

GENERAL CATALOGUE Vol.2-1

- 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.

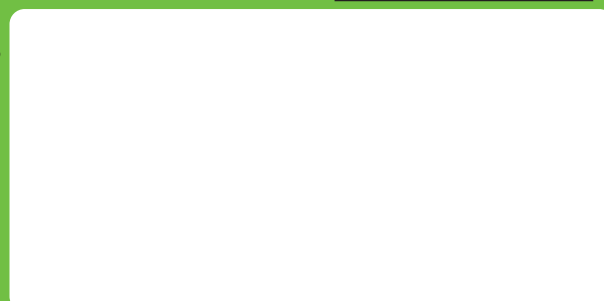
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High voltage

Voltage detector P.21 to 23
Portable live part detector P.30
Phase tester P.34 to 35
Grounding hook P.36 to 41
Discone hook rod P.44

For electric substation equipment

Extra-High Voltage Detecting System(VOLTECT) P.47

Hydroelectric power plant

high voltage substation

154kV~187kV

Wind force power generation system

Primary substation

275kV~500kV

Nuclear power plant

Thermal electric power plant

Low voltage

Voltage detector P.13 to 16
Phase tester P.33
Leakage current measuring device P.46

For photovoltaic power generation system (DC)

Voltage detector P.15 to 16, 19

For electric vehicle (DC)

DC Voltage Checker for
Electric Vehicle P.32

100~440V

Shopping street

Residences

Medium voltage

66kV~77kV

Substation for electric power distribution

6.6kV~36kV

Electricity distribution lines

6.6kV~36kV

Factories

6.6kV~36kV

Buildings

Voltage detector P.17 to 23
Phase tester P.34 to 35
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.36 to 41
Discharge stick P.43
Discone hook stick P.44

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

Voltage detector P.24 to 26
Induction voltage detector P.26
Grounding hook P.42

Medium voltage hot line proximity
alarm P.48

For receiving plant equipment

Extra-High Voltage Detecting System
(VOLTECT) P.47

Common

Voltage detector checker
P.27 to 28

Illuminator P.45

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

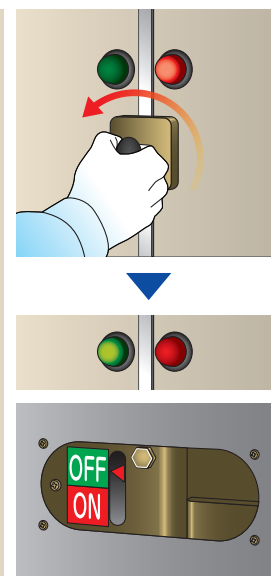
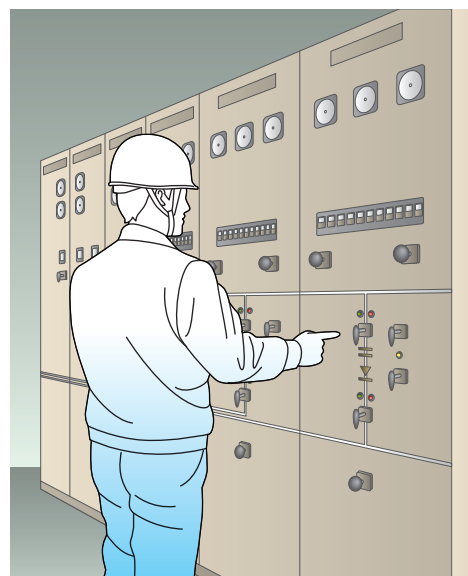


Flashing LED
SPL-Y/R/B/W

Confirming dead-line work

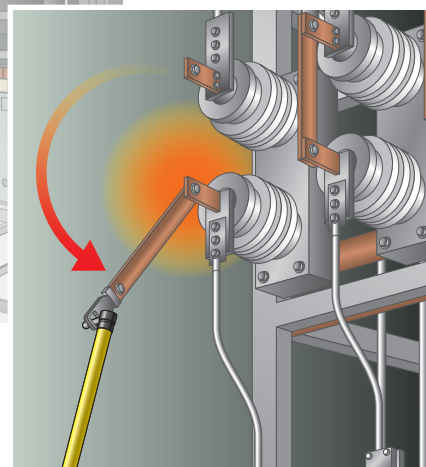
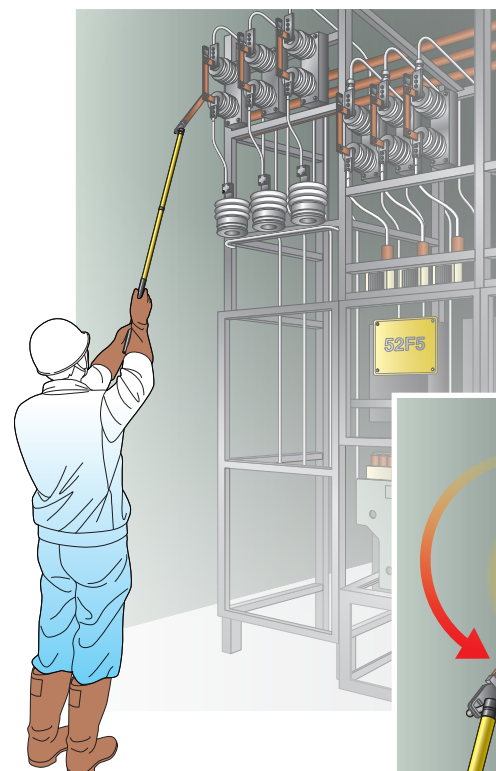
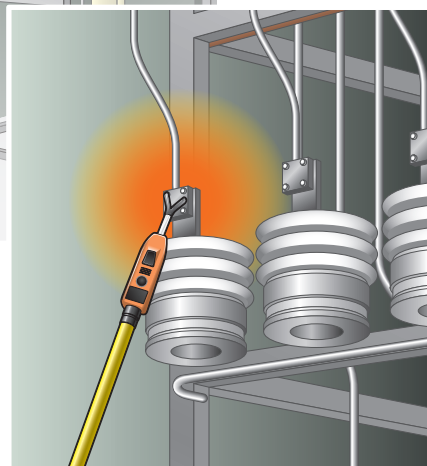
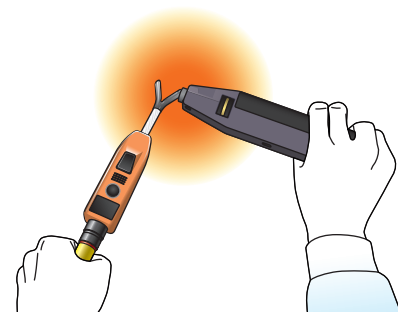
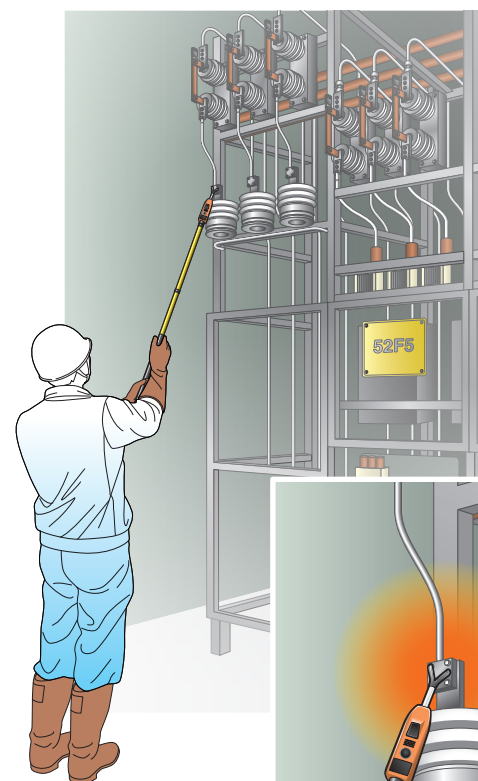


① Visual inspection of appearance and structure
Battery check by pushing the test button



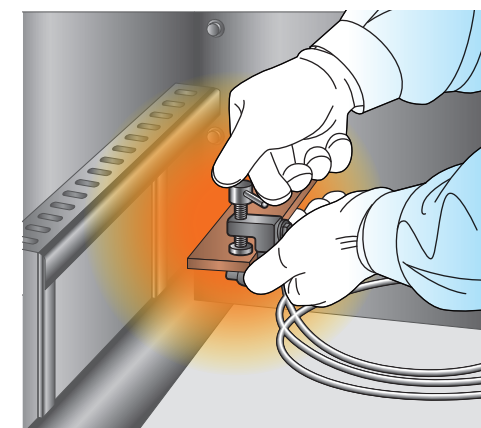
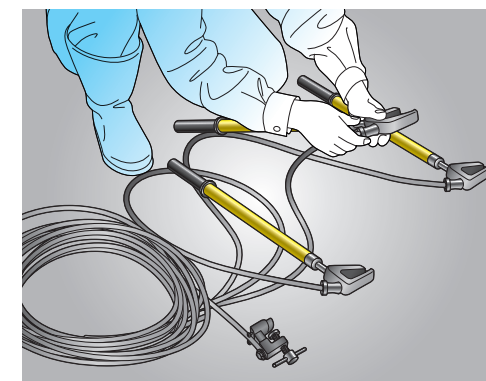
③ Turn off the Circuit Breaker
Turn off the disconnect switch

④ Bring the voltage detector into contact with Line 1, confirm the power is off.
Bring the voltage detector into contact with Line 2, confirm the power is off.
Bring the voltage detector into contact with Line 3, confirm the power is off.
* Confirm all 3 lines



② Confirm normal operation of voltage detector contacting any charged conductor already known

