzzer sound when a live voltage is detected.
- It is ideal for preventing human errors, because there is no power switch, and it is always in a stand-by state for operation.

This auxiliary device is for voltage detection. It sounds an alarm with an electronic buzzer to notify access to a live line from a remote location.



HXW-6

(Both 50Hz and 60Hz)

WRIST ALARM

AC 6.6kV

Exclusively for work relating to cubicles



HX-6

(Exclusively for use at 50 Hz or 60 Hz)

Upper arm fitting type

AC 6.6kV

Hot line proximity alarm exclusively for work with overhead lines

* Please designate the frequency (50 Hz or 60 Hz).



【Attention】

This is not suitable for the work relating to (control) cubicles.

HX-6S

(Exclusively for use at 50 Hz or 60 Hz)

Helmet fitting type

AC 6.6kV

Hot line proximity alarm exclusively for work with overhead lines

* Please designate the frequency (50 Hz or 60 Hz).



【Attention】

This is not suitable for the work relating to (control) cubicles.

■Specifications

Model		HXW-6	HX-6	HX-6S
Location of use		Exclusively for work relating to cubicles	Exclusive for work with overhead lines	
Alarm starting distance (Under standard condition)		60cm	80cm	110cm
Frequency		Both 50Hz and 60Hz	Either 50 Hz or 60 Hz, whichever is designated	
Sound volume		65dB or more (60cm apart)	65dB or more (1m apart)	
Battery		CR1620(3V) × 1 pcs	CR2025 or CR2032(3V) × 1 pcs	
Life of the battery (with new battery)	Continuously operating state	About 15 hr.	About 50 hr.	
	Unused state	About 10 months	About 2 years	
Operating temperature range		-5°C ~ +45°C		

Hot line proximity alarm

■What is a Hot line proximity alarm?

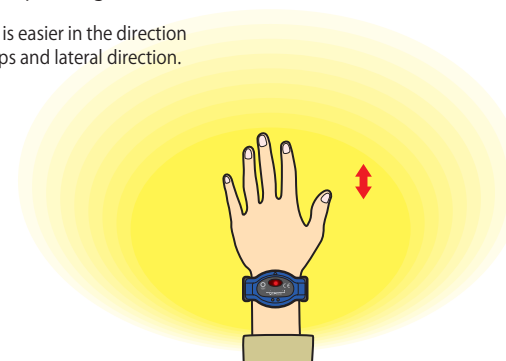
- It is a product that generates an alarm when it detects a voltage from a remote location to prevent electric shock. Unintended access due to human errors such as preconception or misconception can be prevented.
- This product cannot be used as a voltage detector.

■Precautions before purchasing the Hot line proximity alarm

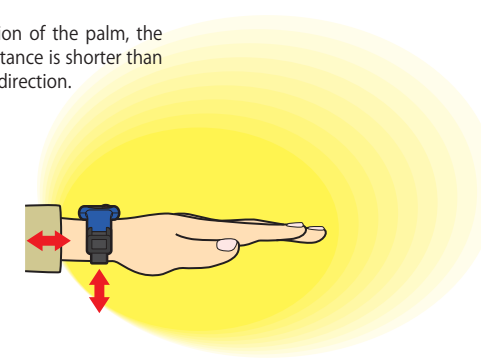
- Because detection sensitivity can be adjusted separately for work relating to cubicles and the work with overhead lines assuming the respective sites, use the product according to its location.
- The specification “○V-○cm” of this product is a distance under the “standard condition” set by our company. At actual sites, the operation distance may become shorter, depending on environment, wiring conditions, etc. (*1) (*1) e.g.: A grounded structure exists nearby, etc.
- The sensitivity of this product is directional. Sensitivity is reduced at the back of the product (in the case of HXW-6, direction of the palm).

●Image of operating distance

Detection is easier in the direction of fingertips and lateral direction.



In the direction of the palm, the detecting distance is shorter than in the upper direction.



HXC-3K

Portable live part detector

AC 3.3kV~77kV



【Attention】

This device is not a voltage detector.

■Features

- Compact size and lightweight make it convenient to carry

For Identifying the Charging State of Substation Facilities



■Specifications

Working voltage range		3.3 kV to 77 kV (Non-contact type for 11 kV or higher)
Operating temperature range		−20℃~+40℃
Frequency		50/60Hz
Battery		LR44(1.5V) × 2 pcs
Dielectric strength		Between tip part and grip of detector 20 kVAC, 1 min (Leakage current: 1 mA or less)
Detection performance		Operation starting voltage: 400 V ± 20% Detectable distance: 5 cm at 3.3 kV, 10 cm at 6.6 kV
Operation status display	Light emission	It shall be possible to confirm luminance of 8,000 lux at a distance of 50 cm. 50dB or more (1m apart)
	Sound volume	
Dimensions		155mm
Weight		35g

* Without the casing

■Voltage & distance to be separated, and detectable distance

Voltage (kV)	3.3	6.6	11	22	33	77
Necessary distance to be separated (cm)	—	—	15	25	35	76
Detectable distance (cm)	5	10	33	90	120	230

HHV-6T

Voice/audio signaling and light emitting type live-part display unit

AC Max 7,000V



■Features

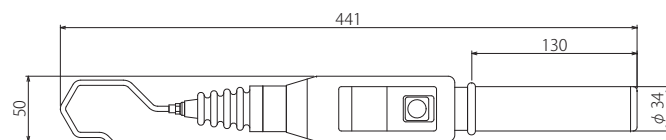
- Voice/Audio signaling of "PI PI JUUDENTYUDESU (Pi,Pi now charging)" is output.
- Flashing LED can be confirmed from all directions.

■Accessory



Bag for housing

■Dimensions



■Specifications

Maximum working voltage	AC7000V
Frequency	50/60Hz
Dielectric strength	Between contact tip (metal fitting) and grip: 15 kVAC, 1 min
Leakage current	At dielectric strength test: 1 mA or less
Battery	R14(1.5V) × 2 pcs
Operating temperature range	−10°C~+40°C
Structure	Equivalent to IPX1 (waterproof 1 type) Operation not influenced by presence of water.
Weight	About 500 g

HH-6A

Audio signaling and light emitting type non-live-part display unit

AC 3kV~7.2kV



■Features

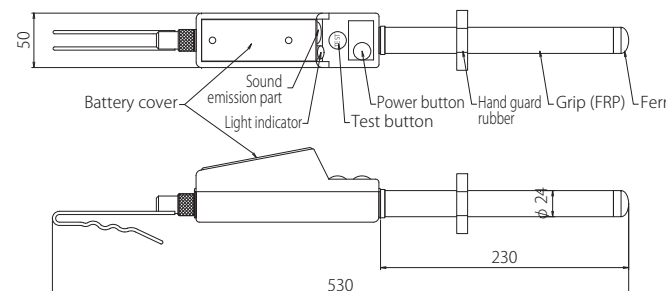
- Shape of the hook makes it difficult to dislodge even in strong winds.

■Accessory



Bag for housing

■Dimensions



■Specifications

Working voltage range	AC3kV~7.2kV
Insulation resistance	Between contact tip (metal fitting) and grip, 100 MΩ or more
Dielectric strength	Ditto, 20 kVAC, 1 min
Leakage current	At dielectric strength test: 500 μA or less
Indication of operation	Light emission Sound generation
Operating temperature range	−10°C~+40°C
Structure	Waterproof (Ingress of water is prevented.)
Battery	R03(1.5V) × 2 pcs
Weight	About 580g

Uncharged State is Notified by Sound and Light Indications.



HEV-750D

DC Voltage Checker for Electric Vehicle

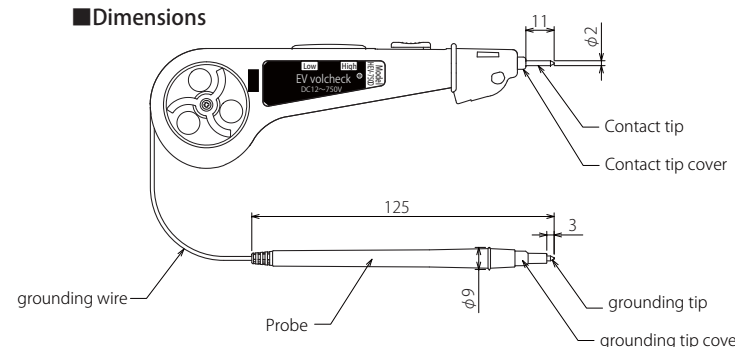
DC 12V~750V



■Features

- Indication of battery voltage is possible.
"Low voltage of the control system/high voltage of the power system" is indicated by sound and light.
- Discharge promotion function of residual electric charge
The residual electric charge stored in the load after disconnecting high-voltage battery can be rapidly discharged.

■Dimensions



Easy to Check Voltage of EV, HV, PHV



In the case of a low-voltage battery for the control system, only Low flashes.

In the case of a high-voltage battery for the power system, Low + High flashes at the same time, and sound and light indications are generated.



■Specifications

Working voltage range	DC12V~750V
Operation starting voltage (No polarity)	Low :DC 6V±3V High :DC35V±5V
Indication of operation	Light Sound
Battery	LR44(1.5V) × 2 pcs
Operating temperature range	−10°C~40°C
Dimensions	Main body 165mm×50mm×22mm (except for protruding part) Probe φ9mm×125mm
Weight	About 70 g

HPL-200

Low voltage phase checker
Non-contact type

AC 200V,400V (Three-Phase)

Checking Phase Rotation is Possible Through Electric Insulated Wire.



■Accessory

Bag for housing

■Indication of phase rotation

	Positive rotation	Inverse rotation
Color of flashing LED	Green color	Red color
Buzzer sound	None	Intermittent sound

■Specifications

Working voltage range	200V,400V (Three-Phase)
Electric line	IV, DV, OW 2mm ² ~100mm ²
Battery	LR03(1.5V) × 2 pcs
Weight	About 190g (including batteries)
Dimensions	About 78mm × 72mm × 26mm

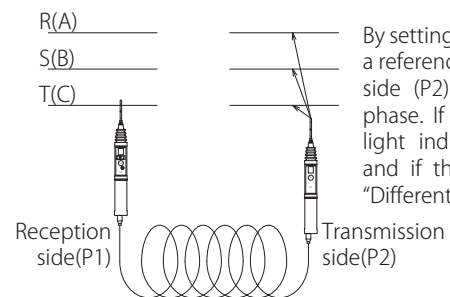
HPI-A6/S6/S20

High voltage & Special high voltage phase tester
Optical fiber type

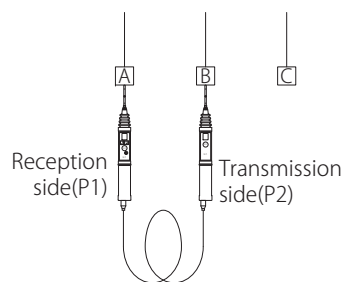
HPI-A6 AC 3kV~7kV
HPI-S6 AC 6.6kV
HPI-S20 AC 22kV~34.5kV

■Features

- A multi-functional phase tester that is provided with a stand-alone voltage detecting function, and phase test/phase sequence functions for combined use.
- Measurement is possible through coated wires.
Measurement is possible through voltage detection terminals and coated wires. * Sealed cables cannot be used.
- In-phase/different phase, and phase sequence are indicated by sound and light indications.

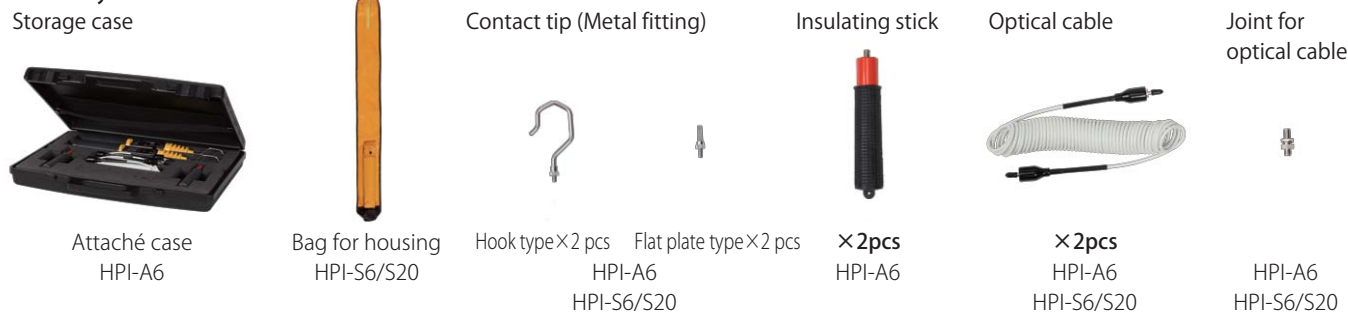


By setting the reception side (P1) as a reference, check the transmission side (P2) corresponding to each phase. If there are no sound and light indications, it is "In-phase," and if there are indications, it is "Different phase."

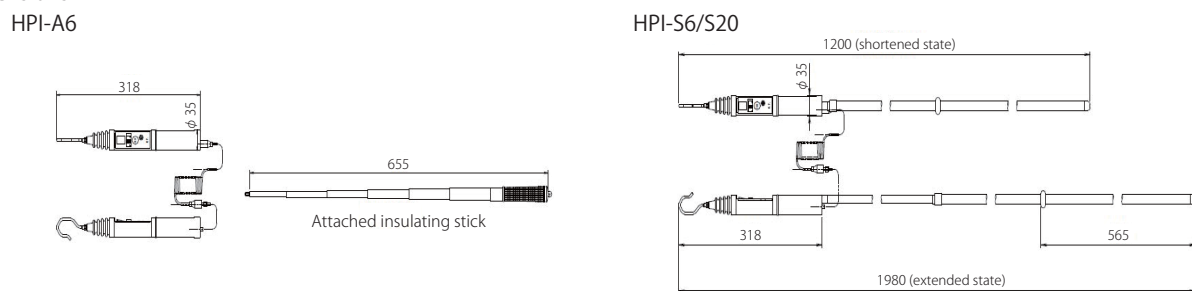


When detectors contact two out of three phases, and if there are no sound and light indications at the reception side (P1), this indicates "positive rotation," and if there are, this indicates "inverse rotation."

■Accessory



■Dimensions



■Specifications

Model		HPI-A6	HPI-S6	HPI-S20
Working voltage range		3kV~7kV	6.6kV	22kV~34.5kV
Target		For cubicles		For overhead lines
Frequency		50/60Hz		
Insulation resistance		2000MΩor more		
Dielectric strength		20 kV, 1 min		75 kV, 1 min
Operating temperature range		-10℃~-+40℃		
Indication of operation	Light emission	It shall be able to confirm luminance of 8,000 lux. 50 db or more at a distance of 1 m from the sound-generating part (intermittent sound generation)		
	Sound generation			
Phase test function		Detection of in-phase or different phase of 120°		
Phase sequence function		Detection of advance or delay of 120°		
Possible distance of phase test		Distance between transmitter and receiver, with standard optical cable: 6 m (3m×2) It can be used at up to 30 m with the optional optical cable.		
Battery		R1(1.5V), each 2 pcs		

■Option

Optical fiber cable



10m (DF01066-1)
20m (DF01066-2)
30m (DF01066-3)

* Use extended with a joint is not possible.

HPseries

High voltage & Special high voltage phase tester
Wireless type

AC 3.3kV~33kV

[Attention]

There is no phase sequence (phase rotation) function.
(Only discriminates in-phase, different phase)
Please designate frequency of 50 Hz or 60 Hz.

■Specifications

Model	HP-T3	HP-S3	HP-U3	HP-T6	HP-S6	HP-U6	HP-S20	HP-U20	
Working voltage range	3.3kV			6.6kV			Common use for 22 kV, 33 kV		
Frequency	50 Hz or 60 Hz (Either one is to be designated.)								
Phase test function	Discrimination of in-phase or different phase of 120° * Attention: There is no phase sequence (phase rotation) function.								
Possible distance of phase test	Distance between transmission side and reception side: Within 5 m								
Total length	When extended	550mm	1220mm	1480mm	550mm	1220mm	1480mm	1220mm	3470mm
	When shortened	(without telescopic structure) 850mm	850mm	1090mm	(without telescopic structure) 850mm	850mm	1090mm	850mm	1640mm
Indication of operation	Light emission	It shall be able to confirm in the luminance of 8,000 lux.							
	Sound generation	50 dB or more at a distance of 3 m							
Battery	6R61 or 6F22(9V), each 1 pcs								
Operating temperature range	-10℃~+50℃								
Structure	Waterproof								
Weight	700g×2	900g×2	1250g×2	700g×2	900g×2	1250g×2	900g×2	2200g×2	

Dielectric strength	Insulating stick (except for the antenna portion): Insulating stick – Surface	HP-S3, HP-U3, HP-S6, HP-U6, HP-S20, HP-U20	Interval of 30 cm, 75 kV, 5 min
	Detector: Contact tip – Joint part	HP-U3, HP-U6 HP-U20	20 kV, 5 min 50 kV, 5 min
	Contact tip – Grip	HP-T3, HP-T6	14 kV, 5 min

HP-UK6R

Voltage detector & phase tester for high voltage power distribution with a phase sequence (phase rotation) function Wireless type

AC 6.6kV

■Features

- Phase sequence (phase rotation) function is provided.
- Angle of tip metal fitting is adjustable. (20° in all directions)
- It is possible to use it in a short state by not fitting the extending insulating stick.

[Attention]

Please designate the frequency of 50 Hz or 60 Hz.

■Accessory

Bag for housing

■Specifications

Dielectric strength	Frequency	50 Hz or 60 Hz (Either one is to be designated.)	Indication	Light emission Sound generation	It shall be able to confirm luminance of 8,000 lux. 50 dB or more at a distance of 2 m
	Phase tester	Drying Between contact tip (metal fitting) and joint 20 kVAC - 1 min Pouring water Ditto 12 kVAC - 1 min	Phase test	Phase test	Discrimination of in-phase or different phase of 120°
	Insulating stick	Drying Between tip part and grip 20 kVAC - 5 min Pouring water Ditto 13.8 kVAC - 5 min	Structure of detector	Phase rotation	Discrimination of advance or delay of 120°
Leakage current		Phase tester: 1 mA or less Insulating stick: 0.5 mA or less	Operating temperature range		
Possible distance of phase test		Distance between transmitting and receiving sides: Within 5 m	Battery		
			6R61 or 6F22(9V), each 1 pcs		

Easy-to-use Wireless Type

Awarded 40th
Shibusawa Prize



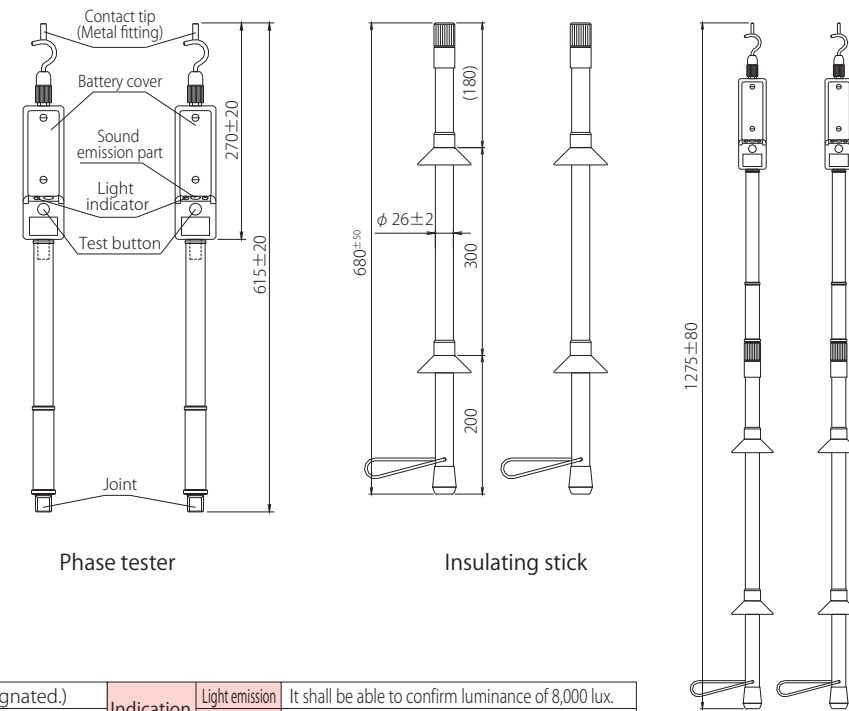
Model HP-U: Universal joint type



Model HP-S: Straight type

■Accessory

Model HP-T: Bag for housing
Model HP-S: Bag for housing
Model HP-U: Trunk case



Phase tester

Insulating stick

The connection state of the insulating stick

Grounding hook

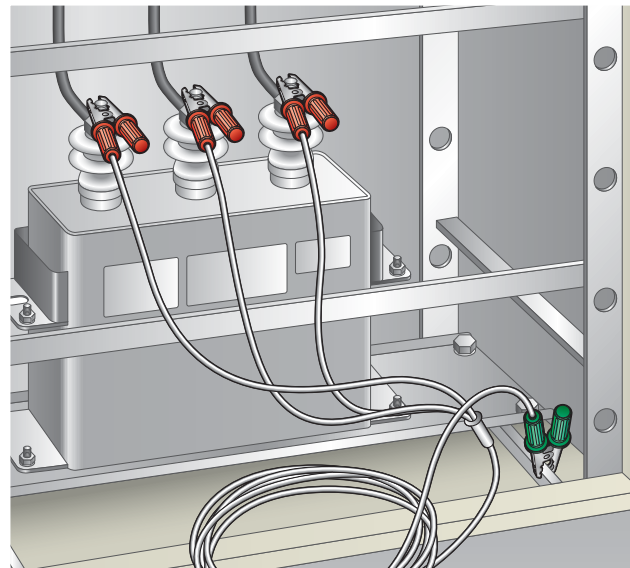
Various Lineups Are Available According to the Application

■When ordering, please designate the following.

1. Type of tip metal fitting
2. Type of insulating stick (supplementary connecting type, telescopic type)
3. Length and diameter of insulating stick
4. Cross-sectional area and length of earth wire
5. Type of grounding metal fitting
6. Working voltage

[Attention]

- Three-phase/one set (three-unit set) is the standard (except for railways).
- The bag for housing is sold separately (except for partial products).
- The products are manufactured to order, so there may be cases when they are non-returnable.



■How to connect operating rod (As a standard, a rod of 3 m or less consists of a single rod.)

Figures inside () indicate outside diameter of the rod.

Length of operating rod	Earth wire of 38 mm ² or less is used.		
		In the case of using a strong type tip metal fitting	In the case of using earth wire of 60 mm ² or more
3.5m (connection of 2 rods)	1.5m (31φ) + 2.0m (34φ)	1.5m (31φ) + 2.0m (34φ)	1.5m (31φ) + 2.0m (34φ)
4.0m (connection of 2 rods)	2.0m (31φ) + 2.0m (34φ)	2.0m (31φ) + 2.0m (34φ)	2.0m (31φ) + 2.0m (34φ)
4.5m (connection of 2 rods)	2.5m (31φ) + 2.0m (34φ)	2.5m (31φ) + 2.0m (34φ)	2.5m (34φ) + 2.0m (39φ)
5.0m (connection of 2 rods)	2.5m (31φ) + 2.5m (34φ)	2.5m (31φ) + 2.5m (34φ)	2.5m (34φ) + 2.5m (39φ)
6.0m (connection of 2 rods)	3.0m (34φ) + 3.0m (39φ)	3.0m (34φ) + 3.0m (39φ)	3.0m (34φ) + 3.0m (39φ)
6.0m (connection of 3 rods)	2m (34φ) + 2m (39φ) + 2m (39φ)	2m (34φ) + 2m (39φ) + 2m (39φ)	2m (34φ) + 2m (39φ) + 2m (39φ)
Kind of joint	uses an insulating joint, and others use a metallic joint.		

■Type of grounding wire (transparent vinyl covered electric wire)

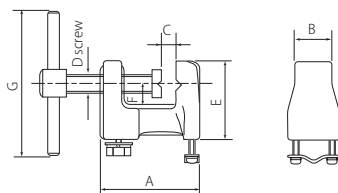
Cross-sectional area	8mm ²	14mm ²	22mm ²	38mm ²	60mm ²	100mm ²
Wire configuration	7/22/0.26	7/38/0.26	7/7/40/0.12	19/38/0.26	19/60/0.26	37/51/0.26
Weight	105g/m	180g/m	265g/m	455g/m	680g/m	1120g/m
Finished outside diameter	6.6mm	8.4mm	10.1mm	12.9mm	15.2mm	19.0mm

■Grounding metal fitting

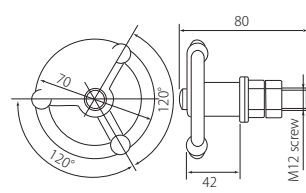
Grounding metal fitting (SA107-B,C,D)



* The photo shows SA107-C.



Valve type grounding handle (SA110)



Model	Mounting method	Applicable wire	A	B	C	D	E	F	G	Weight
SA107-B	Screw tightening method	8mm ² ~ 14mm ²	51	18	18	10	39	13	65	280g
SA107-C	Screw tightening method	22mm ² ~ 38mm ²	66	24	27	12	53	14	95	570g
SA107-D	Screw tightening method	60mm ² ~ 100mm ²	90	30	38	12	75	23	95	1080g
SA110	Stud bolt type	M12 stud	Valve type grounding handle							320g

Grounding hook component

Table 1

●When ordering the earth hook, please designate the following.

1. Type of tip metal fitting
2. Type of insulating stick (supplementary connecting type, telescopic type)
3. Length and diameter of insulating stick
4. Cross-sectional area and length of earth wire
5. Type of grounding metal fitting
6. Working voltage

Attention

- Three-phase/one set is a standard. (Used with AC)
- The bag for housing is sold separately.
- The products are manufactured to order, so there may be cases when they are non-returnable. Please note this when placing an order.

■Fixed type tip metal fitting (The operating rod and tip metal fitting are fixed.)

External appearance	Model name	Range of use (mm)	Dimensions	Weight	Remarks
	MA121-A Large size	φ 8 to 40		710g	For round bus bar
	MA121-AS Special large size	φ 30 to 80		800g	For round bus bar
	MA121-AG Strong large size	φ 20 to 52, L=195 φ 40 to 80, L=195 φ 70 to 150, L=225 φ 100 to 180, L=225		1200g 1920g	For round bus bar (Earth wire: 60 mm ² or more)
	MA121-C Slanted large size	φ 8 to 40		930g	For round bus bar
	MA111-A Universal type	φ 8 to 40 Thickness of bus bar within 12 Width within 75		930g	For dual use of round and flat bus bars
	MA111-AG Strong universal type	φ 20 to 52 Thickness of bus bar within 20 Width within 100		1600g	For dual use of round and flat bus bars (Earth wire: 60 mm ² or more)
	MA111-C Slanted universal type	φ 8 to 40 Thickness of bus bar within 12 Width within 75		1060g	For dual use of round and flat bus bars
	MA122-A Medium size	φ 5 to 25		370g	For round bus bar
	MA114-A Horizontal & slanted copper band type	Thickness within 25 Width within 100		1000g	For flat bus bar
	MA114-AG Strong horizontal & slanted copper band type	Thickness within 30 Width within 100		2250g	For flat bus bar (Earth wire: 60 mm ² or more)
	MA115-A Cubicle type	φ 5 to 25 Thickness of bus bar within 30 Width no limit		500g	For dual use of round and flat bus bars
	MA115-AG Strong cubicle type	φ 8 to 25 Thickness of bus bar within 35 Width no limit		1050g	For dual use of round and flat bus bars (Earth wire: 60 mm ² or more)
	MA115-AN Cubicle type for narrow spaces	φ 5 to 25 Thickness of bus bar within 30 Width within 50		480g	For dual use of round and flat bus bars
	MA115-AH Cubicle type with claw	φ 5 to 25 Thickness of bus bar within 30 Width within 50		530g	For dual use of round and flat bus bars

Grounding hook component

Table 2

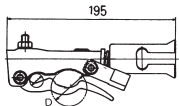
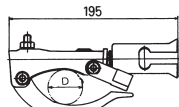
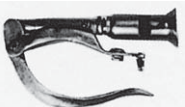
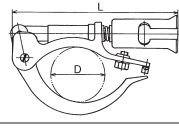
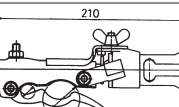
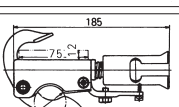
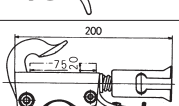
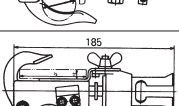
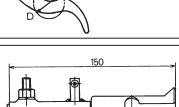
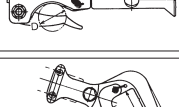
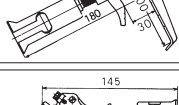
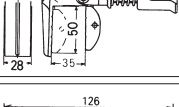
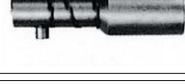
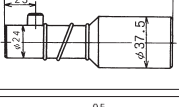
●When ordering the earth hook, please designate the following.