⑤ Visual check of grounding hook set.
Appearance and construction check

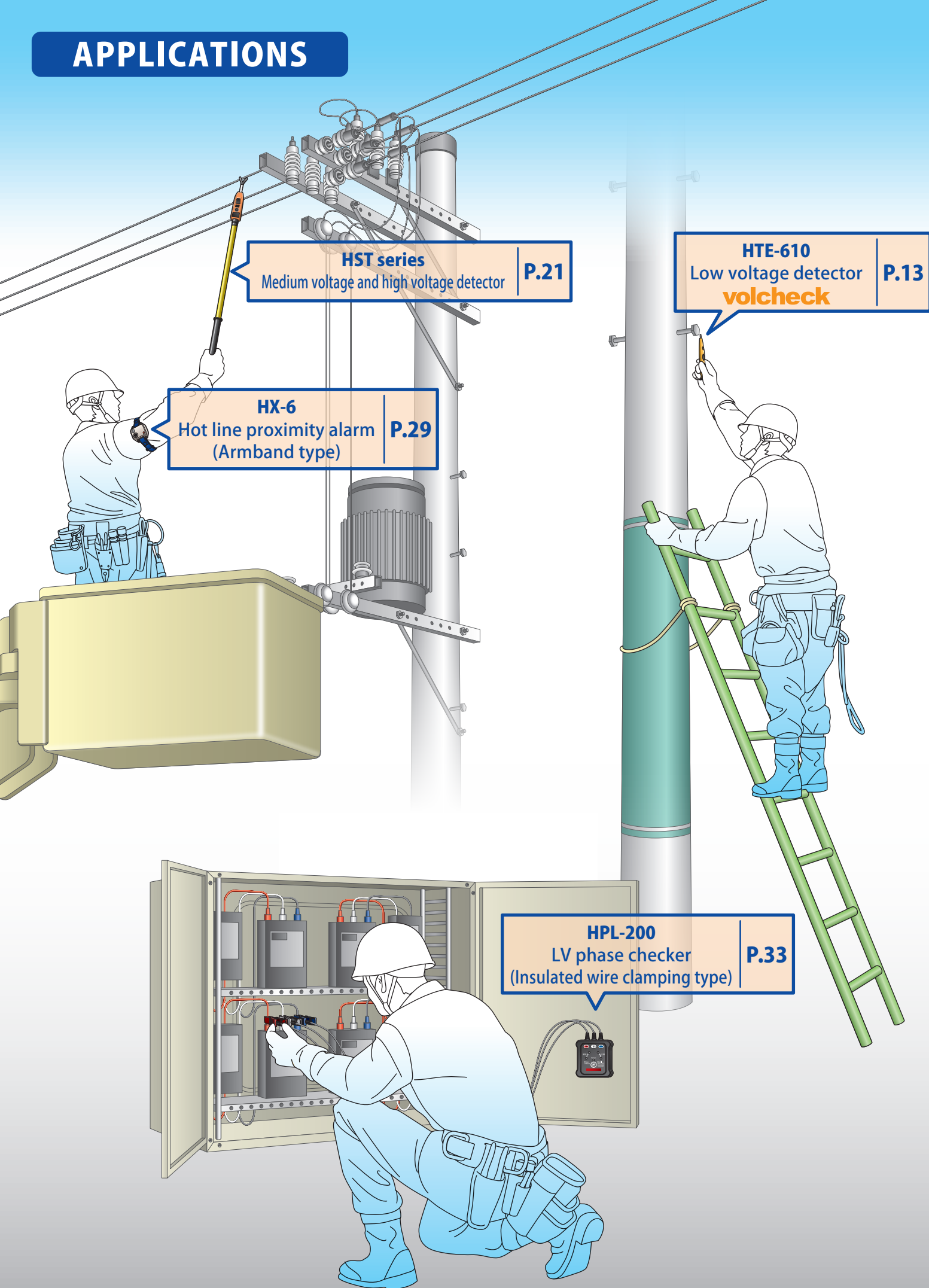


⑥ Connect the grounding device to earth terminal

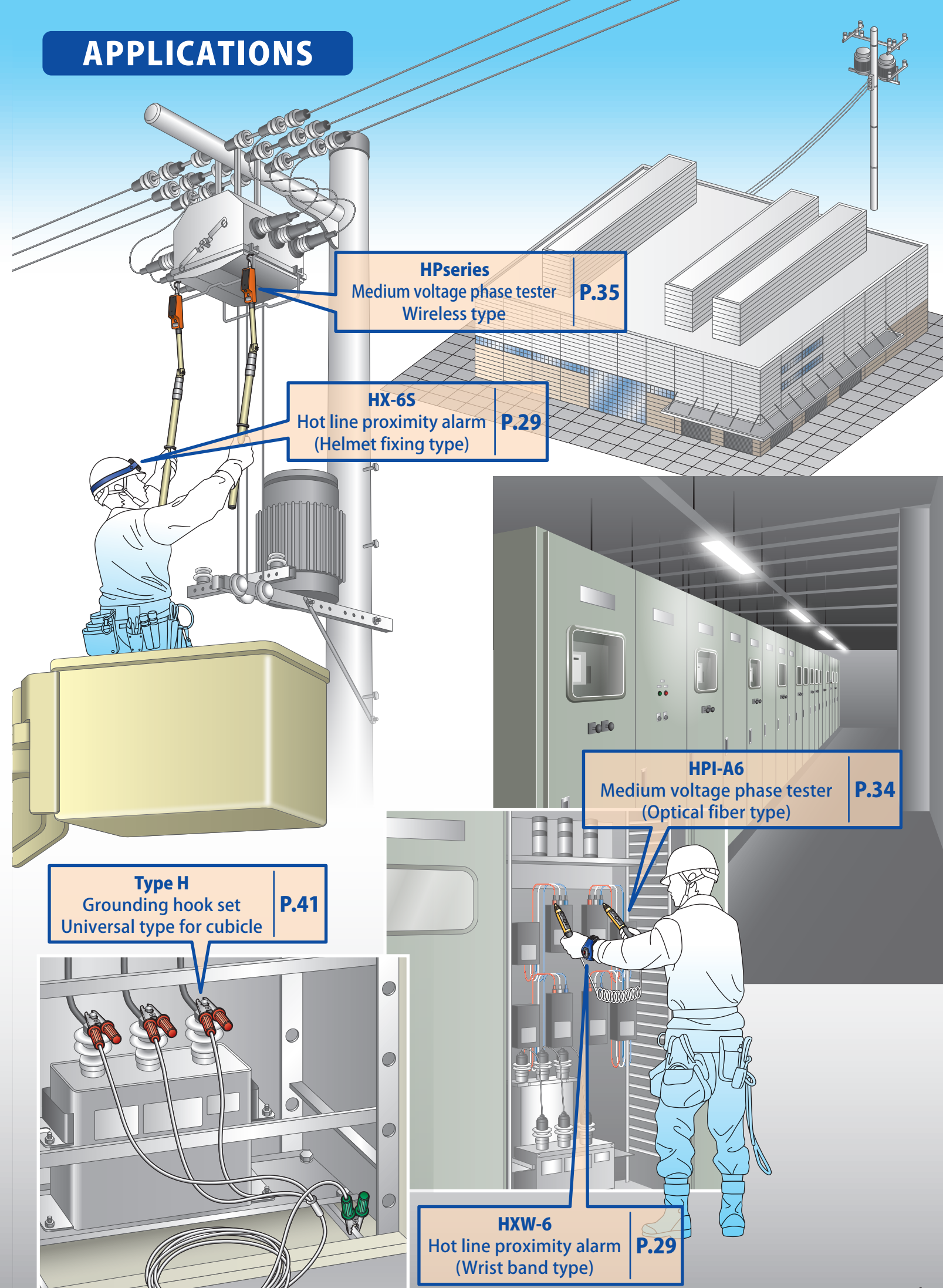


⑦ Connect the contact clamp to Line 1
Connect the contact clamp to Line 2
Connect the contact clamp to Line 3
* Connect all 3 lines