- 1.Type of tip metal fitting
- 2.Type of insulating stick (supplementary connecting type, telescopic type)
- 3.Length and diameter of insulating stick
- 4.Cross-sectional area and length of earth wire
- 5.Type of grounding metal fitting
- 6.Working voltage

Attention

- Three-phase/one set is a standard. (Used with AC)
- The bag for housing is sold separately.
- The products are manufactured to order, so there may be cases when they are non-returnable. Please note this when placing an order.

■Detachable type tip metal fitting (The operating rod and tip metal fitting are detachable.)

External appearance	Model name	Range of use (mm)	Dimensions	Weight	Remarks
	MA121-B Large size	φ 8 to 40		760g	For round bus bar Closed stocks (set items) of the type ZB, type YB have a groove width of 5.5 mm.
	MA121-BS Special large size	φ 30 to 80		860g	For round bus bar
	MA121-BG Strong large size	φ 20 to 52, L=200 φ 40 to 80, L=200 φ 70 to 150, L=200 φ 100 to 180, L=230		1250g 1950g	For round bus bar (Earth wire: 60 mm ² or more)
	MA121-D Large slanted type	φ 8 to 40		930g	For round bus bar
	MA111-B Universal type	φ 8 to 40 Thickness of bus bar within 12 Width within 75		980g	For dual use of round and flat bus bars
	MA111-BG Strong universal type	φ 20 to 52 Thickness of bus bar within 20 Width within 100		1680g	For dual use of round and flat bus bars (Earth wire: 60 mm ² or more)
	MA111-D Universal slanted type	φ 8 to 40 Thickness of bus bar within 12 Width within 75		930g	For dual use of round and flat bus bars
	MA122-B Medium size	φ 5 to 25		420g	For round bus bar
	MA114-B Horizontal & slanted copper band type	Thickness within 25 Width within 100		1010g	For flat bus bar
	MA115-B Cubicle type	φ 5 to 25 Thickness of bus bar within 30 Width no limit		520g	For dual use of round and flat bus bars
	MA105 Tip metal fitting for operating rod			170g	To be used for all detachable models of the types MA115-B, ZB, and YB, except for closed stocks
	MA105-S Tip metal fitting for operating rod			70g	To be used for closed stocks of the types MA115-B, ZB, and YB

Fixed type

●When ordering the earth hook, please designate the following.

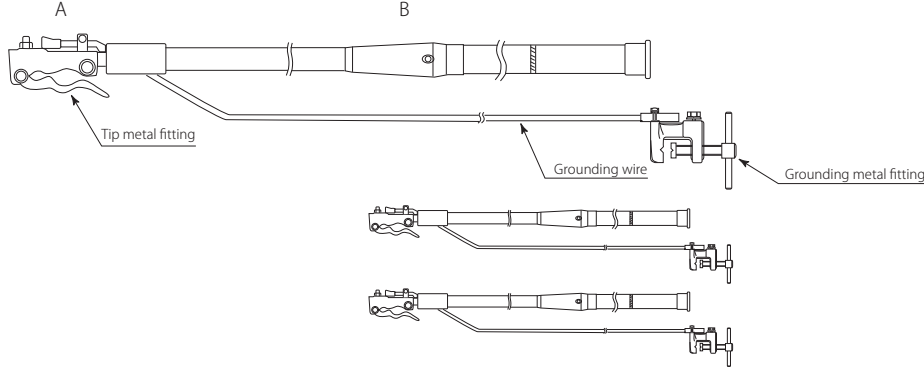
- 1.Type of tip metal fitting
- 2.Type of insulating stick (supplementary connecting type, telescopic type)
- 3.Length and diameter of insulating stick
- 4.Cross-sectional area and length of earth wire
- 5.Type of grounding metal fitting
- 6.Working voltage

Attention

- Three-phase/one set is a standard. (Used with AC)
- The bag for housing is sold separately.
- The products are manufactured to order, so there may be cases when they are non-returnable. Please note this when placing an order.

(Closed stock) = (Operating rod with tip metal fitting + Grounding wire + Grounding metal fitting) × 3

(The bag for housing is sold separately.)



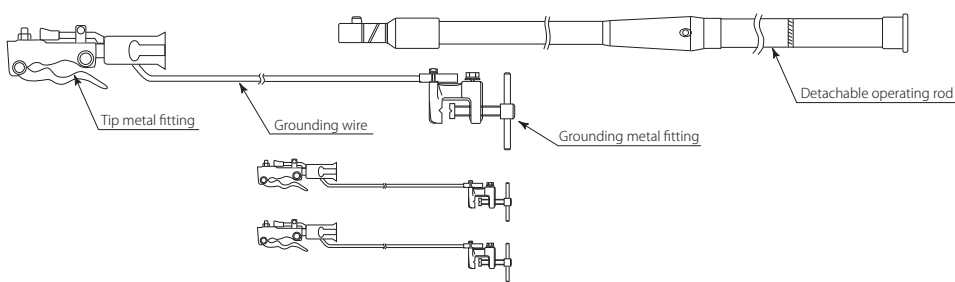
A	Model of tip metal fitting	B	Breakdown of class			Grounding wire	Grounding metal fitting	Applicable voltage
			Class	Length, kind of operating rod				
Large fixed type MA121-A (MA121-C)		Type 5	Neo pipe	0.5m	Single rod	22mm ² ×3m	SA107C	6.6kV
		Type 10	//	1.0m	//	//	//	//
		Type 15	//	1.5m	//	22mm ² ×4m	//	22kV
		Type 20	//	2.0m	//	//	//	//
		Type 25	//	2.5m	//	22mm ² ×5m	//	77kV
		Type 30	//	3.0m	//	//	//	//
		Type 35	//	3.5m (1.5+2)	Connecting type	22mm ² ×6m	//	//
		Type 40	//	4.0m (2+2)	//	//	//	154kV
		Type 45	//	4.5m (2.5+2)	//	22mm ² ×7m	//	//
		Type 50	//	5.0m (2.5+2.5)	//	//	//	//
Universal fixed type MA111-A (MA111-C)		Type 60	//	6.0m (3+3)	//	//	//	275kV
		Type 60	//	6.0m (2×3)	//	//	//	//
Medium-sized fixed type MA122-A Fixed type for cubicle MA115-A		Type 5	//	0.5m	1本もの	14mm ² ×3m	SA107B	6.6kV
		Type 10	//	1.0m	//	//	//	//
		Type 15	//	1.5m	//	14mm ² ×4m	//	22kV
		Type 20	//	2.0m	//	//	//	//

(Regarding the Type 60 described above, please designate either connection with two rods or three rods.)

Detachable type

(Closed stock) = (Detachable tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Detachable operating rod) × 1 (The bag for housing is sold separately.)

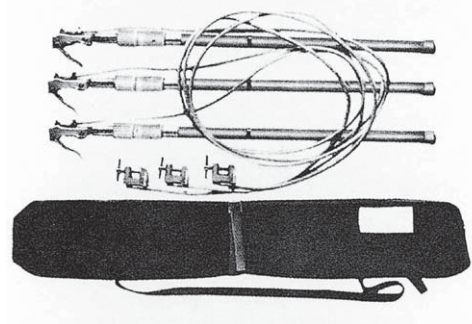
*The f detachable type is not suitable for operation at 4 m or more.



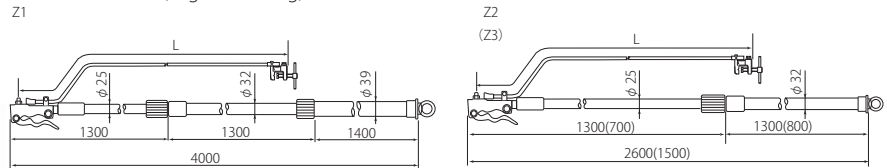
A	Model of tip metal fitting	B	Class	Breakdown of class		Grounding wire	Grounding metal fitting	Applicable voltage
			Length, kind of operating rod					
Large detachable type MA121-B (MA121-D)		Type 5	Neo pipe	0.5m	Single rod	22mm ² ×3m	SA107C	6.6kV
		Type 10	//	1.0m	//	//	//	//
		Type 15	//	1.5m	//	22mm ² ×4m	//	22kV
		Type 20	//	2.0m	//	//	//	//
		Type 25	//	2.5m	//	22mm ² ×5m	//	77kV
Universal detachable type MA111-B (MA111-D)		Type 30	//	3.0m	//	//	//	//
		Type 35	//	3.5m (1.5+2)	Connecting type	22mm ² ×6m	//	//
		Type 40	//	4.0m (2+2)	//	//	//	154kV

Operating rod of compressed tightening-type telescopic model for power transmission line

Type Z



(Closed stock) = (Operating rod with tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Bag for housing) × 1 or × 3



■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

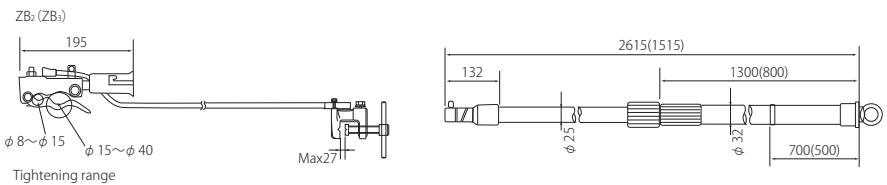
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
Z1	275kV	MA121-A	22mm ² ×5m	4.0m	1.8m	3	Capacity of 1-phase portion	15.5kg
Z2	154kV	"	22mm ² ×4m	2.6m	1.5m	2	Capacity of 3-phase portion	11.0kg
Z3	77kV	"	22mm ² ×3m	1.5m	1.1m	2	"	8.8kg

Operating rod of compressed tightening-type telescopic model for power transmission line

Type ZB



(Closed stock) = (Detachable tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Operating rod) × 1 + (Bag for housing) × 1

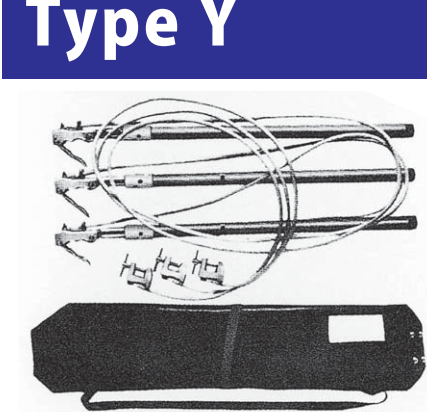


■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

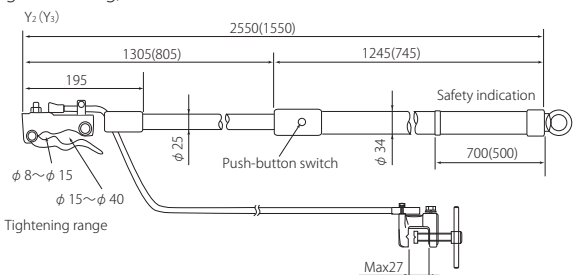
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
ZB2	154kV	MA121-B (Groove: 5.5 mm)	22mm ² ×4m	2.6m	1.4m	2	Capacity of 3-phase portion for 1800 × 120□	9.3kg
ZB3	77kV	"	22mm ² ×3m	1.5m	0.9m	2	Capacity of 3-phase portion for 1200 × 120□	7.8kg

Operating rod of button type telescopic model

Type Y



(Closed stock) = (Operating rod with tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Bag for housing) × 1

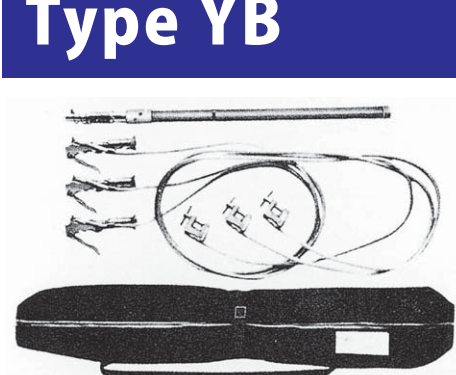


■Grounding metal fitting SA107-C Insulating stick: Neo pipe

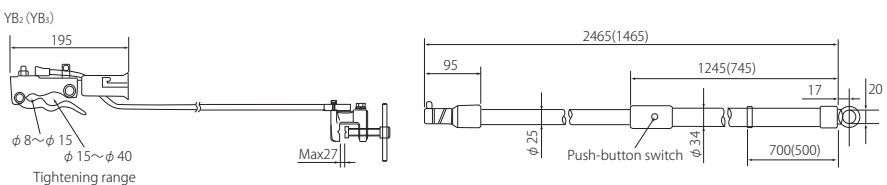
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
Y2	154kV	MA121-A	22mm ² ×4m	2.5m	1.4m	2	Capacity of 3-phase portion	11.5kg
Y3	77kV	"	22mm ² ×3m	1.5m	0.9m	2	"	9.0kg

Operating rod of button type telescopic model

Type YB



(Closed stock) = (Detachable tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Operating rod) × 1 + (Bag for housing) × 1



■Grounding metal fitting SA107-C Insulating stick: Neo pipe

Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
YB2	154kV	MA121-B	22mm ² ×4m	2.4m	1.4m	2	Capacity of 3-phase portion	9.6kg
YB3	77kV	"	22mm ² ×3m	1.4m	0.9m	2	"	8.1kg

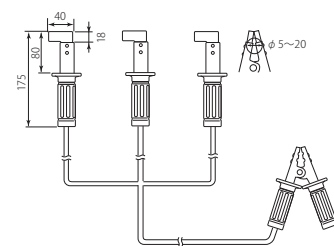
Type H

Universal type for cubicle

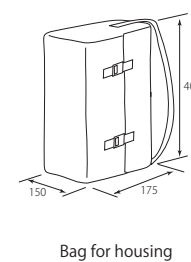
For 6.6 kV with carrying case



■Dimensions



■Accessory



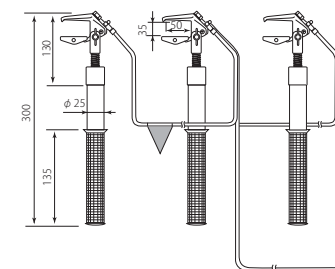
Type C

Universal type for cubicle

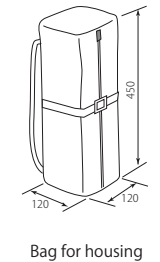
For 6.6 kV (narrow space type) with carrying case



■Dimensions



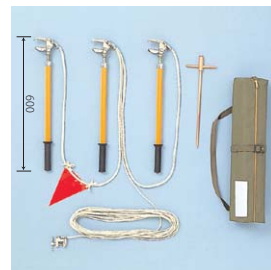
■Accessory



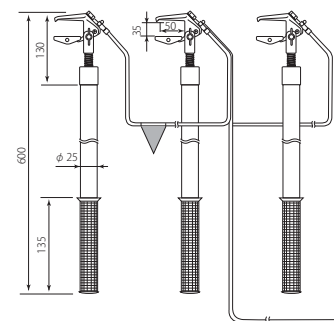
Type F

Universal type for cubicle

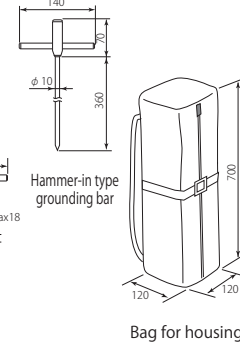
For 6.6 to 22 kV with carrying case



■Dimensions



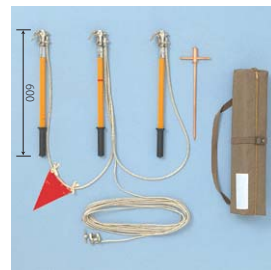
■Accessory



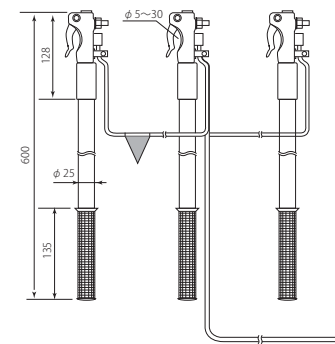
Type S

For round bus bar

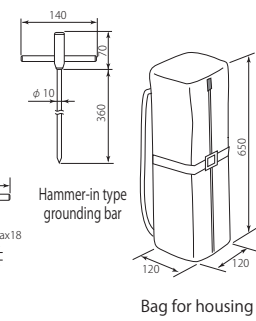
For 6.6 to 22 kV with carrying case



■Dimensions



■Accessory



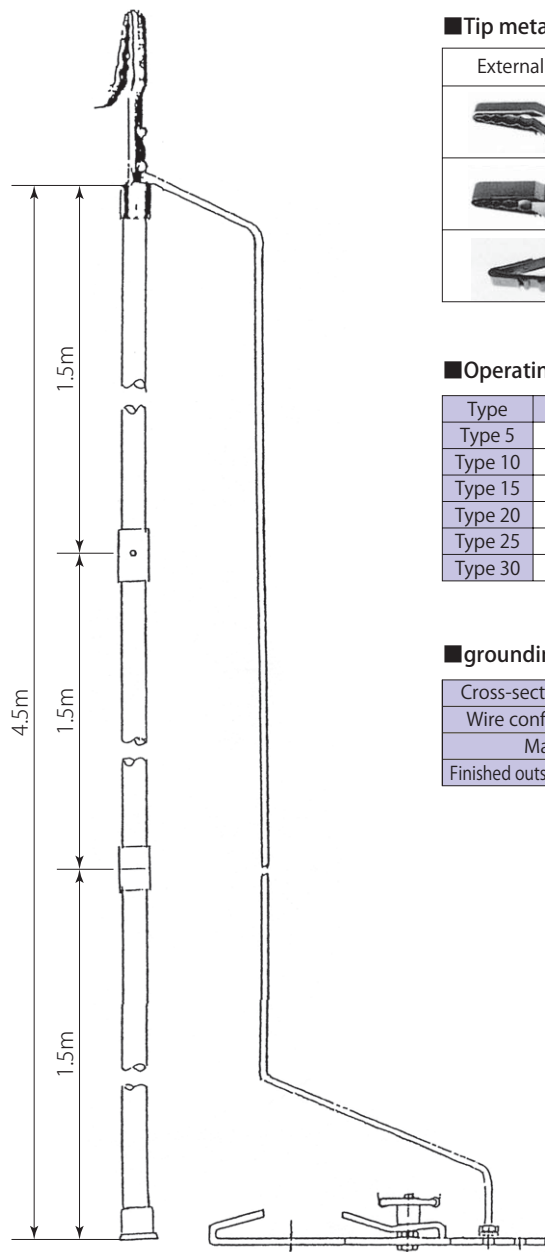
■Specifications

Type	Tip metal fitting	Length of insulating stick	Grounding wire	Grounding metal fitting	Hammer-in type grounding bar	Bag for housing	Weight
H	Insulation rubber clip	With rubber grip	22mm ² ×1.7m×3 wires 8mm ² ×5 m×1 wire	Clip	None	Portable type 400×175×150	4.0kg
C	MA115—AN	Neo pipe (φ 25×35mm) with rubber grip	14mm ² ×0.7m×2 wires (with red triangular flag) 8mm ² ×7m×1 wire	Clip	None	Portable type 450×120□	3.4kg
F	MA115—AH	Neo pipe (φ 25×335mm) with rubber grip	22mm ² ×1.5m×2 wires (with red triangular flag) 8mm ² ×15m×1 wire	SA107-B	φ 10 steel bar	Portable type 700×120□	5.6kg
S	MA122—A	Neo pipe (φ 25×337mm) with rubber grip	22mm ² ×1.5m×2 wires (with red triangular flag) 8mm ² ×15m×1 wire	SA107-B	φ 10 steel bar	Portable type 650×120□	5.0kg

Type H is made by Hasegawa Electric Co., Ltd., and all other types are made by Sunasaki Seisakusho.

Grounding hook for railways

Manufacture to order is possible with free combination of tip metal fitting, length of operating rod, length and size of earth wire, and grounding metal fitting.



Tip metal fitting

External appearance	Model name	Range of use (mm)	Dimension	Weight
	SA106-A Insertion type	φ 10~25		630g
	SA106-C Slanted insertion type	φ 10~25		720g
	SA106-S Compact insertion type	φ 4~10		400g

Operating stick

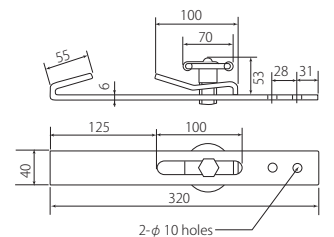
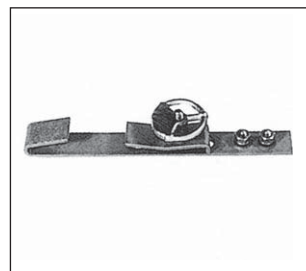
Type	Length	Length
Type 5	0.5m	Single rod
Type 10	1.0m	
Type 15	1.5m	
Type 20	2.0m	
Type 25	2.5m	
Type 30	3.0m	

Type	Length	Number of connections
Type 35	3.5m	Connection of 2 rods (1.5 m + 2.0 m)
Type 40	4.0m	Connection of 2 rods (2.0 m + 2.0 m)
Type 45-A	4.5m	Connection of 2 rods (2.0 m + 2.5 m)
Type 45-B	4.5m	Connection of 3 rods (1.5 m + 1.5 m + 1.5 m)
Type 50	5.0m	Connection of 2 rods (2.5 m + 2.5 m)
Type 60-A	6.0m	Connection of 2 rods (3.0 m + 3.0 m)
Type 60-B	6.0m	Connection of 3 rods (2.0 m + 2.0 m + 2.0 m)

grounding wire

Cross-sectional area	38mm ²	60mm ²	100mm ²
Wire configuration	19/38/0.26	19/60/0.26	37/51/0.26
Mass	455g/m	680g/m	1120g/m
Finished outside diameter	12.9mm	15.2mm	19.0mm

Grounding metal fitting (SA120)



Mass: 1,000g

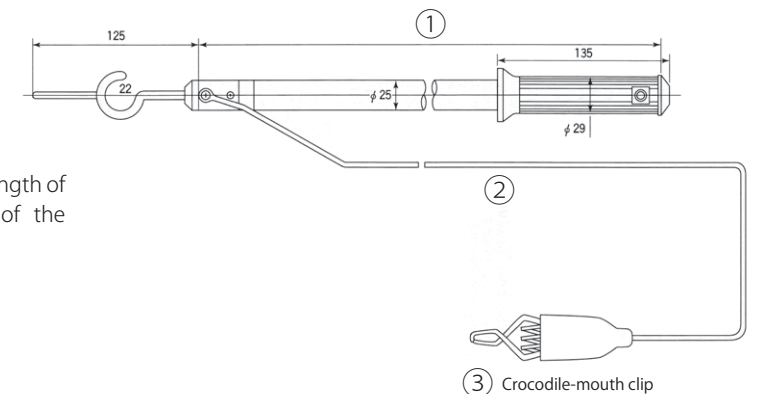
Standard model

Type	Tip metal fitting	Grounding wire	Operating rod	Grounding metal fitting	Bag for housing
SA106A Type 45-A	SA106A	60mm ² ×7m	4.5 m, connection of 2 rods (2.0 m + 2.5 m)	SA120	Sold separately
SA106A Type 45-B	SA106A	60mm ² ×7m	4.5 m, connection of 3 rods (1.5 m + 1.5 m + 1.5 m)	SA120	Sold separately

Discharge stick

AC 6.6kV

Simple Discharge stick with Internal Resistance Not Built In.



- (1) Length of insulating stick; (2) Cross-sectional area and length of grounding wire; (3) Product by order where a kind of the grounding metal fitting is to be designated

(1) Dimensions of insulating stick
0.5m,1.0m,1.5m,2.0m

(2) Cross-sectional area & length of grounding wire
Cross-sectional area 8mm²•14mm²
Length 2m,3m,4m,5m,6m,7m,8m,9m,10m

(3) Grounding metal fitting
Crocodile-mouth clip, vise type (SA107-B) * For the Dimensions, refer to P.30.

HSH-K6

Discone hook stick with voltage detector

AC 6.6kV

■Features

- Safety and work efficiency are enhanced by adding the voltage-detecting function to the high voltage cutout operating rod.

■Specifications

Model	HSH-K6
Working voltage range	AC 6.6kV
Operation starting voltage (Voltage to ground)	1300V±20% (continuous indications of sound & light) (with insulated wire)
Insulation resistance	Between contact tip (metal fitting) and grip: 100 MΩ or more
Dielectric strength	Ditto: 1 min
Leakage current	1 mA or less at dielectric strength test
Indication of operation	Light emission Sound generation
	Light emission: It shall be able to confirm luminance of 8,000 lux. Sound: 50 dB or more at a distance of 2 m



Enhance Safety and Efficiency of Work

Operating temperature range	−10℃~+40℃
Structure	Waterproof (Water shall not ingress.)
Tensile performance	200kg, 1 min
Battery	6R61 or 6F22(9V) × 1 pcs
Dimensions	About 470mm
Weight	About 390g

* Without the casing

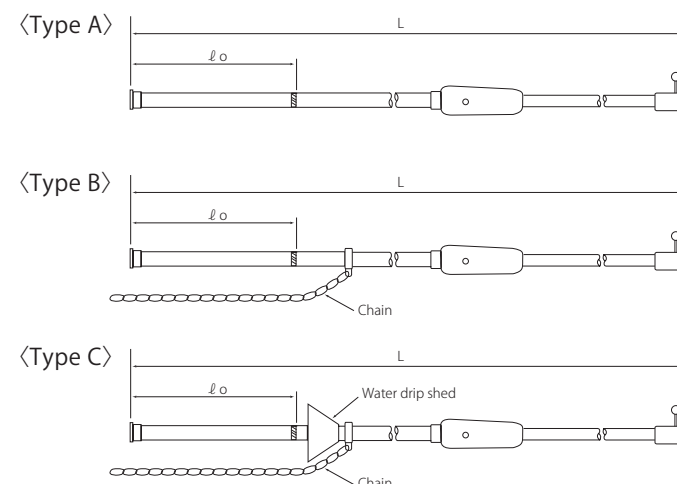
SA109□-□

Discone hook stick

AC 10kV~110kV

■Features

- There are lineups with or without the water drip shed (for outdoor use) as well as chain.



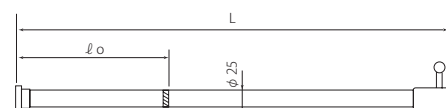
■Specifications

Model (SA109)		A-1	A-1.5	A-2	A-3	A2-4	A2-5	A2-6	A3-6	Chain	Water drip shed
		B-1	B-1.5	B-2	B-3	B2-4	B2-5	B2-6	B3-6		
	Indoor	C-1	C-1.5	C-2	C-3	C2-4	C2-5	C2-6	C3-6		
Applicable voltage	Outdoors	10kV	20kV	30kV	40kV	70kV	110kV				
Length of hook rod(L)		1.0m	1.5m	2.0m	3.0m	4.0m (connection of 2 rods)	5.0m (connection of 2 rods)	6.0m (connection of 2 rods)	6.0m (connection of 2 rods)		
Rod dia. & connecting method	φ 31	1.0m	1.5m	2.0m	3.0m	2.0m	2.5m	—	—		
	φ 34	—	—	—	—	—	2.0m	2.5m	3.0m	2.0m	
	φ 39	—	—	—	—	—	—	3.0m	2.0m+2.0m		
Length of grip(ℓ o)		0.3m	0.5m	0.5m	0.7m	0.7m	1.0m	1.0m	1.0m		
Tip metal fitting for discone hook rod		SA108-B			SA108-C			SA108-E			

D□

Discone hook stick

AC 6.6kV~30kV



■Specifications

Class	D1	D2	D3	D4
Length (L)	0.5m	1.0m	1.5m	2.0m
Length of grip (ℓ o)	0.3m	0.3m	0.5m	0.5m
Applicable voltage	6.6kV	10kV	20kV	30kV

EWL-3

LED working light
Ecopika-kun

EWL-3set (Model of the set)
Contents: EWL-3 (Illuminator)、
EWL-2B (Battery unit)
EWL-2C (AC adapter)



■Features

- The working light has the 2-stage luminance switching function and flashing function.
- The spotlight enables visual recognition at a distance of 10 m.
- A magnet is built into the hand guard, and the irradiation angle can be freely adjusted, because it is movable.
- Shoulder belt and S-shaped hook are attached.