APPLICATIONS

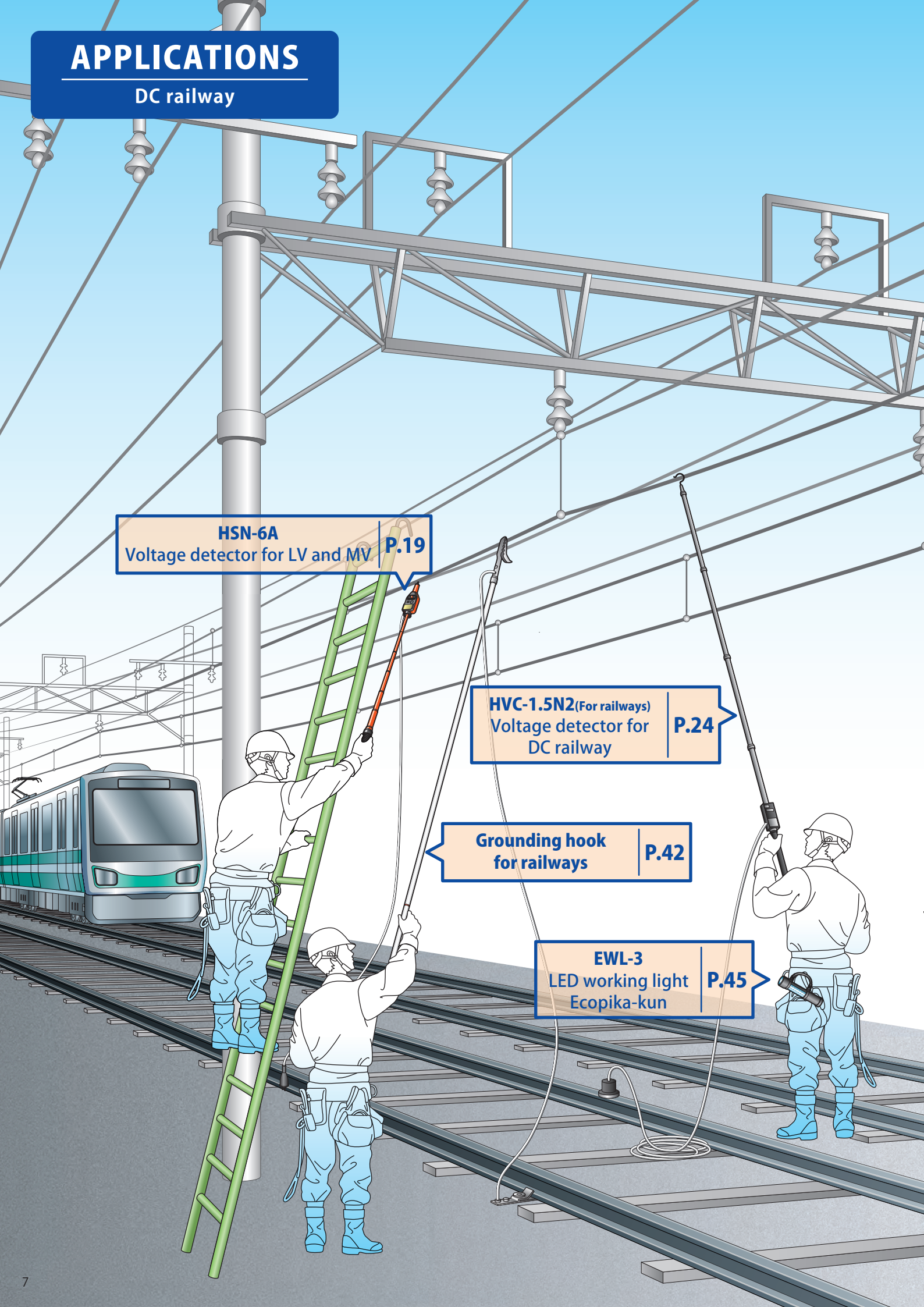


APPLICATIONS



APPLICATIONS

DC railway



HSN-6A
Voltage detector for LV and MV **P.19**

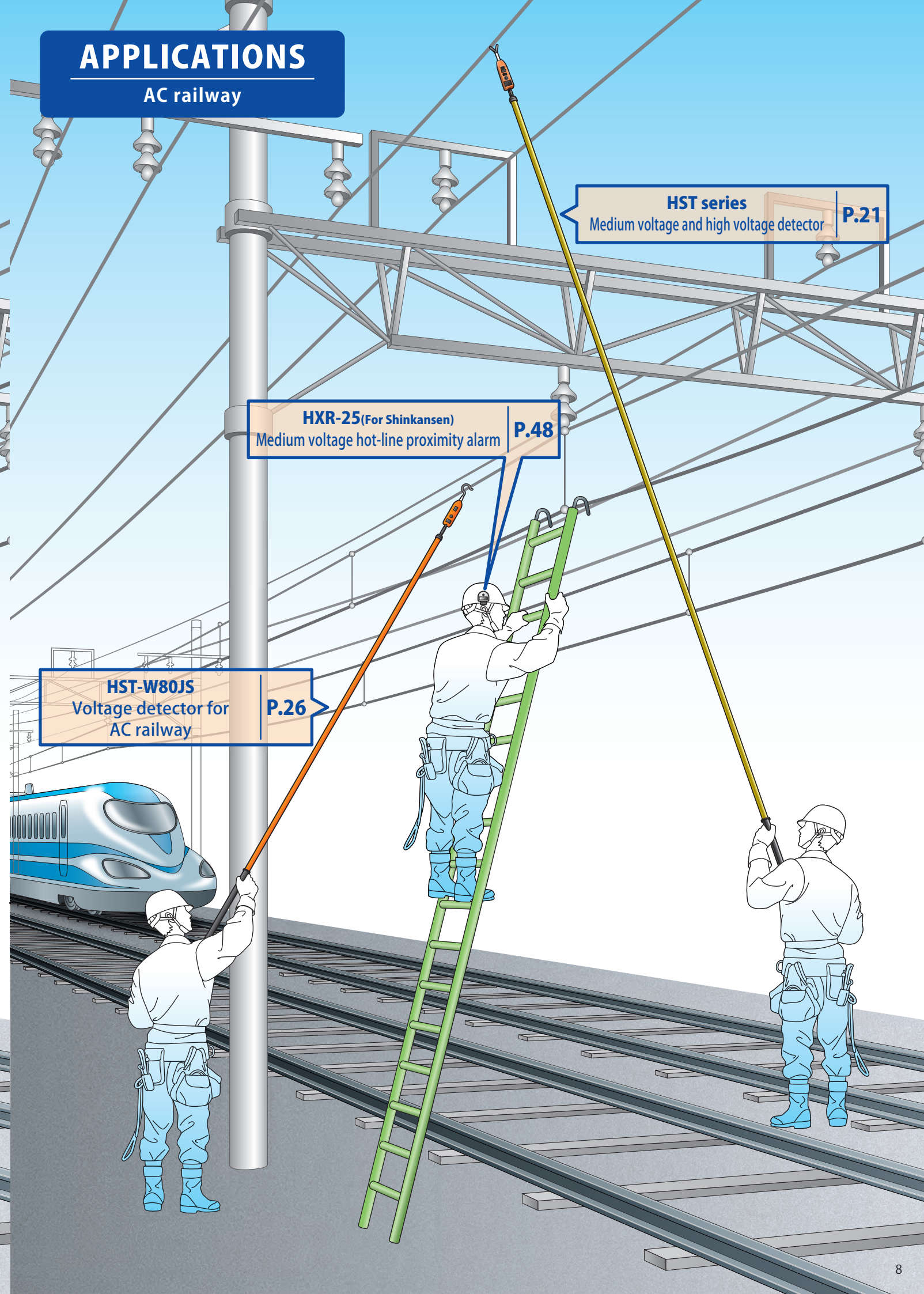
HVC-1.5N2(For railways)
Voltage detector for DC railway **P.24**

Grounding hook
for railways **P.42**

EWL-3
LED working light Ecopika-kun **P.45**

APPLICATIONS

AC railway



HST series
Medium voltage and high voltage detector **P.21**

HXR-25(For Shinkansen)
Medium voltage hot-line proximity alarm **P.48**

HST-W80JS
Voltage detector for AC railway **P.26**

① HTE-610-Y/M/I ② Low voltage detector ③ volcheck ④ AC 50~600V

Standard Model of the Low Voltage Detector

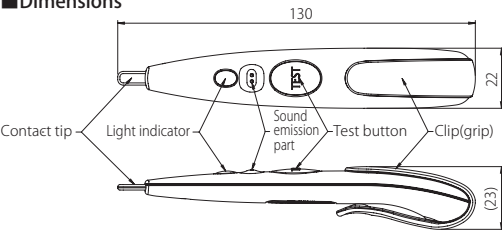
④ Audio signaling and light emitting Contact tip Conductive rubber Sensitivity adjustment Voltage detection through covering (sheath) CE RoHS

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 accident due to a short-circuit.
- Sensitivity adjustable. It is possible to adjust the sensitivity with volume knob in accordance with working condition and purpose.
- Detector designed with minimum variance of sensitivity between bare and covered conductor.

■Dimensions



■Specifications

Working voltage range	AC 50 V to 600 V common use for 50/60 Hz
Operation starting voltage (Voltage to ground)	Detection sensitivity adjustable at shipment from the factory. Default: AC 40 V ± 10 V, contacting to the insulated wire (600 V - IV, 2 mm ²) according to Hasegawa standard
Battery	LR44(1.5V) × 2 pcs
Battery life	New battery :about 10 hours for continuous operation, 1.5 years for storage
Weight	22g (including batteries)

* Without the casing

①Product type

②Product name

③Working voltage range

④Marking

Audio signaling and light emitting: Action is notified by sound and light.

AC DC: The product is usable for both AC and DC.

Telescopic type: The operating rod is telescopic.

CE: This marking is for products for the EU market, conforming relevant standard.

Contact tip - Conductive rubber: Conductive rubber tip prevents accident of short circuit.

Voltage detection through covering (sheath): Voltage detection over insulation. Voltage can be detected over the insulation sheath. (Not possible for shielded cables.)

Waterproof: Water-resistant structure for rain and water drops.

RoHS: The marking is to confirm satisfaction of the RoHS regulation.

Contact tip - Replaceable: Detector tips are sold as optional component, and replaceable.

*AC only Voltage detection through covering (sheath): Voltage detection over the insulation *AC only. Voltage detection over the insulation not possible for DC.

Battery-less: No battery is used for operation.

Sensitivity adjustment: Sensitivity can be adjusted by turning the volume knob.

LED lighting: LED lamp is equipped to light the target location of voltage detection.

Auxiliary device for voltage detection: The product is not a voltage detector, but is used to assist voltage detection work.

⑤Battery life -----The battery supplied with product is for testing, this battery life shall not be applied.

Voltage detector

◇Low voltage detector [For AC]	
HTE-610/volcheck	13
HTE-610L/volcheck (with LED light)	13

◇Low voltage detector [For AC/DC]	
HT-680D/DS/DB/DBS	15
HT-670	15

◇Voltage detector for medium & low voltages	
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HST-20N	23
HS-90N	23

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HLA-1A	27
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Auxiliary device for voltage detection

◇Hot line proximity alarm	
HXW-6 / WRIST ALARM	29
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◇Voltage detector	
HVC-1.5N2	24
HS-1.5NJ	25
HS-1.5NR	25
HST-W80JS	26

◇Auxiliary device for voltage detection	
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HXR-20•25/Non-contact AC voltage detector	48

◇Grounding hook	
SA106A-□	42

Voltage Detectors as per working voltages

■ For Low Voltage to Medium Voltage

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 Medium Voltage to Extra 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 Railway (for trolley wire)

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

General Catalog of Voltage Detectors

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HTE-610-Y/M/I

Low voltage detector

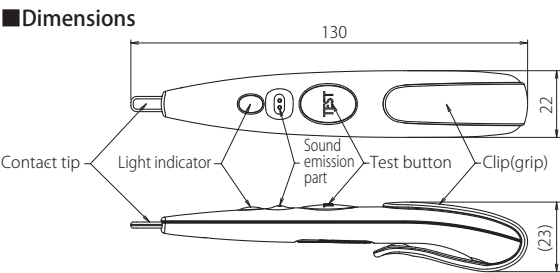
volcheck

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 accident due to a short-circuit.
 - Sensitivity adjustable.
It is possible to adjust the sensitivity with volume knob in accordance with working condition and purpose.
 - Detector designed with minimum variance of sensitivity between bare and covered conductor.



■Specifications

Working voltage range	AC 50 V to 600 V common use for 50/60 Hz
Operation starting voltage (Voltage to ground)	Detection sensitivity adjustable at shipment from the factory Default: AC 40 V ± 10 V, contacting to the insulated wire (600 V – IV, 2 mm ²) according to Hasegawa standard
Battery	LR44(1.5V) × 2 pcs
Battery life	New battery :about 10 hours for continuous operation, 1.5 years for storage
Weight	22g (including batteries)

* Without the casing

HTE-610L-R

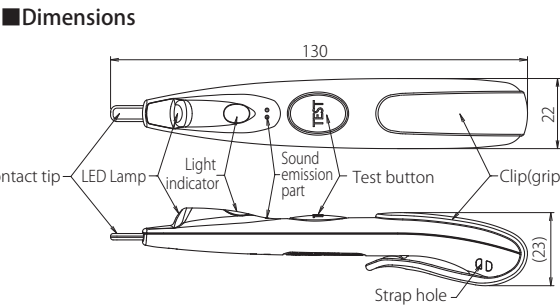
Low voltage detector

volcheck

AC 50~600V



- Features
- Built in LED light with auto power-off function.
Prevent unnecessary battery consumption when the user forgets to turn off the instrument.
 - The LED light let you know when the detector becomes low battery.
When the battery level becomes low, the LED light does not turn on. Then the users need to replace the battery.



■Specifications (About LED light ; The basic specification is same with HTE-610.)

LED light	Turn on/off the light by pressing TEST button of the detector. The light is automatically turned off after approx. 30 sec (Auto power-off function). * The voltage detector is working regardless of the light ON/OFF.
Battery life	New battery : About 10 hours for continuous operation without LED light. About 5 hours operation with LED light ON.
Weight	22g (including batteries)

* Without the casing

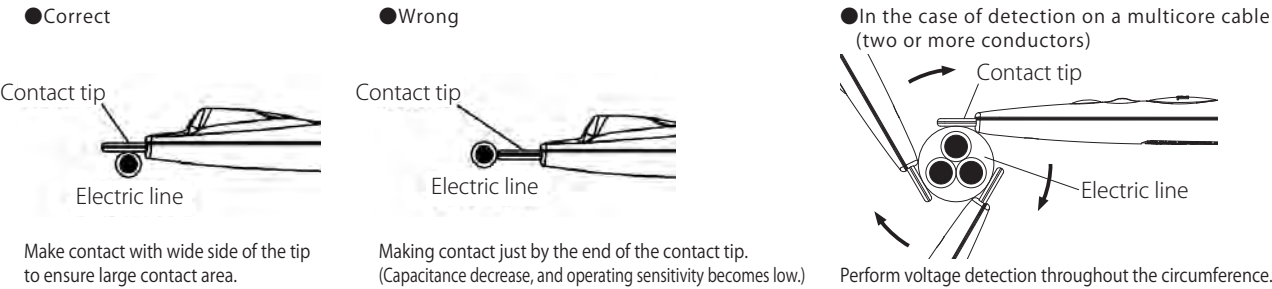
How to use the LV voltage detector for AC

■Perform voltage detection while holding the grip firmly.

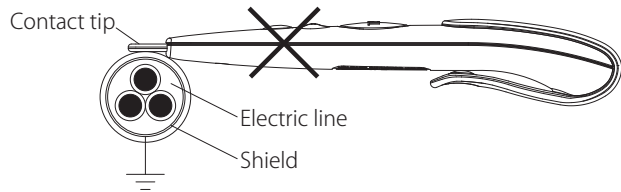
The contact area with the hand affects the sensitivity of the low voltage detector. So, appropriate sensitivity cannot be obtained unless it is held firmly.