■Specifications

Illuminator	EWL-3
Light source	Working light : LED × 42 pcs (equivalent to 12 W) Spot light : 5 W LED × 1 pc
Illuminance	Working light : 1,000 lux or more/30 cm Working light (dimmed state) : 300 lux or more/30 cm Spot light : 25,000 lux or more/30 cm (With fully charged battery unit (EWL-2B) in every case)
Continuous lighting time	Working light : Lighting About 5 hr. Lighting (dimmed state) About 15 hr. Flashing About 20 hr. (Cycle of flashing: About 6 Hz) Spotlight : About 5 hr. (With fully charged battery unit (EWL-2B) in every case)
Power supply	Battery unit (EWL-2B)
Structure	Waterproof structure (Protection code: Equivalent to IP44)
Specified temperature range	−10℃~40℃
Outside dimensions	φ 60mm×275mm (except for hand guard)
Weight	About 480g (including battery unit)
Accessory	Shoulder belt, S-shaped hook

Battery unit EWL-2B

Battery to be used	Rechargeable type Nickel metal hydride packed battery (7.2 V, 2,200 mAh)
Charging system	About 4.5 hr. (using EWL-2C)
Battery life	Number of charges/discharges: 500 times or more (Differs depending on service conditions.)
Outside dimensions	25mm×38mm×236mm
Weight	About 245g

AC adapter EWL-2C

Input	AC100V (50/60Hz)
Cable length	About 1.8m
Outside dimensions	46mm×33mm×24mm
Weight	About 70g

SPL-Y/R/B/W

Flashing LED

Color code SPL-□
Y: Yellow/R: Red/B: Blue/W: Clear

■Features

- Excellent waterproof performance
- Mode can be changed between lighting and flashing.
- A magnet is provided at the rear face.

Tough Professional Specification



■Option

EWL-2B

Battery unit

It is to be set and used in the main body of the illuminator.

EWL-2C

AC adapter

It is necessary to charge the battery unit.

EWL-3D

Charging stand

It is possible to charge the main body of the illuminator in a vertical state. (EWL-2C is required separately.)

EWL-2C-B

Cigar lighter socket adapter

It is possible to charge from a cigar lighter socket of a car. (Exclusive use for 12 VDC)

EWL-3R

Red cover

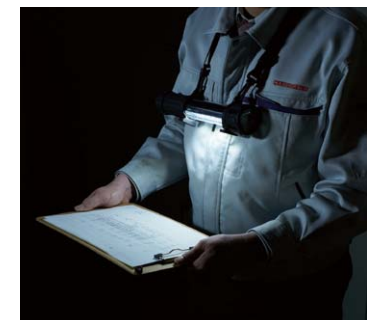
It can also be used as a warning lamp.

In the configuration of initial purchase, three items comprising EWL-3 (illuminator), EWL-2B (battery), and EWL-2C (AC adapter) are required. Please order the closed stock (set item) which is economical.

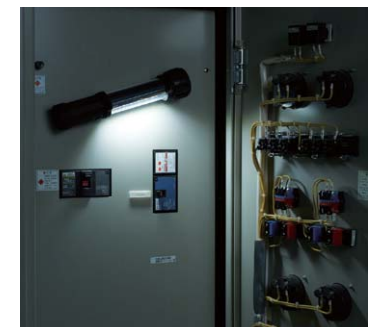
Model of the set: EWL-three sets (EWL-3 + EWL-2B + EWL-2C)



■ Visual recognition at a distance of 10 m is possible.



■ Work/operation at hand and foot is easy with shoulder belt.



■ Irradiation angle can be freely adjusted with the movable type magnet.

Compact Size and Convenient to Carry



Lighting time	Lighting: About 100 hr. Flashing: (132 times/min) About 250 hr.
Magnetic attractive force	2,400g
Battery to be used	CR2032 × 2 pcs
Outer shape	57×40×30 (mm)
Structure	Dustproof, waterproof
Weight	38g
Operating temperature range	−30℃~60℃
Waterproof performance	50m

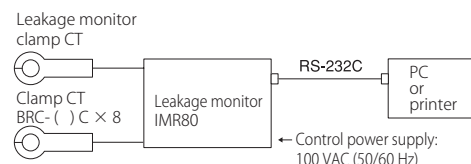
IMR-80

Leakage monitor
Leakage current measuring device
for low voltages

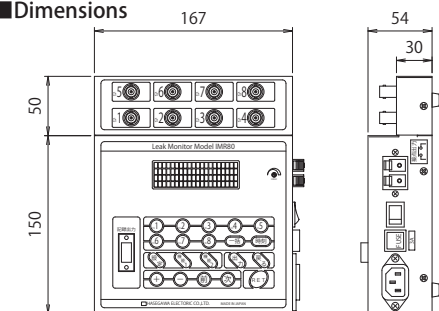
■Features

- Labor savings when researching leakage accidents are possible by simultaneously measuring eight circuits.
- Leakage current (I_o) and fundamental wave component (I_o fundamental wave) are measured at the same time.
- With the root mean square value (effective value) computation system for each one cycle (50/60 Hz), even a current with a distorted waveform can be measured precisely.
- Precise measurement is also possible for interruptions due to accidents that are recovered in a short time, and/or due to an electric leakage breaker, etc. (Measurement is possible up to three cycles.)
- Data management with personal computers using record management software (Data can be stored with the CSV format.)
- Output with a printer is possible (optional).
- The clamp CT for the models IMR-50, 60, 70, which are old products, can be also used.

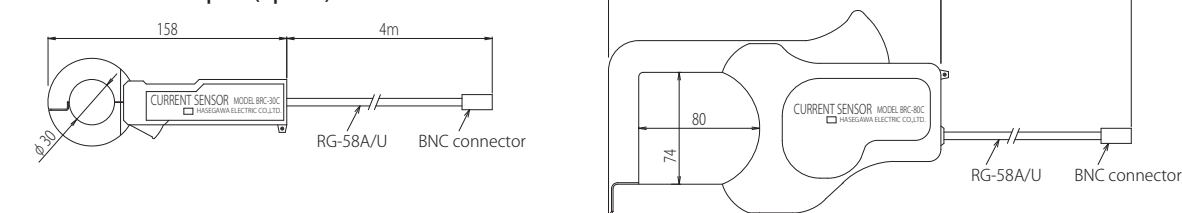
■Configuration



■Dimensions



■Dimensions of Clamp CT (option)



Multi-circuit Type, Capable of Measuring up to Eight Circuits

Conventional leakage current and fundamental wave component of leakage current from which the harmonic component has been removed can be measured and displayed at the same time, by combining analog filter and high-performance digital filter. Therefore, measurement in accordance with the frequency characteristics of the electrical leakage relay and electric leakage breaker is possible in the circuit where leakage current includes a lot of lower harmonic waves.



■Accessory

Instruction manual	1	Warranty certificate	1
Quick manual	1	RS-232C cable (to be used at connecting a PC) 1.5 m	1
Soft case for storage	1	Record management software (CD-R)	1
Power cable	1	Spare fuse (3 A)	1

■Option (sold separately)

	Name	Model
Sensor relations	Clamp CT (hole dia. ϕ 30 mm)	BRC-30C
	Clamp CT (hole dia. vertical 80 mm $\times$ lateral 74 mm)	BRC-80C
	Clamp CT extension cord (10 m)	BRCD-10B
	Clamp CT carrying case (380 $\times$ 422 $\times$ 160 mm)	IMR-OP03
Conversion connector (when CT for IMR50 is used)		BNCP-FJ
Printer relations	Thermal printer (including AC power supply & AC cable)	BL-58RS
	Battery for printer	UR-121
	Charger for printer	NC-LSC05
	Recording paper (1 box = 10 rolls)	TP211C-3

Detection system	Io system	Contact output	Alarm output No voltage 1a Switching capacity 250 VAC 5 A (resistance load) It is closed when a current that exceeds a setting value is detected in any channel.
Measurement range	Io current : 0 to 1,000 mA (1 mA pitch) Current of the Io fundamental wave : 0 to 800 mA (1 mA pitch)	Record	• As for the current recording section (max. current at each section is memorized), 5-10-15-30-60 minutes can be preset. Then, 10-day period with 5-minute setting, and 120-day period with 1-hour setting can be memorized. • Record of electric leakage (latest 200 items for each channel) • Record of electric power failure (latest 20 items)
AC conversion system	Computation of root mean square value by each one-cycle period (50/60 Hz) (Sampling period: Electrical angle of 6°)	Output of record	Personal computer (Microsoft Windows XP/7) Printer for exclusive use (2-inch thermal line dot system)
Synchronization system	LINE (automatic discrimination from control power supply) or inside (50/60 Hz) can be selected.	Display device	Liquid crystal display (LCD) with LED backlight
Accuracy (main body)	Io current : $\pm 5\%$ ± 5 mA Current of Io fundamental wave : $\pm 5\%$ ± 5 mA	Temperature range	0~50°C
Frequency characteristic	Io current : Analog low-pass filter (fc = 1,200 Hz) Current of Io fundamental wave : Digital band-pass filter (Secondary to 20th harmonic components are removed.)	Control power supply	AC100V 50/60Hz
Setting range	Io current : 10 to 900 mA (1 mA pitch) Current of Io fundamental wave : 10 to 700 mA (1 mA pitch)	Power consumption	About 7 VA on a steady basis
Sensor	Clamp type zero phase current transformer BRC-30C/80C (common to IMR70 series) Corresponding to the clamp CT for IMR50/60 series The CT for IMR50 requires a conversion connector.	Outside dimensions	170 $\times$ 167 $\times$ 54 (mm)
		Weight	About 1.5 kg (main body only)
Display	• Present current values (Io and Io fundamental wave), setting value, recording rate of electric leakages, record of electric leakages, and record of currents, for each channel		
	• Present current values (Io and Io fundamental wave), setting value (Io and Io fundamental wave), recording rate of electric leakage, and record of electric leakages, in aggregate		

VOLTECT

Extra-High Voltage
Detecting System

AC 3.3kV~550kV

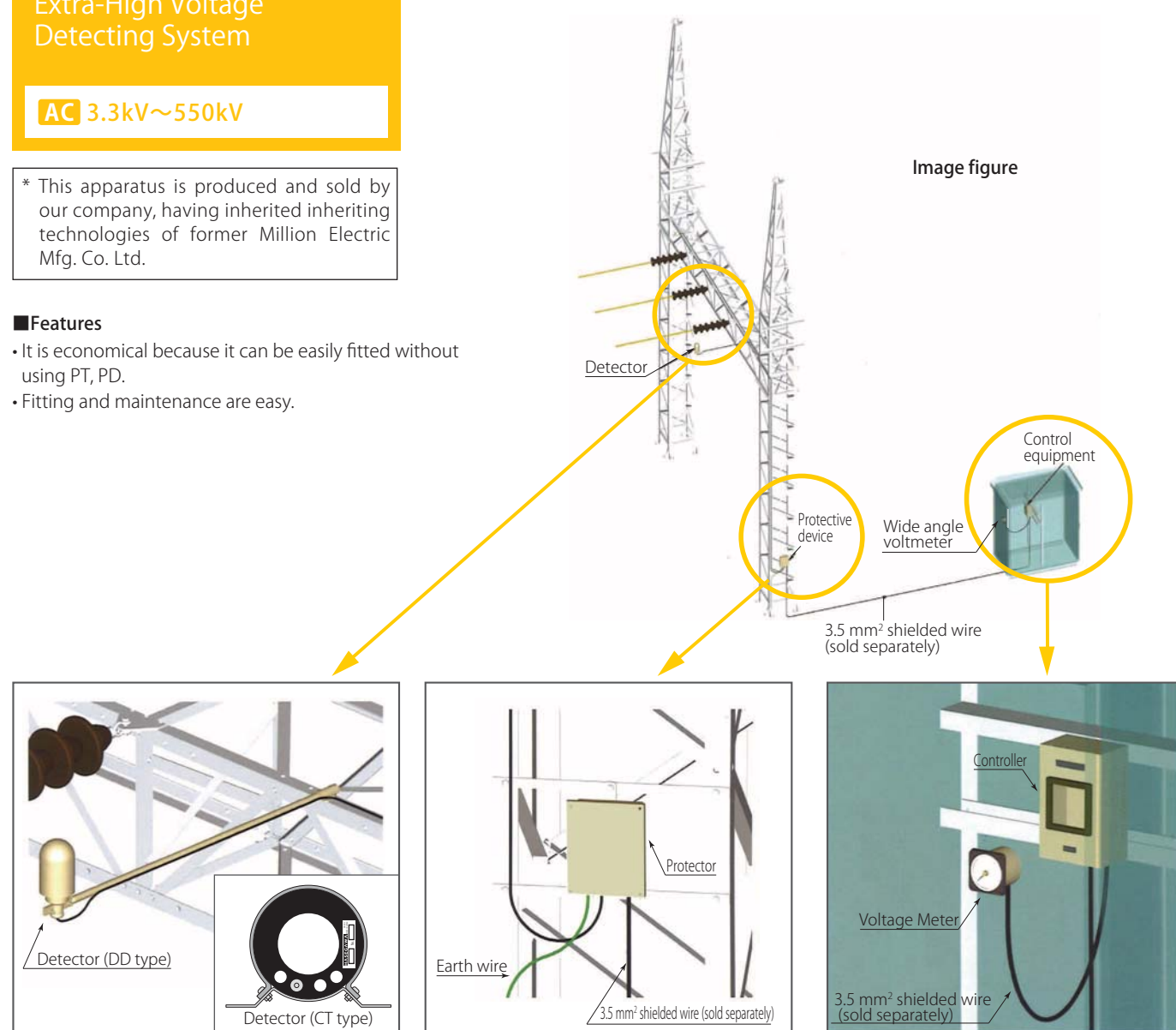
* This apparatus is produced and sold by our company, having inherited inheriting technologies of former Million Electric Mfg. Co. Ltd.

■Features

- It is economical because it can be easily fitted without using PT, PD.
- Fitting and maintenance are easy.

This indication and warning apparatus detects the presence or absence of a charged state of special high voltage substations, electric power transmission lines, power receiving equipment, etc. in a non-contact operation.

Image figure



Detector

- (DD type) HG7-DD-○m
- (CT type) HG7-CT-○m

Attached cable	Standard 10 m 20, 30, 40, 50, or 60 m to be designated
----------------	---

Protector

- HG7-P1B(for single phase)
- HG7-P2B(for two-phase)

Controller

- HG7-SM○○
- HG7-DM○○

* Refer to the following Rating table.

Voltage Meter

- 2101A30

■Rating table

Indicating type of the measuring instrument	Voltage switching indication		Indication proportional to voltage
Type of Controller (*1)	Single-phase detection	SM1AH(high sensitivity) SM1A(standard sensitivity)	DM1A
	Two-phase detection	SM2AH(high sensitivity) SM2A(standard sensitivity)	DM2A
Line voltage (50/60 Hz)		3.3~550 kV	
Contact	Operating time at charging/power failure	0.5 sec or less (However, ratio of operating point setting: 70 % or less)	
	Configuration	1c (for single phase), 1c $\times$ 2 (for two-phase)	
	Switching capacity/100 VDC	Resistance load: 0.5 A, Induction load: 0.1 A	
	Max. allowable circuit voltage	180V. DC, 140V. AC	
Meter	Output	0~1mA. DC	
	Internal resistance	Less than 5 k Ω	
Operation indication lamp		Charging: Red light, Power failure: Green light, No power: Extinguished (milky white)	
Power supply voltage		Standard: 110 V, DC (Others: 24 V, 220 V)	
Power supply current		75 mA (for single phase), 100 mA (for two-phase)	
Withstand voltage, insulation resistance (*2)		2 kV, AC-1 min; 10 M Ω or more/500 V, DC	
Impulse withstand voltage		± 7 kV, 1.2 $\times$ 50 μ S (between terminals in a lump ~ terminal E & case)	

*1. DM1A & DM2A in the table are of standard sensitivity. In addition to these, there is the low-sensitivity type SM (L).
*2. Between terminals in a group ~ case; However, terminal E should be included in the terminals of a group, or detached. Then, execute the test.

■How to decide the specification

Installation site of detector	Outdoors	Indoor	Inside the cubicle
Nominal line voltage	Control equipment	Detector	Control equipment
3.3kV	—	H	CT
6.6kV	H	H, ST	CT
11kV	H	H	CT
22kV	H, ST	H, ST	CT
33kV	ST	ST	CT
40~160kV	—	—	—
161kV~550kV	Low sensitivity (L)	Low sensitivity (L)	—

* As for H, use high sensitivity (H) of the type SM.
* As for ST, use standard sensitivity of type SM or type DM.

HXR-20

(For existing railways)

HXR-25

(For Shinkansen)

High voltage hot-line proximity alarm

AC

HXR-20

20kV

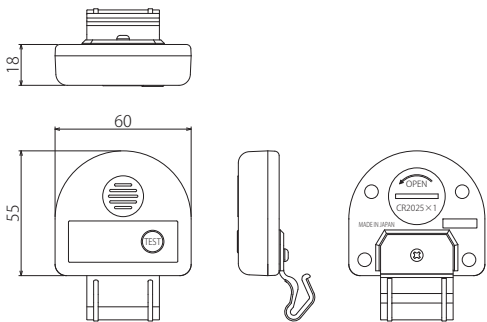
HXR-25

25kV

■Features

- Alarm is generated at a distance of about 2 m from the energized overhead contact lines in existing railways (20 kVAC) and Bullet train (25 kVAC).
- Directionality can identify overhead contact lines in a charged state
- It is compact, lightweight, and can be fitted to a helmet with a one-touch operation

■Dimensions (common to Model HXR-20 & Model HXR-25)



Detect Charged State of AC Overhead

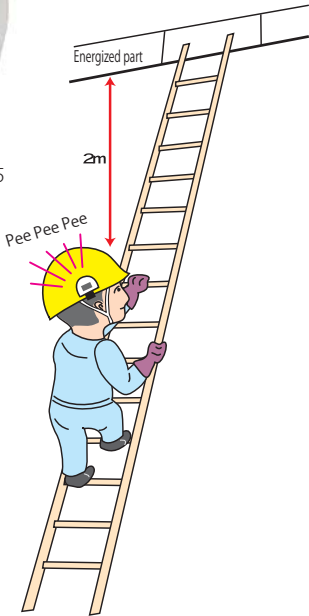
Contact Lines with Non-contact Operation

The product is a collaborative development with East Japan Railway Company (JR East)



■Specifications

Operating sensitivity (Electric field intensity)	Model HXR-20 For existing railways: 2,500 V/m Model HXR-25 For bullet train: 3,000 V/m
Standard operation starting distance	About 2 m (It differs depending on the environment.)
Alarm operation	Piezoelectric buzzer type
Sound volume	60dB±5dB/10cm
Frequency	Common use for 50/60 Hz
Structure	Waterproof structure (equivalent to IPX4)
Operating temperature range	−10℃~+40℃
Battery	CR2025(3V) × 1 pcs
Life of the battery	About two years in unused state
Dimensions	60mm×55mm×18mm
Weight	About 40g



Fiscal 2013

Railway Electrical

Technology Award

JECA FAIR 2013

Product Contest

Award

Introduction to the General Catalog of Relays

A separate volume with a blue front cover is provided as the general catalog of ground fault protection relays for AC and DC.

■Contents

- Ground fault protection relay for AC
- Zero phase current transformer
- Transformer for ground mode measuring instrument
- Ground fault protection relay for DC
- Ground fault current transformer for DC
- DC ground fault protection relay



■DC ground fault protection relay for quick chargers of electric vehicles
(Conforming to CHAdeMO standard)

■Plug-in type DC ground fault protection relay
■DC ground fault current transformer

■DC circuit breaker for wiring with direct current leakage alarm



■Plug-in type AC current leakage relay

■ ω C measurement type digital ground fault protection relay



To prevent accidents during electrical work, extensive research has been carried out to improve facilities/equipment, working methods, and mechanical tools. Among those, the voltage detector for checking final charging status and electric power outages of circuits and apparatus onsite is an indispensable device for preventing electrical accidents. During electrical work, it is not uncommon for electric shock accidents to occur due to mistaking live lines for lines with a power stoppage. It is important for workers to confirm without fail, that electricity lines do not have electricity flowing through them using a voltage detector before touching them. Their use is also required by OSH Regulations (Article 339).

A voltage detector is a device that detects whether electricity is flowing in a circuit or not. Various types of detector have been manufactured and are widely used. But, there was no official standard for the structure and performance of voltage detectors, and they were mainly manufactured according to the in-house specifications of users, such as electric power companies. However, since the electronic circuit voltage detector with a built-in battery was developed in recent years, detectors with complicated structures and unique modes of operating performance have been manufactured by various companies. Accordingly, the National Institute of Industrial Safety in Labor Ministry (at that time) released the Safety Guideline on the structure, performance, test method, and use of these voltage detectors, in order to make their selection and correct use well known.

The following explains the structure, performance, and correct use, mainly of high/low voltage detectors for AC circuits, which are in general use.

1. Structure and operating principle of voltage detector

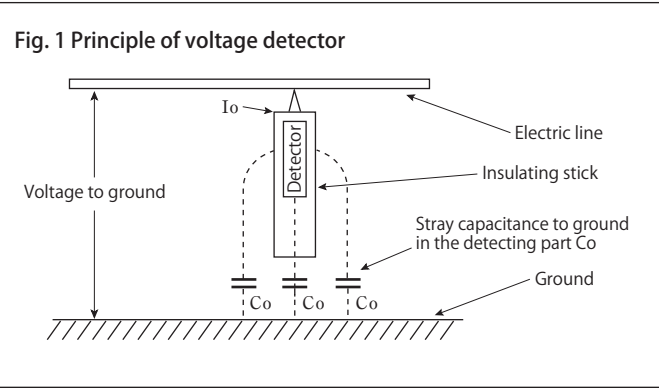
1.1 Voltage detection of AC circuit

In general, voltage detectors have a structure with a detector built into a casing of insulation material. When the contact tip of the voltage detector makes contact with a cableway (electric circuit) as shown in Fig. 1, it detects minute electric currents I_0 flowing in the Electric line → Detector → Stray capacitance to ground in the detecting part C_0 of the detector → Ground, and is activated. Then, it identifies the charging or electric power outage status of the circuit, indicating the result by lighting a lamp or sounding an alarm.

There are various types of voltage detector, depending on the working voltage, such as low voltage, high voltage, and special high voltage detectors, and according to the targeted application, such as for overhead lines and substations. There are many types of voltage detector including, for example, low voltage driver type or pencil type voltage detectors, which can easily check whether or not a voltage is applied to a household plug socket and to the cable terminals of electric appliances, as well as voltage

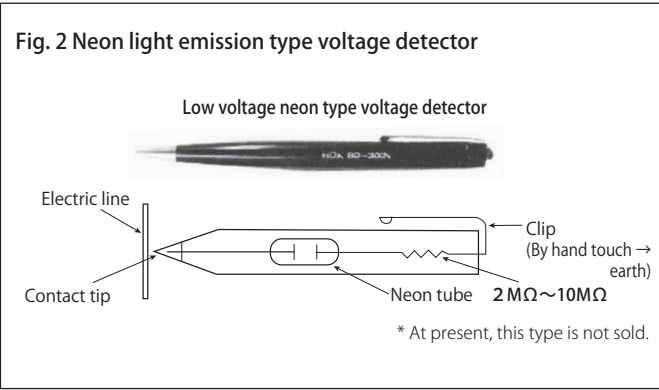
detectors used for construction work, inspecting electric power supply equipment, etc.

Among commonly used voltage detectors, the neon light emission type, which has the merits of a simple structure and not requiring a power supply, has been widely used. However, its weak luminance is a drawback when checking if its lamp is lit, which is a vital point. Accordingly, a better indication of detection than that provided by the discharge light emission from a neon tube has been required by users. Today, a voltage detector that can detect a voltage through an insulated cable and indicate it has been developed, with battery and amplifier circuit built in. This has become a commonly used type.



◆Neon light emission type voltage detector (Fig. 2)

This made use of the feature whereby if a discharge voltage is applied to a neon discharge tube, it glows a brilliant orange color, even in the case of a minute current. It has been widely used for low, high, and special high voltage detectors, because its structure is very simple and it is easy to handle. Its drawback is that the weak light emitted is difficult to verify in well-lit areas, and voltage detection is not possible through the covering of an insulated cable.



◆Electronic circuit type voltage detector (Fig. 3) (Fig. 4)

This device identifies charging or electric power outage status by incorporating a battery and an electronic amplifier circuit with semiconductors inside the voltage detector. These amplify the minute detection current to light an easy-to-see indication lamp, and convert the current into an audio frequency to generate an easy-to-hear sound using the switching circuit and oscillating circuit.

The great advantage is that by designing an amplifier circuit it is possible to manufacture voltage detectors with various characteristics and to have the common type for high/low voltages, as well as to detect a voltage through an insulating sheath. Furthermore, because electronic circuit type voltage detectors are provided with a button for easily checking the battery and built-in circuit, it is easy to confirm a voltage detector's functions.

Fig. 3 Audio signaling and light emitting type low voltage detector (example)

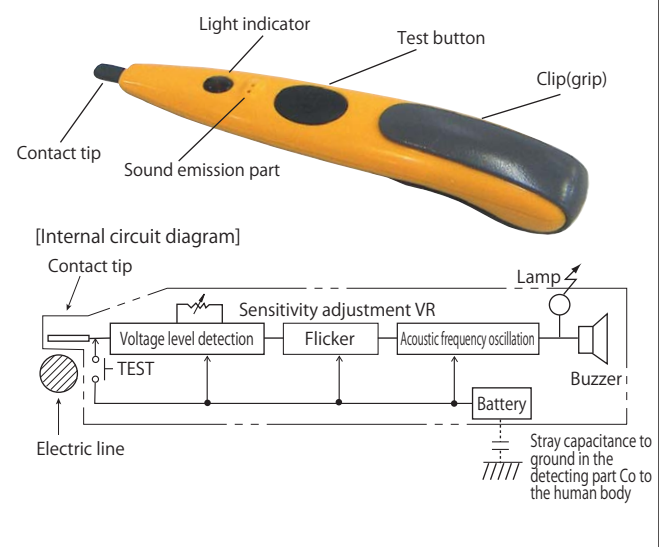
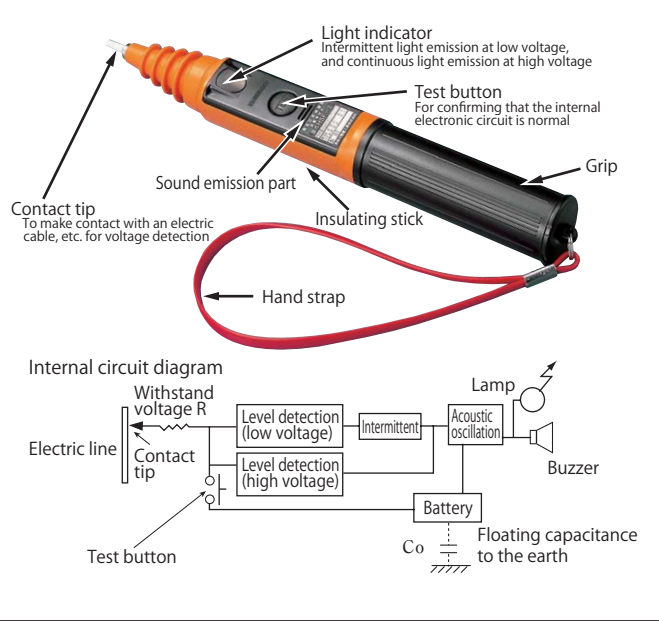


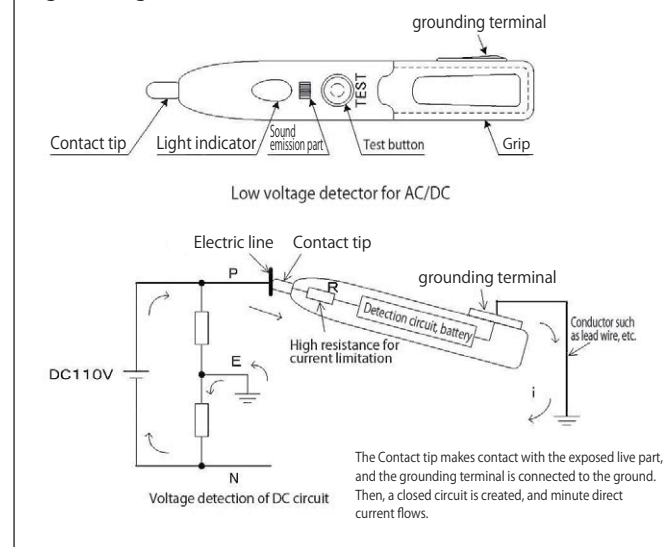
Fig. 4 Audio signaling and light emitting type high/low voltage detector (example)



1.2 Voltage detection of DC circuit

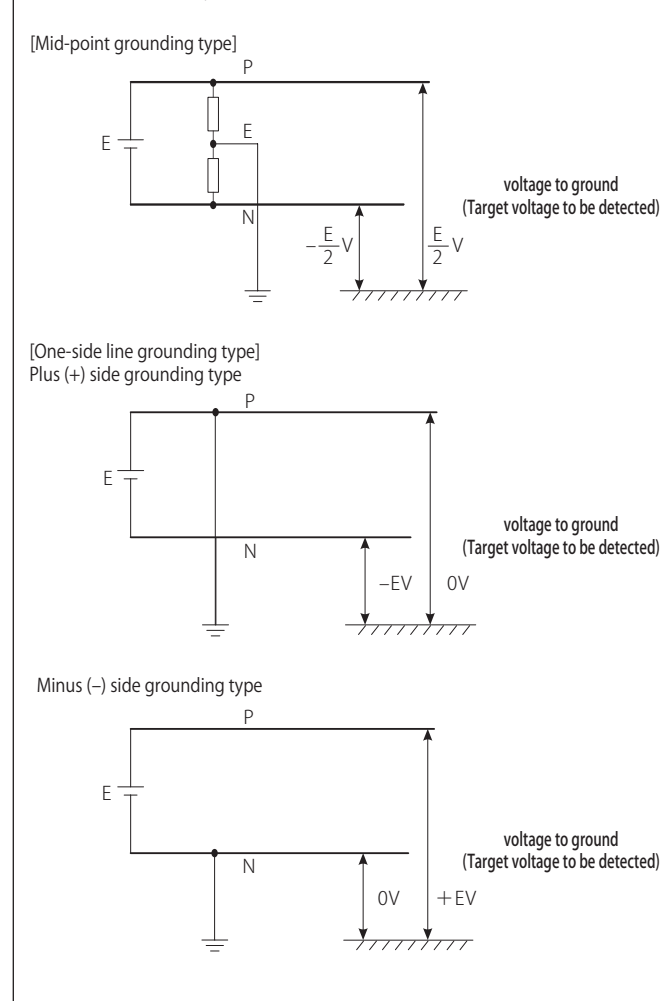
When detecting the voltage of a DC circuit, it is possible to have the contact tip make contact with an exposed live part of a electric line then create a closed circuit by connecting the earth terminal to the ground, and flow a direct current (**Fig. 5**), because the current does not flow via capacitance, unlike the case of AC. Therefore, voltage detection through a covering (sheath) is not possible in the case of a DC circuit. Furthermore, a voltage detector exclusively for AC use cannot detect a DC voltage. Moreover, voltage detection in a DC circuit with the cableway not grounded is impossible, because there is no return route for the current. The grounding system and voltage to the earth of the low voltage DC circuit are shown in **Fig. 6**.