■How to make contact with the detector



■Voltage detection for shielded cables is not possible.



The voltage detector does not work because of the electrical shielding layer which is grounded.

■Sensitivity adjustment (for HTE-610, HTE-610L, HT-670)

* Adjustment is made by the volume knob after detaching the clip.

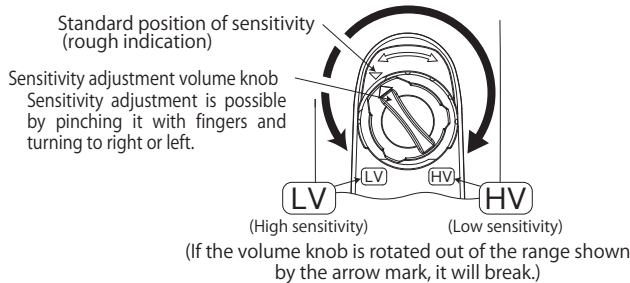
The products are adjusted to the standard sensitivity at shipment (as default). However, sensitivity adjustment can be made when it is required for some reasons such as: When the detection is not possible over the outer surface of the insulated cable; When it is required to reduce the influence of induced voltage of the area etc.

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

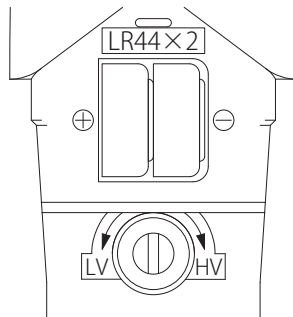
* The volume knob can be turned only about half a rotation. Overturning may cause damage.

* Pay attention to excessively high or low sensitivity. If it is excessively high, there is a risk that an correct judgment would not be possible, because the product responds to too small voltage and static electricity etc.

■HTE-610/610L



■HT-670



HT-680D/DS/DB/DBS

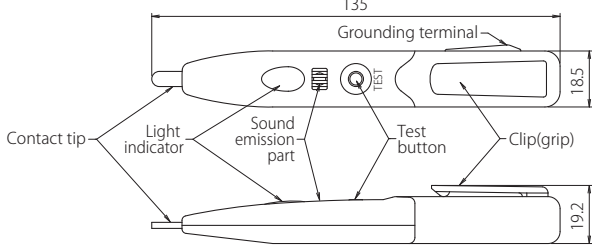
Low voltage detector

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



- Features
- Two types of contact tip : Conductive rubber tip / Metal tip
 - Choice of minimum working voltages at DC : from 12 V / from 50 V

■ Dimensions



AC/DC Low Voltage Detector (for bare conductors)



■ 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 indication	Light	Continuous light emission in red; Verifiable at 8000 Lx			
	Sound	Continuous sound; 50dB or more (10cm apart)			
Battery		LR44(1.5V) × 2 pcs			
Battery life		About one year with normal use			
Weight		27g(including batteries)			

* Without the casing

HT-670

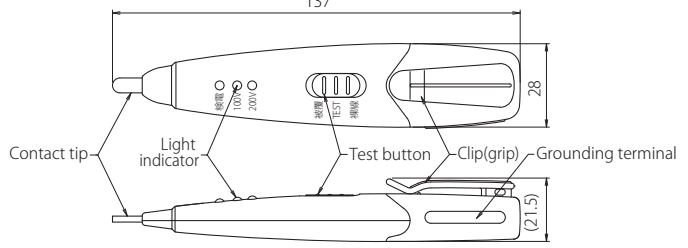
Low voltage detector

AC 50~600V
DC 50~600V



- Features
- Sensitivity switch-over by slider switch depending on the detection (bare conductor/insulated conductor)
- Option Grounding wire/DF01027
- Optional grounding wire can be used for
- Voltage discrimination function (discrimination of 100 V, 200 V)
 - Prevents unnecessary detection due to reverse induction voltage (Grounding wire should be contacted to grounded metal)

■ Dimensions



Optimized for works at Photovoltaic Facilities



■ Specifications

		Without lead wire	With lead wire
Working voltage range	AC	50~600V	
	DC	50~600V	
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	30 ± 15 V (continuous operation)
		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	
Battery life		About one year with normal use	
Weight		26g (except for lead wire)	

* Without the casing

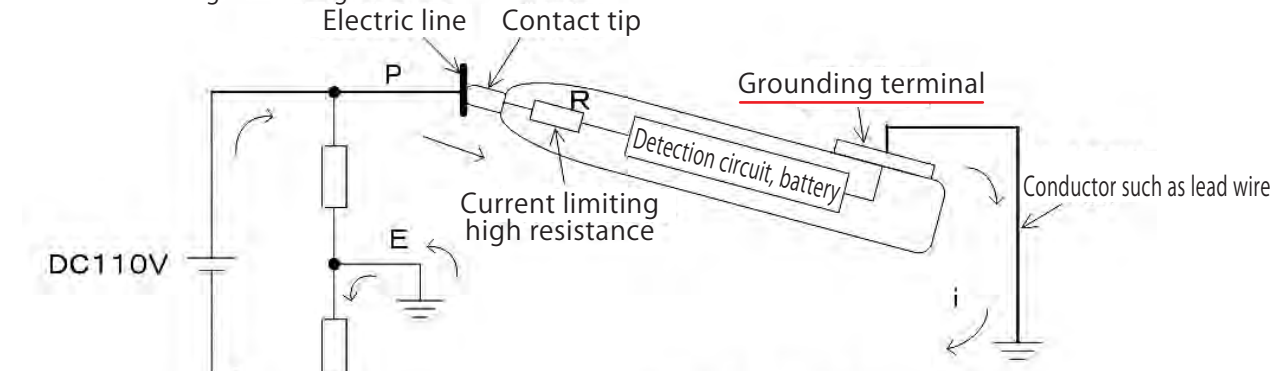
How to use the LV Voltage Detector for DC

(For AC, refer to P.14.)

■ Key points of 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, DC voltage detection becomes possible when the DC current flow through the detector by contacting the detector to an exposed charged conductor (*①), connecting the earth terminal to the ground (*②) and therefore creating a closed circuit (*③).

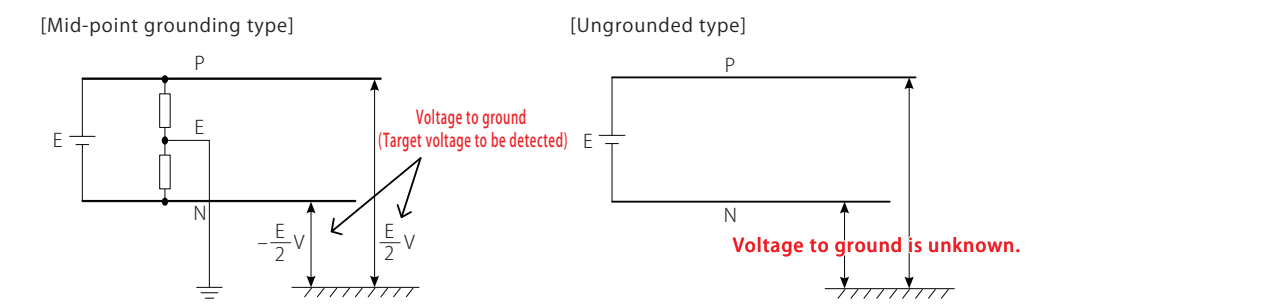
- ① Voltage detection is not possible over the insulation. (Direct touch of contact tip to an exposed live part is necessary.)
- ② It is necessary to connect the Grounding terminal to earth with lead wire (option of HT-670) and/or with the free hand not holding the voltage detector.



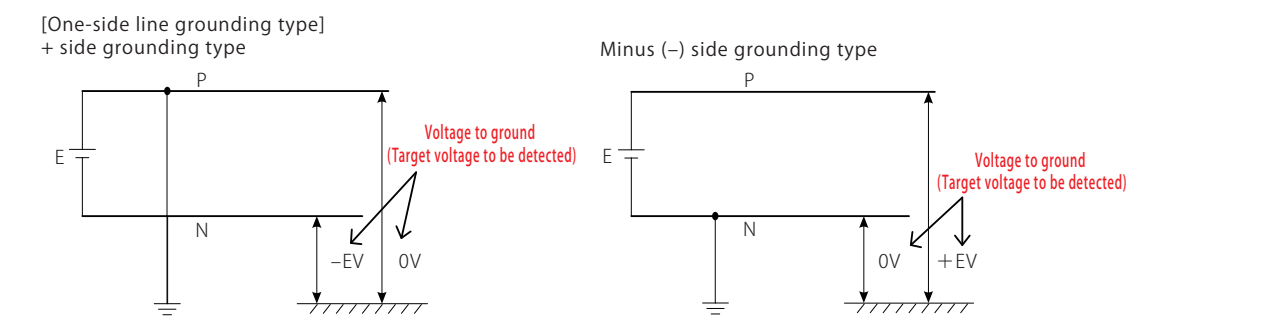
The contact tip must contact to the exposed live part, and the grounding terminal need to be connected to the ground. As a closed circuit is formed, a minute direct current flows.

- ③ Since the detected voltage between the live part and ground is depending on the condition of connection from grounding terminal to earth, it is necessary to understand about the circuit formed for detection. (cf. Voltage detection for un-earthed circuit is not possible.)

* When HT-670 lead wire is used, the line-to-line voltage can be checked.
(Pay sufficient attention to the handling of lead wires. There is a risk of electric shock and/or short-circuit if misused.)



* Voltage detection is not possible.



* No detection for Grounded plus (+) side.

* No detection for Grounded minus (-) side.

HSF-7

Voltage detector for Medium/Low voltage

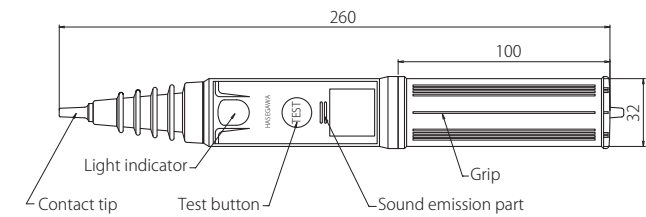
AC 80~7000V



■ Features

- Medium voltage and low voltage can be identified with the indication(Sound/Light).
Low voltage detection is indicated by intermittent sound & light and medium voltage is indicated by continuous sound & light.
- Feeling of firm grip.

■ Dimensions



Standard Model for 6 kV



■ Accessory



■ 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	(φ5mm 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	
Battery life	About 6 hr. under continuously operating state (with new battery)	
Operating temperature range	-10℃~+40℃	
Weight	About 150 g	

HSE-7T1

Voltage detector for Medium/Low voltage

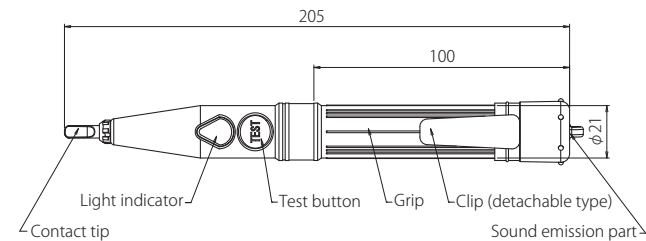
AC 80~7000V



■ Features

- Compact enough to carry in the pockets of working clothes.
- The contact tip made of conductive rubber is replaceable.
- Medium voltage and low voltage can be identified with the indication (Sound/Light).
Low voltage detection is indicated by intermittent sound & light and medium voltage is indicated by continuous sound & light.

■ Dimensions



Compact, Lightweight and Handy



■ 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	(φ5mm 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	
Battery life	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 Medium/Low voltage

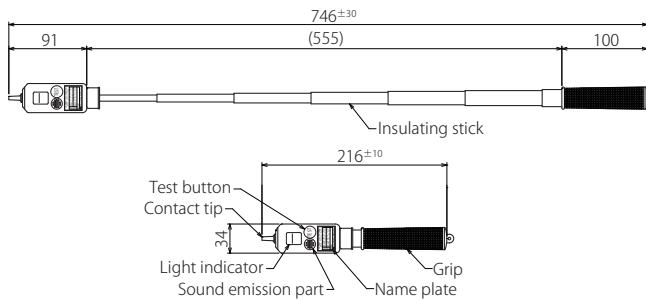
AC 80~25000V



■ Features

- Voltage detection from a remote place is possible by extending it
- * Low voltage cannot be detected on stick extension mode.

■ Dimensions



Telescopic type, Standard model for Medium Voltage

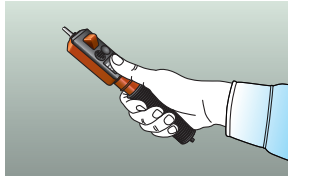


■ Accessory



Storage case

■ Detecting at low voltage



■ 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 (φ3mm) : AC 250V ± 50V OC wire (φ5mm) : AC 1000V ± 200V (Detect holding the grip)
Frequency	50/60Hz	
Dielectric strength	Between contact tip and grip: Extended state 50 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	
Battery life	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 Medium/Low voltage

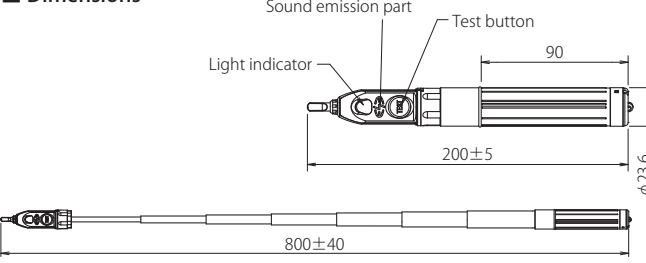
AC 80~7000V



■ Features

- Super-compact and lightweight, 85g
- The contact tip made of conductive rubber is replaceable.
- Medium voltage and low voltage can be identified with the indication (Sound/Light).
Low voltage detection is indicated by intermittent sound & light and medium voltage is indicated by continuous sound & light.
- * Low voltages cannot be detected on stick extension mode.

■ Dimensions



Telescopic Type, Lightweight and Compact



■ 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	(φ5mm 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	
Battery life	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 Medium/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)

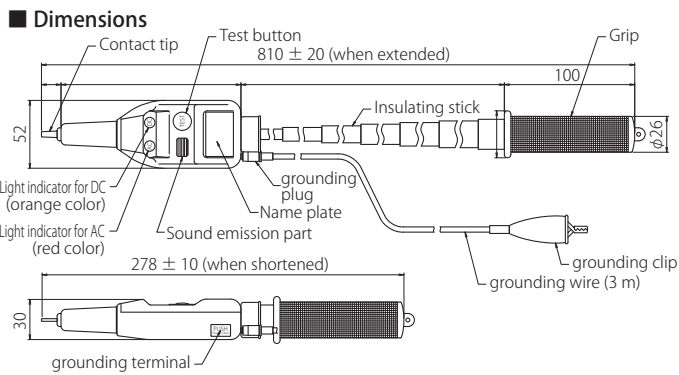
Audio signaling and light emitting

Telescopic type

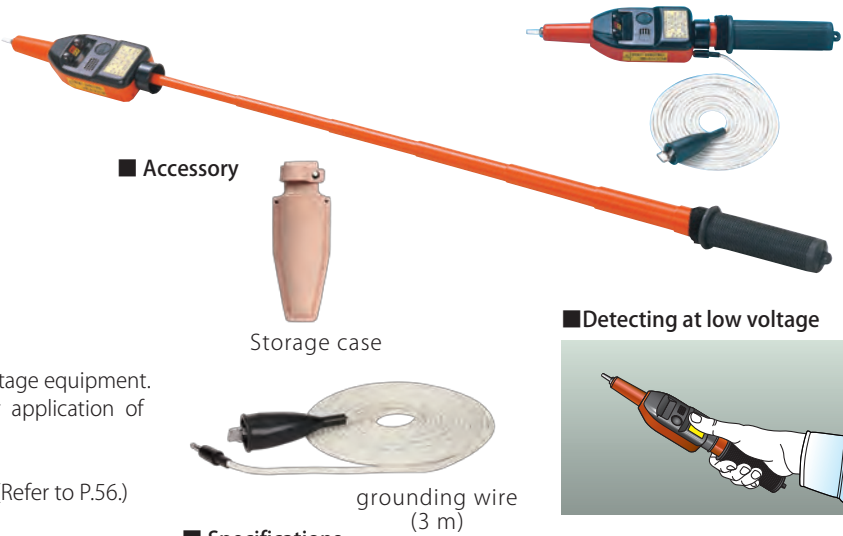
AC DC

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.
 - Discriminate AC and DC
 - Checking residual electric charge, and discharging it. (Refer to P.56.)



Recommended for Withstand Voltage Test



■ 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
Leakage current	Between contact tip and name plate		4 kVAC, 1 min, 1 mA or less
	Between contact tip and grip		(Insulating stick: Shortened) 20 kVAC, 1min, 100 μA or less
	Between contact tip and grounding clip		(Insulating stick: Extended) 50 kVAC, 1min, 100 μA or less
	Between core of the grounding plug and outside the covering		26 kVAC, 1 min, 1 mA or less
Battery			LR44(1.5V) × 2 pcs
Operating temperature range			−10°C ~ +50°C
Weight			About 290 g

HST-1.5N

Medium voltage detector

AC 600~7000V

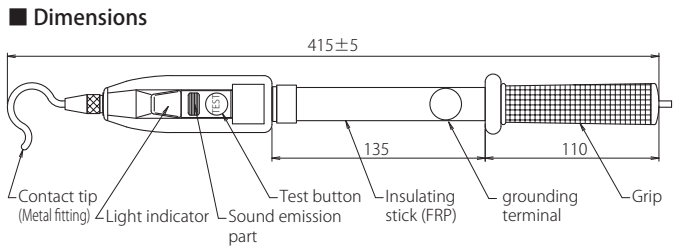
DC 600~7000V

Audio signaling and light emitting

AC DC

Waterproof

- Features
- With 7-m grounding wire



Robust and Lightweight, FRP for Insulating Stick



■ Specifications

Working voltage range	AC	600V~7000V
	DC	600V~7000V
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
Battery life		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 Medium/Low voltage

AC 60~7000V

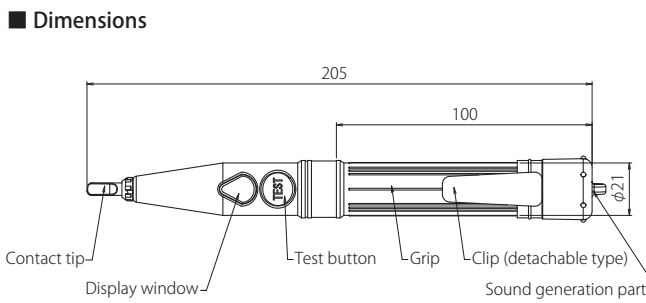
Audio signaling and light emitting

Contact tip Conductive rubber

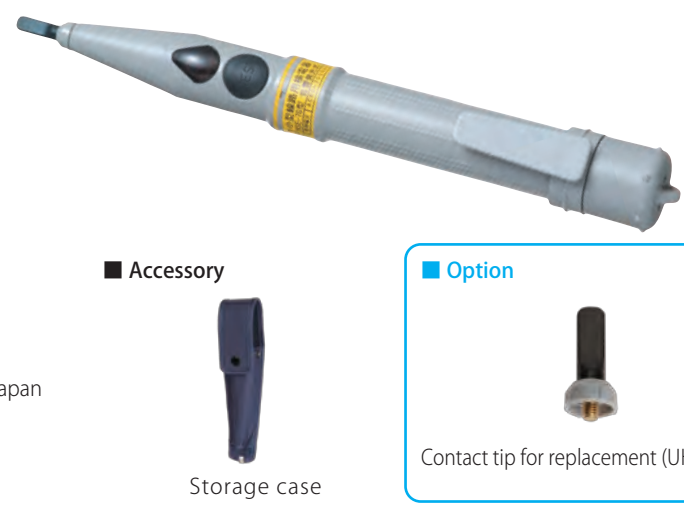
Contact tip Replaceable

Waterproof

- Features
- Working voltage range from AC 60V as per Telecom standard in Japan
 - Successor of HSC-7G (certified product as per NTT spec.)



Recommended for Telecom workers on the pole



■ Specifications

Working voltage range		AC60V~7000 V
Operation starting voltage	Low voltage	Exposed live part 60 V (in contact with live part)
	High voltage	Exposed live part 400 V (in contact with live part)
(Voltage to ground) Insulated wire		(φ5mm 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
Battery life		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 Medium/Low voltage

AC 60~7000V

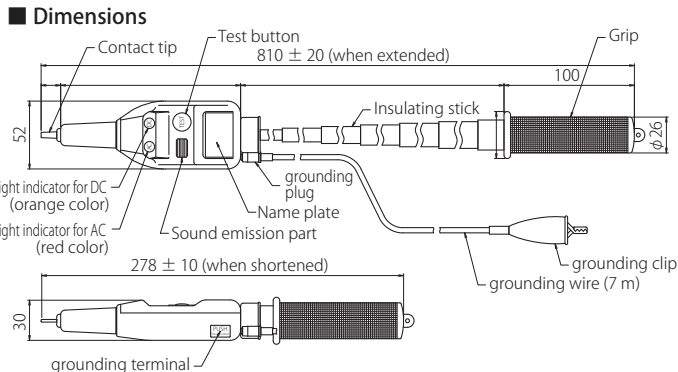
Audio signaling and light emitting

Telescopic type

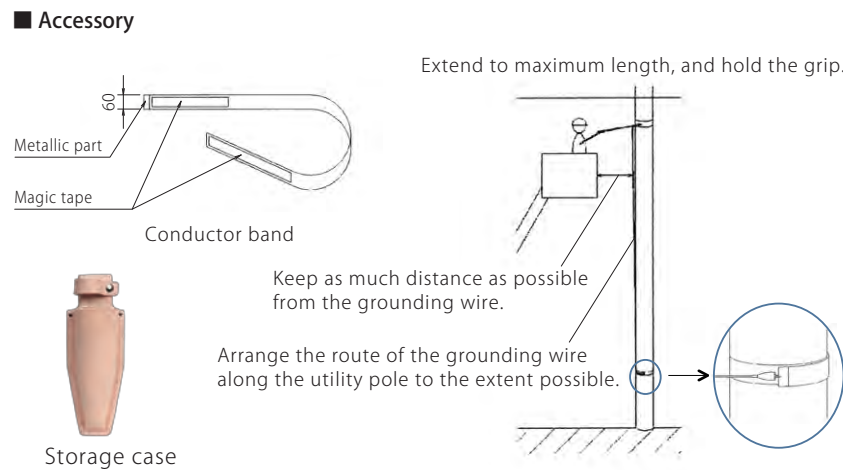
Waterproof

[Precaution]

This product is adapted for special applications. Please contact our sales team for detailed specifications.