Fig. 5 Voltage detection of DC circuit



As described above, because the voltage to the ground (target voltage to be detected) differs depending on the type of voltage, wiring, and grounding system, and the detection method also differs between AC and DC, a basic task of voltage detection is to identify the kind of Electric line (electric circuit) in which the voltage is to be detected, then select a suitable voltage detector, and execute voltage detection with the correct method.

Fig. 6 Grounding system and voltage to the earth of DC circuit



2. Performance required of voltage detectors

The first main performance priority from the viewpoint of a voltage detector's intended use is voltage detection sensitivity (operation starting voltage). It tends to be considered that as sensitivity increases, performance increases. However, as sensitivity increases, there are concerns that false-positive indications increase due to noise and/or induction. Other important things to consider are withstand voltage in terms of the safety of users, and indication method from the viewpoint of certainty.

2.1 Operation starting voltage (detectable minimum voltage)

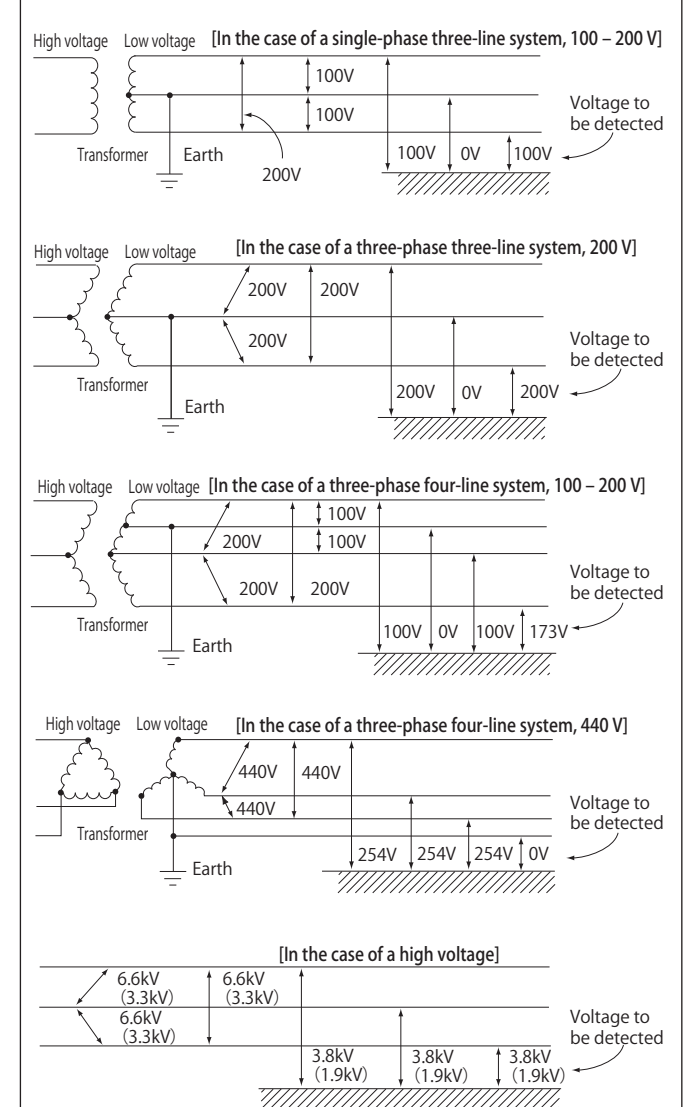
In normal cases, a user of a voltage detector holds the main body or one end of the insulating stick connected to the main body with a hand(s), then makes contact between the detector and one line of the cableway, detecting the voltage flowing in the conductive cableway to the earth (voltage to the earth). Therefore, the operation starting voltage is indicated by the voltage to the earth. The target voltage to be detected in a low voltage circuit and a high voltage circuit is the voltage to the earth, as shown in **Fig. 7**, which is lower than the line voltage. In addition, voltage detection in a grounded cableway (line) is naturally impossible, because the voltage to earth is zero.

- (1) The low voltage detector** generally targets the minimum circuit voltage, which is 100 V (95 to 107 V), and the operation starting voltage is set at $65 V \pm 15 V$, or not to exceed 80 V. In a voltage detector dedicated to low voltages, there is also a detector in which the voltage to the earth is set at 50 V or lower as the target (limit) under the OSH Regulations, because there is no need to consider the influence of induction from a high voltage.
- (2) Regarding a high voltage detector**, there are cases where a working voltage of 300 V or higher is specified as a high voltage, because the voltage to the earth is 254 V, with regard to a 440 V three-phase four-wire system, which is the highest voltage of a low voltage circuit. Furthermore, there is also a case where 600 V or higher can be detected, based on the regulation: "High voltage of

AC denotes the range of higher than 600 V to 7,000 V or lower," specified in Technical Standards (ministerial ordinance).

In addition, in the case of a voltage detector dedicated to high voltages, there are various types depending on target cableways and applications, such as the case in which the voltage to earth of 1,900 V for a 3,300 V circuit is set at 1,000 V (almost 1/2) considering the margin for voltage detection, in order to prevent miss-operation due to induction from the live wire, as far as possible, and the case in which the working voltage is set at 3,300 V against the voltage to earth of 3,800 V for a 6,600 V circuit, considering the margin, and to enable voltage detection through a sheathed wire. In general, the value that enables detection of the voltage to earth for the targeted circuit's voltage, through a sheathed wire and with a

Fig. 7 voltage to ground of various circuits (detection voltage)



margin considered appropriate for safety, is used for voltage detection.

For comparison, **Table 1** shows a partial quoted example of an apparatus and supplies material standard for Japanese electric power companies.

Table 1 Partial example of the apparatus and supplies material for a voltage detector

	Operation starting voltage [V]		Remark
	Bare wire (a)	Coated wire (b)	
Company A	250 ± 50	(2,900 or less)	audio signaling and light emitting type
Company B	300 ± 50	(3,300 or less)	〃
Company C	1,000 or less	3,300 or less	〃
Company D	1000 ± 200	2800 ± 500	〃

(Note)(1) The reason why the ratios in column (a) and column (b) differ significantly between companies A, B and companies C, D is due to structural differences in the voltage detector.
(2) Although the values in () of column (b) are not described in the apparatus and supplies material standard, they are used as practical standard values.
(3) That of company A is a common type for 50/60 Hz, and the others are dedicated to a designated frequency.
(4) The table above describes only the high voltage range of a high/low voltage detector.
(The low voltage range is specified as 65 ± 15 V by every company.)

2.2 Non-operation distance

When a voltage detector approaches a high voltage circuit, it is activated from a certain distance. However, if operation starts too far away, a phenomenon is generated whereby discriminating between live lines and non-energized lines among plural targets becomes impossible. Then, it is considered that, not only can the primary purpose of the voltage detector not be achieved, but it is also dangerous. Accordingly, it is common to specify a minimum distance for a system, beyond which operation is not started when the voltage detector approaches (called the non-operating distance), and in the case of a high voltage, the non-operating distance is usually 3 to 5 cm.

2.3 Withstand voltage

A high voltage detector is classified from the viewpoint of actual use for defective (porcelain) insulators, etc. among apparatus for live-line work, as described in the Public Notice of the Ministry of Labour No. 33, Article 9. Generally, it shall withstand an AC test voltage corresponding to two times the voltage of the target cableway to be used, for one minute. Regarding voltage detectors with a built-in battery, detectors having a withstand voltage performance of not only 14,000 V (6,900 V × 2), but also 20,000 V are manufactured,

2.4 Representation of the result of detection (light and sound)

It is specified that detection by voltage detectors shall be indicated by either light emission or sound generation (Safety guideline for voltage detectors).

Regarding indication by light emission, it is generally possible for light emissions to be identified if the luminance is 8,000 lux on a practical basis in shadow in sunlight (place without direct sunlight).

Regarding sound indication, it is also necessary to consider locations with high ambient noise of 80 dB, such as in the vicinity of roads in urban areas, when reviewing the usage environment of a voltage detector. However, a sound volume of 50 dB or more is deemed sufficient in practice, using sound generated at around 3,000 Hz, to which the sensitivity of a human’s auditory sense is high, because ambient noise is generally in low frequency bands, which corresponds to the low tone range.

3. How to use voltage detectors correctly

3.1 Check carefully before use.

Because a voltage detector is an important device for protecting the lives of workers, it must always be stored and handled carefully. External appearance as well as lighting should also be check before use. Defective products must be replaced immediately.

- (1) Confirm whether the working voltage range of the voltage detector conforms to electric line or not.
- (2) Visually check for the presence or absence of breakages, dirt, flaws, cracks, etc. in the voltage detector.
- (3) Confirm that the detecting function of the voltage detector is normal, using a known power supply, voltage detector checker (**Fig. 8**), etc.
- (4) For a the voltage detector with a built-in battery, confirm that the internal circuit and battery voltage are normal by checking the mechanism (test button).

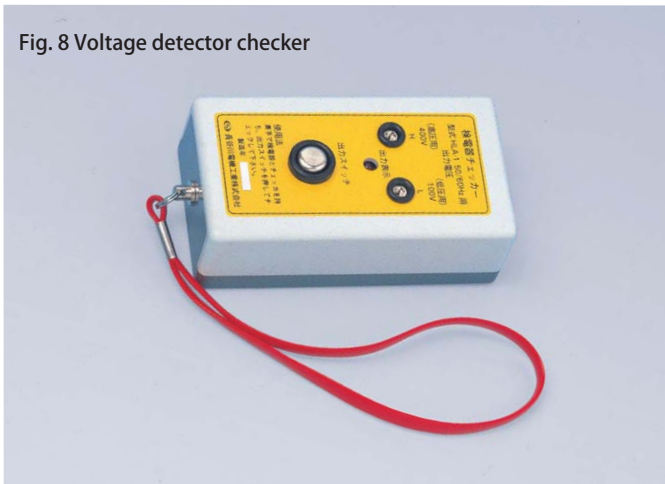


Fig. 8 Voltage detector checker

■Point to be noted about contact tip made of conductive rubber

Insulation materials such as oil shall not adhere to the conductive rubber part (detector). In particular, if gasoline, alcohol, etc. adhere, conductive properties can be lost.

Do not wipe it with chemicals, etc. When cleaning, use a soft and clean dry cloth.

3.2 Points to be noted for voltage detection

- (1) Before voltage detection, confirm that the voltage detector corresponds to a suitable working voltage range

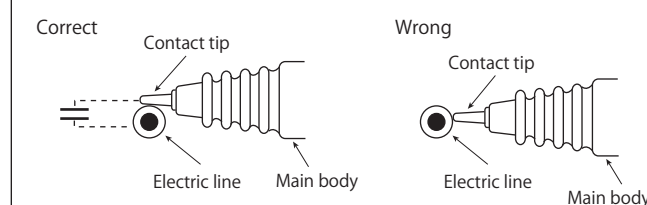
that conforms to the target cableway; (Example: A low voltage detector cannot detect high voltages). Also confirm the status of the cableway, with switches, indication lamps, and circuit diagrams, etc.

- (2) Set the insulating stick to the normal state by extending and/or tightening it, depending on the type of voltage detector.
- (3) During voltage detection, do not touch parts other than the grip of the voltage detector, because this may be dangerous.
- (4) When detecting a high voltage, wear insulated rubber gloves when a hand approaches within a distance of 60 cm from the high-voltage part. If an ordinary voltage detector with a length of 25 cm is used, be sure to wear insulated rubber gloves. In the case of an inspection tour, and if protective equipment and/or protective guard are not carried, it is convenient to use a long voltage detector with an insulating stick.
- (5) When there is a risk of a surge voltage being generated, such as when a lightning strike occurs or when opening/closing a circuit breaker, switch, etc., stop using the voltage detector.
- (6) Voltage detection in the rain should be avoided, in principle. When it is performed from sheer necessity, pay attention to the wet condition of the voltage detector, and whether operation in the rain is reliable or not. It is also necessary to investigate and confirm whether there is a risk of electric shock or not.
- (7) Perform voltage detection for each phase, sequentially.
- (8) Perform voltage detection by moving the voltage detector closer from the earth side to the electric line.

3.3 How to make contact with a voltage detector

Hold the grip of a the voltage detector firmly, and have it make contact with the part targeted for voltage detection. When detecting voltage through a covered (sheathed) wire, ensure sufficient contact between the detector and the wire as shown in **Fig. 9**. Otherwise, capacitance between the core wire and detection metal fitting changes, and operating sensitivity decreases.