Voltage Detector used on Bucket Cars



■ Specifications

Working voltage range		AC60V~7000 V
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		Between contact tip and grounding clip: Ditto
Battery		LR44(1.5V) × 2 pcs
Operating temperature range		−10°C ~ +50°C
Weight		About 290 g (main body only)

HST series

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

Medium voltage & High voltage detector

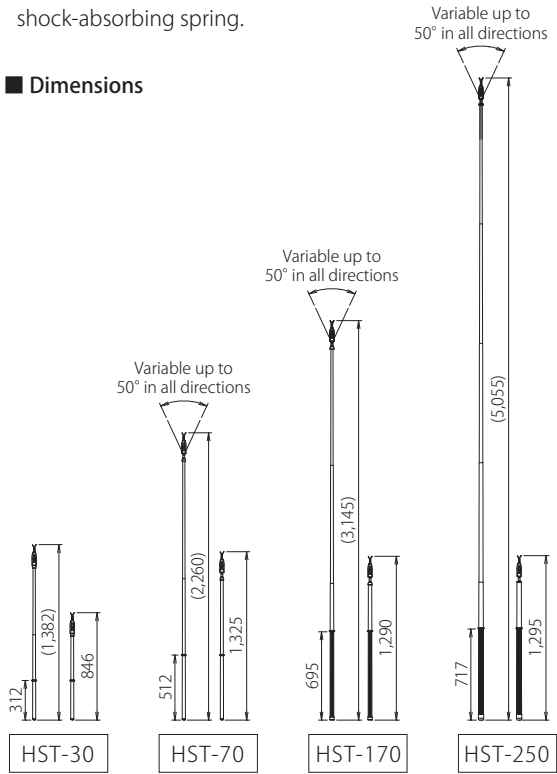
AC	HST-30	3kV~	34.5kV
	HST-70	20kV~	80.5kV
	HST-170	60kV~	195.5kV
	HST-250	150kV~	287.5kV

- Audio signaling and light emitting
- Telescopic type
- Waterproof

■ Features

- FRP is used for the insulating stick. It is lightweight and outstanding in operability.
- Tip metal fitting consists of a shock-absorbing spring.

■ Dimensions



For Medium voltage and High voltage, light weight 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)

■ 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.)

Model	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)
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%	3kV±20%	10kV±20%	20kV±20%
	φ5mm-OC wire	3 kV or less	—	—	—
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			
Battery life		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

* There is also for AC 3kV to 42kV. [MODEL: HST-30W]

HS-500

Extra high voltage detector

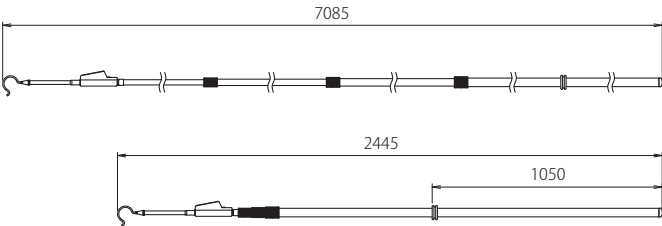
AC 250k~550kV

- Audio signaling and light emitting
- Telescopic type
- Waterproof

■ Features

- Voltage detector for the highest voltage T/L in Japan
- Sound and light indications can be confirmed outdoors in daytime, even in high level of noise.

■ Dimensions



■ 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 4.7 kg

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 operating with energy to be detected.

Voltage Detection Check with Rotation of Pinwheel.



Contact tip (Metal fitting): Spring

■ 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

HST-20N

Medium voltage detector

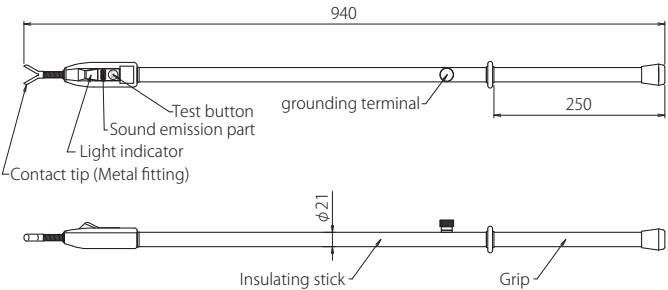
AC 3k~25kV

DC 3k~25kV



- Features
- New model with reduced weight 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 and grounding terminal, AC 50kV, 1 min	
Leakage current	0.5 mA or less at dielectric strength test	
Battery	LR44(1.5V) × 2 pcs	
Battery life	About 4 hr. in a continuously operating state	
Operating temperature range	-10℃~+40℃	
Weight	About 610 g (main body only)	

HS-90N

Medium voltage and High voltage detector

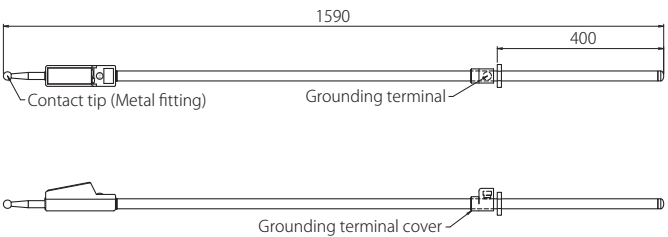
AC 6k~90kV

DC 6k~90kV



- Features
- It operates over wide range from medium voltages to high voltages

■ Dimensions



Wide Range type for both 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 and grounding terminal, AC 180kV, 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

Voltage detector for DC overhead contact wire

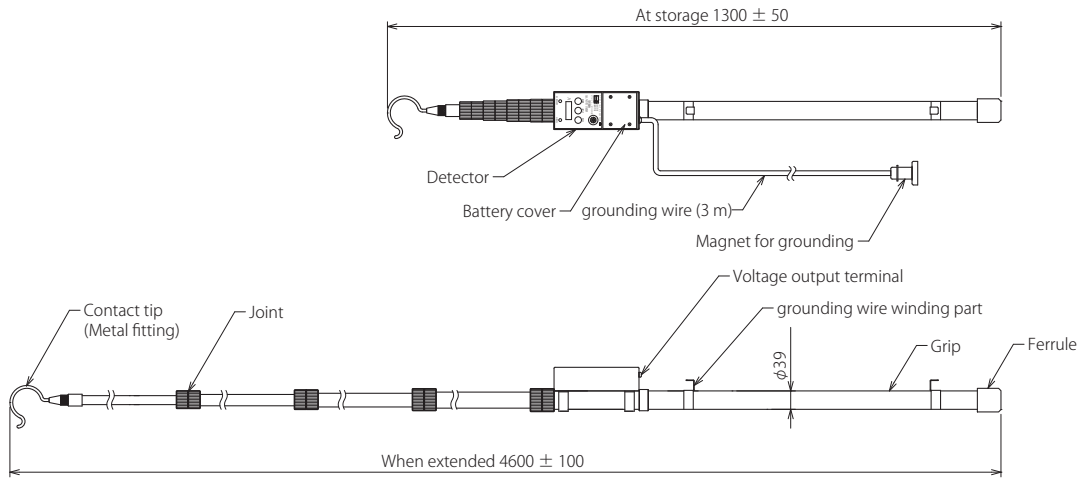
For railways

DC 1500V



- Features
- Grounding wire disconnection check function
 - Voltage measurement function
 - Rapidly discharges residual electric charge
 - Built-in Voltage detector checker
Because there is a voltage-generating function inside the main body, separate voltage detector checker is not required
 - The sound volume of the buzzer is adjustable (High → Medium → Low)
 - Length enables horizontal storage in the trunk of mid-sized car

■ Dimensions



■ Specifications

Working voltage range		DC 1500V * 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 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
Volume adjustment for buzzer sound		
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°C ~ +50°C
Weight		About 4 kg

■ Accessory



Bag for housing



Lead wire for test

Voltage Detector for DC 1500V Contact Wires, Visualization of decreasing Residual Voltage

OK lamp for grounding wire

Digital display of voltage

Button for adjusting sound volume



HS-1.5NJ

HS-1.5NR

Medium Voltage detector

For railways

AC 6600V

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



■ Features

- Grounding wire options : Clip Type (HS-1.5NJ) and Magnet Type (HS-1.5NR)
- Discharging state of residual charge after power outage can be distinguished (HS - 1.5 NR)

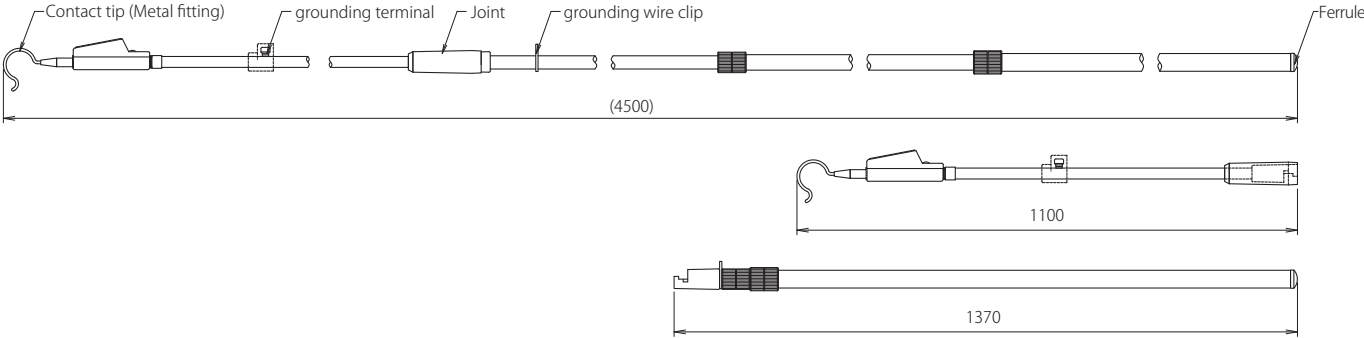
Operation display (HS-1.5NR)

Voltage		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



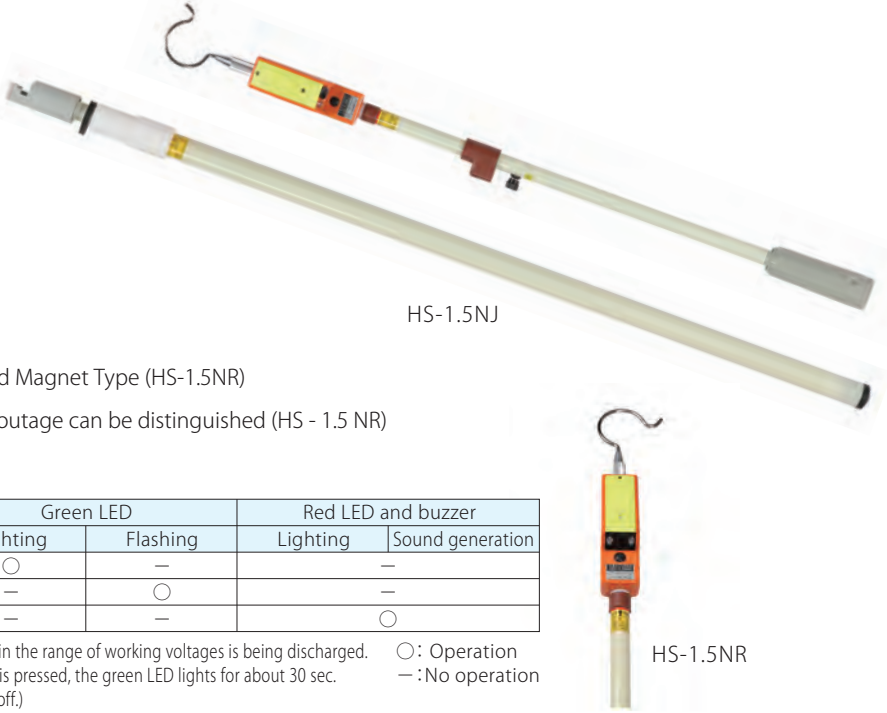
■ Accessory



■ 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	It can be confirmed in the luminance of 8,000 lux.		
	Sound	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 for DC Contact Wire and AC 7kV



HST-W80JS

Voltage detector for AC overhead contact wire

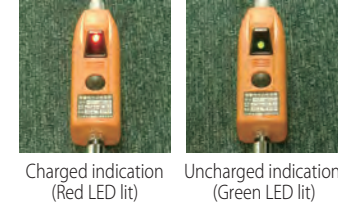
For railways

AC 20kV~80.5kV

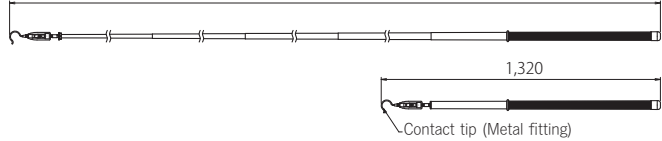


■ Features

- Standby display function is provided. After pressing the test button, the green LED lights up even after voltage detection. * The green LED automatically turns off in 1 to 2 min. Voltage detection is possible even after turning off (in case there is no problem with battery level)



■ Dimensions



HST-22JX

Induced voltage detecting instrument

For railways

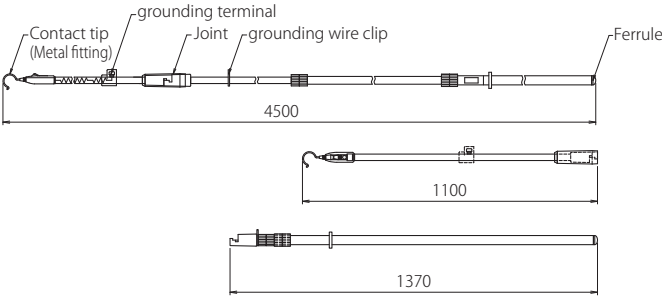
AC 20kV



■ Features

- Two-piece operating rods : Three-step telescopic rod, the other rod with detecting instrument.

■ Dimensions



Voltage Detector for AC Overhead Contact wires of normal Railways and Shinkansen



■ Accessory

■ 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 can be confirmed in the luminance of 8,000 lux.
	50 dB or more at a distance of 2 m
Dielectric strength	Insulating stick, AC 75 kV/300mm x 1 min. (6 locations on the insulating stick, except for electrode and joints)
Leakage current	100 μ A or less at dielectric strength test/1 location
Battery	LR44(1.5V) × 2 pcs
Battery life	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.

Checking presence of Induced Voltage at Overhead Contact wire without voltage application

【Attention】

This instrument is not a voltage detector. The product is to be used with a voltage detector by fitting the grounding 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℃～+50℃
Battery	LR03(1.5V) × 4 pcs Battery life ----- Total operating time: About 1 hr.
Dimensions	65mm×120mm×40mm
Weight	430g

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

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℃～+50℃
Battery	6R61 or 6F22(9V) × 2 pcs Battery life ----- Total operating time: About 2 hr.
Dimensions	80mm×150mm×50mm
Weight	700g

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℃～+50℃
Battery	LR03(1.5V) × 4 pcs
Dimensions	72mm×114mm×45mm
Weight	280g

■Correspondence table of voltage detector checker

Product model		Voltage detector checker model					
		HLA-1A	HLA-2G	HLL-1	HLL-6D	HLA-N2	CL-1-06
HTE-610/610 L		○	○	○	○		
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)
HST-22JX		○					
HST-25JX		○					

Inspection before use
As for the Voltage Detector, it is mandatory as per "Article 352 of Occupational Safety and Health Regulation (OSH Regulations) of Japan" that "there shall be no abnormality in appearance by visual inspection" and "Voltage detection performance shall be checked" before use.
The test button on the detector is checking the internal electronic circuit and checking the battery voltage, it is not for checking operation starting voltage, wiring from detector to electronic circuit etc. For this reason, it is necessary to check voltage detection performance by voltage detector checker or a known power supply at the time of inspection before use.

CL-1-06

Voltage detector checker

Handy Type with Piezoelectric device



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

Hot line proximity alarm

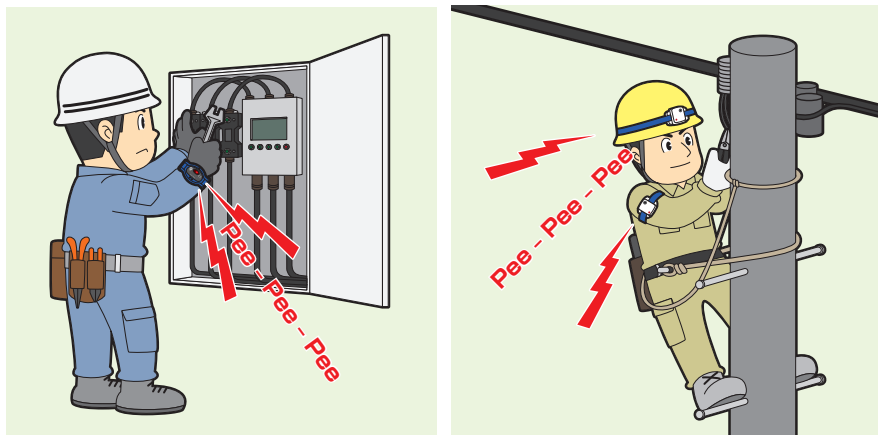
AC 6.6kV



■Features

- Alarm sound of electronic buzzer when approaching to live line is detected.
- It is ideal for preventing human errors, as there is no power switch and it is always on stand-by.

Auxiliary voltage detection device that gives alarm sounding at a distance when approach to a live line.



HXW-6

(Both 50Hz and 60Hz)

WRIST ALARM



AC 6.6kV

Exclusively for cubicle works



HX-6

(Exclusively for use at 50 Hz or 60 Hz)

Upper arm fitting type

AC 6.6kV

Hot line proximity alarm exclusively for overhead line works

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



【Attention】

This is not suitable for cubicle works.

HX-6S

(Exclusively for use at 50 Hz or 60 Hz)

Helmet fitting type

AC 6.6kV

Hot line proximity alarm exclusively for overhead line works

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



【Attention】

This is not suitable for cubicle works.

■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	
Battery life (with new battery)	Continuously operating state	About 15 hr.	
	Unused state	About 10 months	
Operating temperature range	-10℃～+40℃		-5℃～+45℃

Hot line proximity alarm

■What is a Hot line proximity alarm?

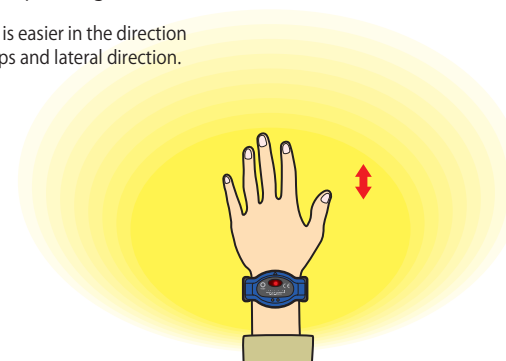
- It is a product that generates an alarm when it detects a voltage at a distance to prevent accident of electric shock. Unintended access due to human errors such as preconception or misconception can be prevented.
- This product cannot be used as a voltage detector.

■Precautions before purchasing the Hot line proximity alarm

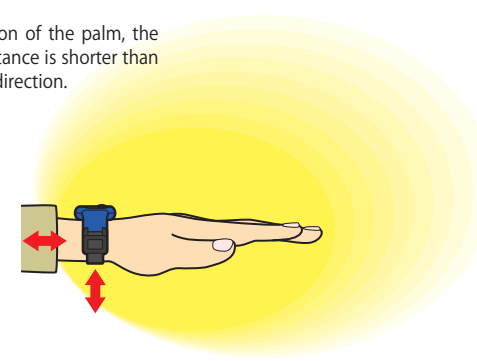
- Please use proper model according to the applications, because detection sensitivity has been adjusted for cubicle works and overhead line works respectively assuming the general site conditions.
- The specification “○V-○cm” of this product is a distance under the “standard condition” set in the factory.
At actual sites, the operation distance may become shorter, depending on environment, wiring conditions, etc. (*1)
(*1) e.g.: When 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

Determine whether the Substation Facilities are charged



■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	Can be confirmed at the distance of 50 cm in the luminance of 8,000 lux 50dB or more (1m apart)
	Sound	
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 indicator

AC Max 7,000V



■Features

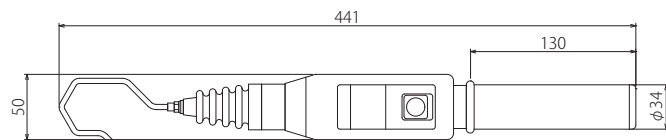
- Voice/Audio signaling ; "PI PI JUDENCHUDESU (Pi,Pi now charging)"
- LED flashing display can be confirmed from all directions.

■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	No harmful effect by IPX1 (waterproof I type) equivalent water drops
Weight	About 500 g

HH-6A

Audio signaling and light emitting type non-live-part indicator

AC 3kV~7.2kV



■Features

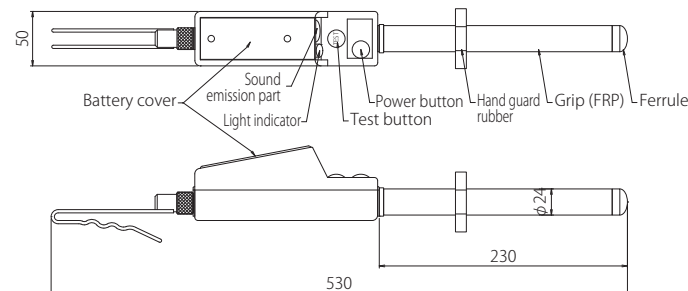
- Shape of the hook makes it difficult to dislodge even in strong winds.