Fig. 9 How to make contact with the contact tip of the surface of coated wire

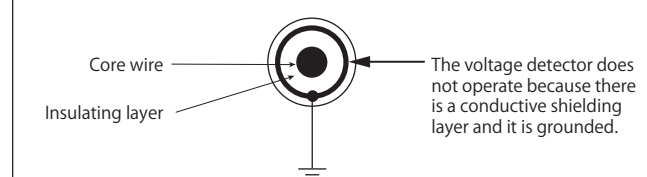


3.4 Voltage detection for a high voltage electric line is not possible.

Voltage detection for the high voltage power cable is not possible because the conductor is shielded and grounded with conductive tape. (Fig. 10)

Perform voltage detection at the terminal that is specially provided at the cable end for detection, using a dedicated voltage detector. Furthermore, there are also cases of using a current detector for detecting a current that flows in a cable.

Fig. 10 Voltage detection for a high voltage electric line is not possible.



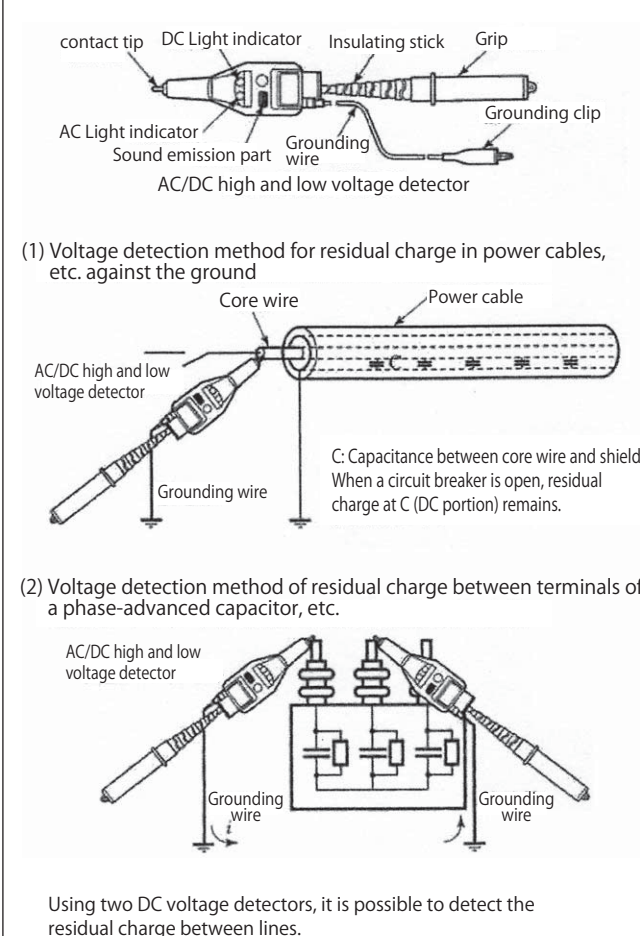
3.5 Electric discharge of residual charge

When there are electric power cables, power capacitor, etc. on the cableway, it can be hazardous even with an AC cableway, because a residual DC charge remains after an electric power outage. In the OSH Regulations No. 339 Article 2, it is specified that “Regarding a cableway where its open-circuit has power cables, power capacitor, etc. and there is a risk of danger due to residual charge, the corresponding residual charge must be securely discharged with a safe method,” and it is necessary to completely discharge the residual charge with a discharge bar or similar means. At this time, there are cases of a charge remaining between the cableway and the earth, and cases of it remaining between lines. So, discharge all residual charges with care. In addition, it is nec-

essary to take sufficient time when discharging, because there are also cases in which it takes a long time for discharging, depending on the resistance value of a discharge resistor and capacity of a condenser.

Moreover, when the residual charge is checked, use a voltage detector for dual AC/DC use, and perform voltage detection for the electric potential at both ends where the electric charge remains (Fig. 11).

Fig. 11 Method of detecting a residual charge



3.6 Precautions for carrying and storage

- (1) Handle voltage detectors carefully, and pay attention not to apply a shock or strong force, caused by dropping, placing a heavy object on top, etc.
- (2) Pay attention not to leave it on a road or at a place that is subject to high temperatures, such as inside a car in summer.
- (3) In winter, when a voltage detector is suddenly brought out from a hot room to the cold outdoors or the reverse, dew condensation can be generated at the volt-

age detector, and its operating functions may be affected. So, attention is required.

- (4) For storage, select a dry, clean dust-free location inside a room, which is not exposed to direct sunlight.

3.7 Perform periodic inspections without fail

Voltage detectors are not included among the targets of periodic inspections specified by law (by OSH Regulations). However, unlike work tools such as pliers and screwdrivers, a voltage detector is an important piece of safety equipment for preventing accidents to workers due to electric shock when doing work related to electricity. Therefore, it is considered desirable to periodically check withstand voltage performance. (Safety guideline for voltage detectors)

- (1) The withstand voltage test for a high voltage detector is to be performed at a test voltage of 10 kV or higher for one minute, at least once a year.
- (2) The built-in batteries of voltage detectors are to be checked at periodic inspections and replaced, because there is a natural discharge of individual battery units, even if not used.

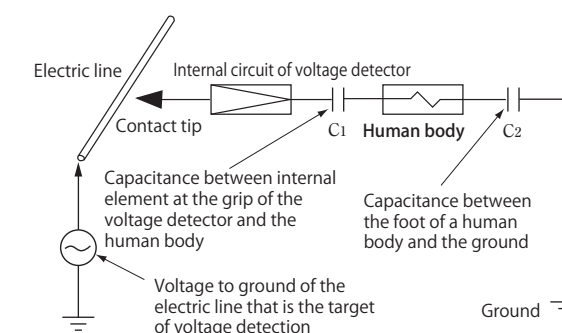
4. Influence of unique usage conditions

The site environments where voltage detectors are used are not always the same, and detection performance sometimes changes depending on usage conditions. The conditions with notable influences are as follows.

4.1 When the correct position of the grip is not identified:

If the grip of a commonly used short voltage detector is not held firmly, and when it is used in a state in which it is only held by finger tips, the operation starting voltage increases because the value of capacitance C_1 , as shown in the equivalent circuit of Fig. 12, decreases.

Fig. 12 Equivalent circuit using a voltage detector



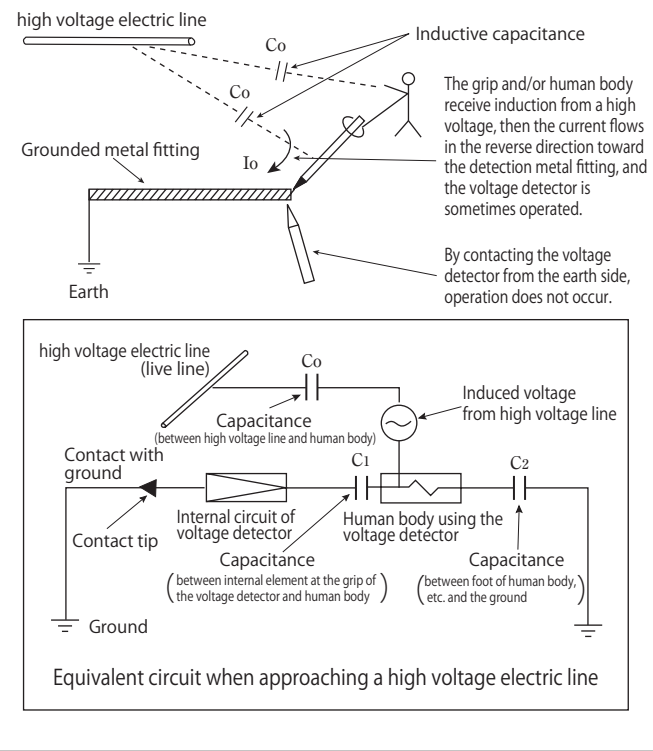
4.2 When voltage detection is performed near a high voltage electric line:

When the detector of a high/low voltage detector (with built-in battery) makes contact with an earth wire or grounded metal while approaching a high voltage live part on a pillar or inside an electric utility room, the voltage detector sometimes displays “Voltage is applied,” in the range of low voltage use.

This phenomenon is explained, as shown in Fig. 13, as the human body and/or grip of the voltage detector that approaches the high voltage line having a voltage that flows to the earth due to induction from the live line, and an induction current flows in the reverse direction from the grip of the voltage detector to the detector, causing it to operate. In such a case, abnormal operation can be prevented by keeping it as far as possible from the high voltage line, or carrying the voltage detector from the earth side, because induction is decreased.

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Fig. 13 How to make contact between detector and surface of a sheathed wire

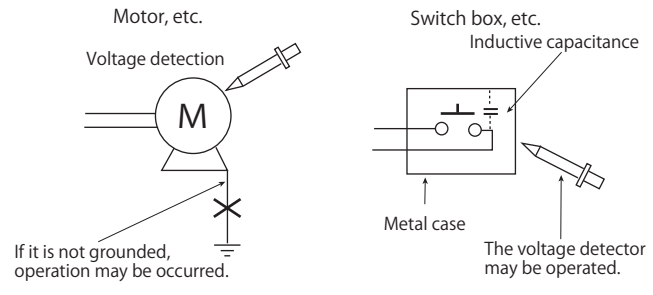


4.3 In the case of apparatus that is not grounded:

To reduce the inflowing current to the human body to a very small value, the impedance between the detector and the human body is increased to a very large value. Accordingly, when the casing of the apparatus is not grounded as shown in **Fig. 14**, the voltage detector sometimes gives an indication when the inductive capacitance of the apparatus is large, even if the insulation of the target apparatus is normal.

In such a case, it is necessary to confirm whether the grounding of the apparatus is perfect or not. Furthermore, in the case of apparatus that is not grounded, measure the voltage to verify if it is in a safe range or not using a meter with a relatively low impedance, such as an analog tester.

Fig. 14 Voltage detection at the casing of electric apparatus



A comprehensive explanation of high/low voltage detectors has been provided above. Again, because voltage detectors are important items for ensuring safety during electrical work, correct use with sufficient recognition of the system/mechanism is naturally required. We hope this document helps ensure correct use of voltage detectors. For details of quoted regulations, etc., refer to the following.

- OSH Regulations No.339 (Work following an electric power outage)
- OSH Regulations No.342 (Work in proximity to a high voltage)
- OSH Regulations No.348 (Electrical insulating protectors, etc.)
- OSH Regulations No.352 (Inspection before use, etc.)
- OSH Regulations No.354 (Exclusion from application)
- Public Notice of the Ministry of Labour No.33 (revised version), 1975 (Standard of protectors for insulation, etc.)
- Technical guideline of National Institute of Industrial Safety in Labor Ministry
RIIS ~ TR ~85~2
(Safety guideline for portable voltage detector for high voltage wiring cableway)

■Warranty period

- Product warranty period is one year after purchase. If any failure, trouble, etc. is caused during normal use in the course of the warranty period, we will repair or replace it free of charge.

■Scope of warrantee

- If disassembly, modification, etc. is performed by customers, the product becomes outside the scope of warranty.
- Consumable parts such as batteries attached to products, etc. are outside the scope of warranty. Furthermore, because attached batteries are provided for the purpose of confirming operation, early replacement is recommended.

■Repair

- If the product malfunctions, please inquire at a sales office of our company or a sales agent. Requests for repair will be received through sales agents.
- When an estimate before repair is needed, please request it when asking for the repair. When declining repair after submission of the “estimate before repair,” the cost of diagnosis will be requested.
- Warranty period after repair is six months. Scope of warranty is limited to the corresponding portion(s) repaired, and even within that warranty period, any new problem arising is outside the scope of warranty.

[Period for repair]

Materials and components for repair are kept for a minimum of five years after stopping manufacture of a product. However, please note that there are cases in which repair can become impossible before that period has expired.

■Recommended period for replacement

(voltage detector, phase tester, auxiliary device for voltage detection, etc.)

Products can be used for a long period if they are handled with sufficient care. However, it is inevitable that functional deterioration occurs to the strength of components, insulation performance, etc. due to aging, micro-cracks caused by shocks when handling resin parts, etc. For safety, please use the product until the recommended time for replacement under product control. The table to the right summarizes recommended replacement periods.

For a detailed table, please inquire at our company’s homepage (URL is given on the back cover of the catalog) or a sales office.

Product classification	Recommended period for replacement
Low voltage detector	3 to 5 years
High voltage detector	5 to 7 years
High voltage & special high voltage detector	
High voltage & special high voltage detector (Non-extendable type)	5 to 10 years

■Periodic inspection, calibration test

- For high voltage and special high voltage detectors, we recommend periodic inspection at least once a year. For requests, please inquire at a sales office of our company, or a sales agent.
- After the calibration test, we will issue a test report, calibration certificate, and traceability certificate.
- If calibration documents are required when purchasing a new product, please request them when placing an order.

■Consigned testing

Taking advantage of being a leading maker of domestic test equipment and many years of experience, we will execute withstand voltage tests for products even made by other companies.



Voltage detector test equipment



Simulated power pole for electricity distribution line

■ISO management system Acquiring certification of ISO9001, ISO14001

Hasegawa Electric Co., Ltd. has acquired certification of “ISO9001,” which is the international standard of the Quality management system, and certification of “ISO14001,” which is the international standard of the Environment management system.

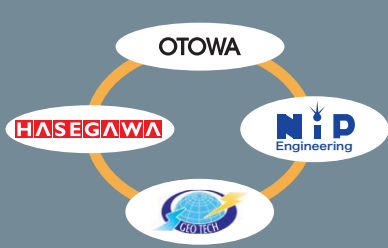
ISO9001 Registration No.: 0921

ISO14001 Registration No.: E635



Information materials	Relay	Railway products	Measuring instrument	Illuminator	Discone hook stick	Discharge stick	Grounding hook	Phase tester	Auxiliary device for voltage detection	Voltage detector checker	Voltage detector	Index etc.
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Introduction to group companies



OTOWA ELECTRIC CO.,LTD.

(Sales of various lightning arrestor products and sales of other electric equipment and devices)

Homepage <http://www.otowadenki.co.jp>

E-mail sales@otowadenki.co.jp

Otowa Korea Co., Ltd.

Homepage <http://www.otowa.co.kr>

E-mail dsyoo@otowa-kr.com



NIP Engineering Co., Ltd.

(Design and sales of lightning arrestors, grounding systems, and operational services for photovoltaic power generation, etc.)

Homepage <http://www.kami-nari.com>

E-mail nip@kami-nari.com



Geological Assessment Tech Co., Ltd.

(Geological survey and water quality survey, grounding design, grounding resistance reduction work, and consulting)

Homepage <http://www.geotech.co.jp>

Meneon Co., Ltd. (Execution of work and maintenance of lightning protection system)



Ceraon Co., Ltd. (Production and sales of ceramic device products)

Information materials	Relay	Railway products	Measuring instrument	Illuminator	Discone hook stick	Discharge stick	Grounding hook	Phase tester	Auxiliary device for voltage detection	Voltage detector checker	Voltage detector	Index etc.
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