■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	It shall be possible to confirm luminance of 8,000 lux. Light is emitted in uncharged state.
	Sound	50 dB or more at a distance of 2 m Sound is generated in uncharged state.
Operating temperature range		-10°C~+40°C
Structure		Waterproof (Ingress of water is prevented.)
Battery		R03(1.5V) × 2 pcs
Weight		About 580g

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.

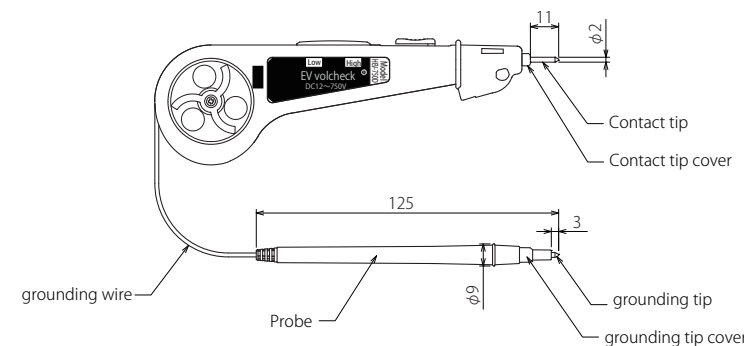
In the case of a low-voltage battery for the control system, only Low flashes.



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.



■Dimensions



■Specifications

Working voltage range		DC12V~750V
Operation starting voltage (No polarity)		Low :DC 6V±3V High :DC35V±5V
Indication of operation	Light	Red LED, 2 pcs Low: Low lamp flashes.

Easy to Check Voltage of EV, HV, PHV



HPL-200

Low voltage phase checker
Insulated wire clamping type

AC 80~600V (Three-Phase)

Global first*! This one unit can be used for both in-phase and different phase checks

* As of June 2015, own company investigation



■Features

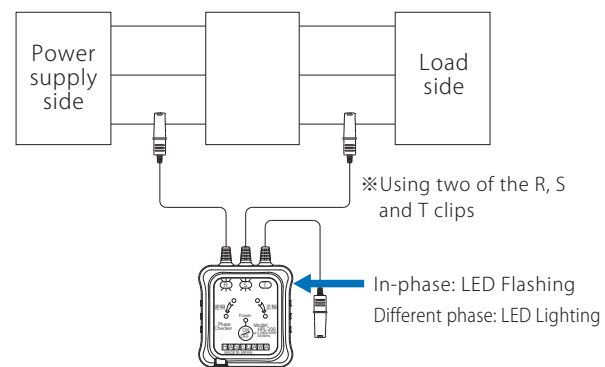
- Live-part display function: Differentiates charging status (voltage to ground of 80 V or higher) and clip connection failure
- Non-contact type: Phase rotation and in-phase/different phase can be checked from above insulated cables
- Electric line size: Wide range from 2 mm² - 100 mm² (Finished external diameter ϕ 2.8 mm - 22 mm)
- The magnet attached on the rear of the product makes hands-free checking possible

■Specifications

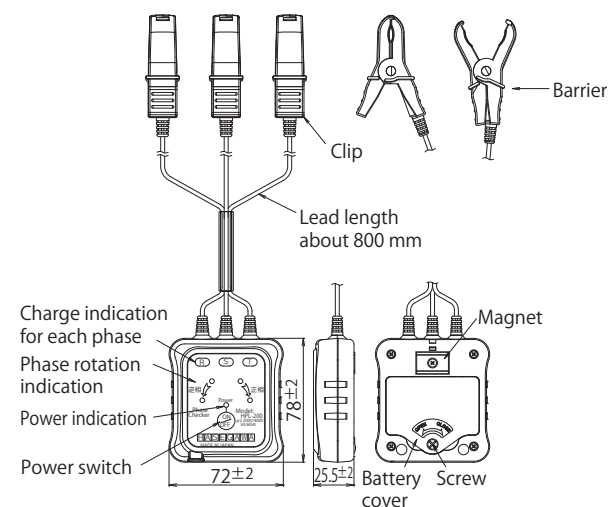
Applicable circuits	3-phase 3-line system and 3-phase 4-line system
Working voltage range	AC 80 V to 600 V (Sine wave, continuous) 45~66Hz
Dielectric resistance	100 M Ω or more, using 500 V megger (Between clip and case)
Dielectric strength	AC 2,000 V, one minute (Between clip and case)
Leakage current	During dielectric strength testing, 100 μ A or less
Power supply display	Red LED \times 1 (Automatic power OFF approx. 5 minutes)
Sound volume	50 dB or more (50 cm apart)
Battery	LR03(1.5V) \times 2
	Continuous use approx. 15 hours
Electric line	IV, DV, OW 2 mm ² to 100 mm ² (Finished external diameter ϕ 2.8 mm to 22 mm)
Weight	About 190 g (including batteries)

■Connection method for in-phase and different phase checks

Electric meter replacement work without power cut
(Phase test before in-phase attachment of bypass cable)



■Dimensions



■Indications

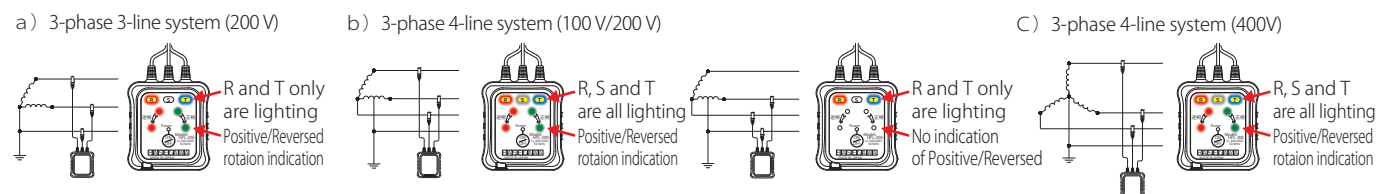
Charge indication	LED color	LED indication	Charged state (Voltage to ground of 80 V or higher)	Power cut state, or	* 1, 2
			R (Yellow), S (Yellow), T (Yellow)	Lighting	—
* 1			If voltage to ground is 80 V or lower		* 2
					If ground phase or open-phase

Phase rotation indication	LED Flashing/Color	Positive rotation	Reversed rotation
		Green	Red
		—	Intermittent sound

In-phase and different phase indication (Charge indication)	LED color	In-phase	Different phase
		R (Yellow), S (Yellow), T (Yellow)	Flashing
		Flashing	Lighting

* Display of two clips used, light off when unused

■Example indications



HPI-A6/S6/S20

Medium voltage phase tester,
Optical fiber type

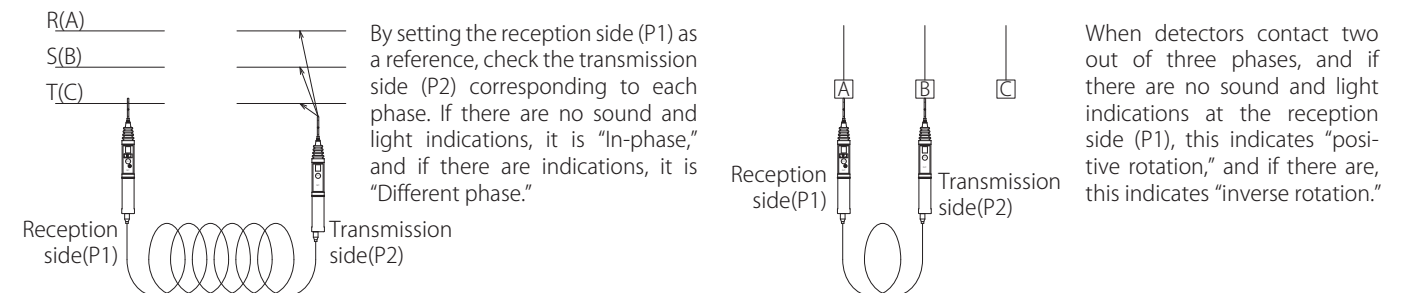
HPI-A6 AC 3kV~7kV
HPI-S6 AC 6.6kV
HPI-S20 AC 22kV~34.5kV

Detector pairs insulated with optical fiber

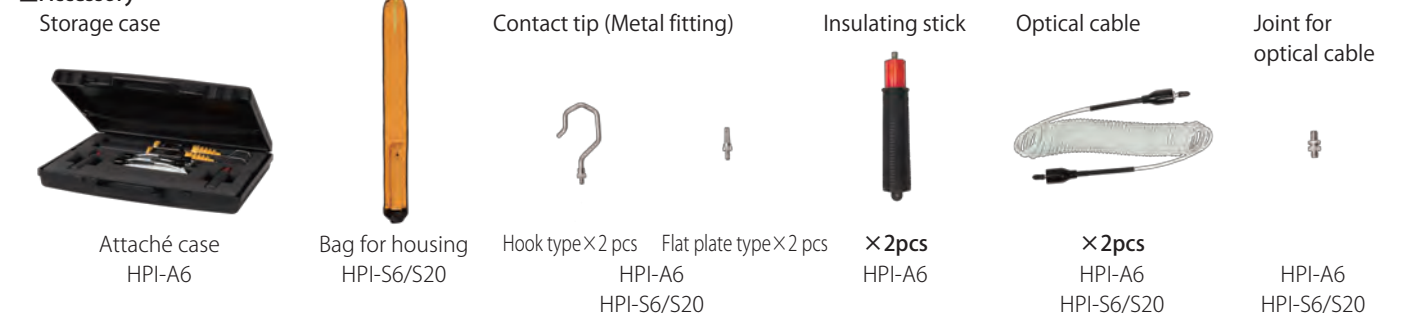


■Features

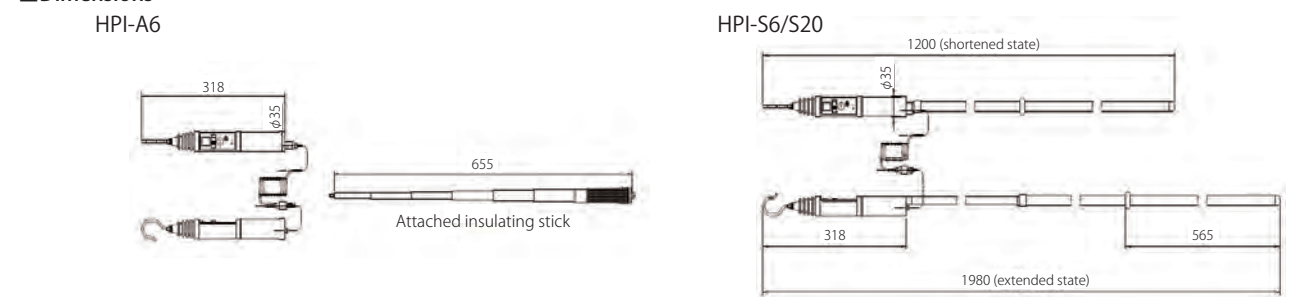
- Multi-functional phase tester: Voltage Detection by single detector use, Phase detection / phase sequence check with pair detector use
- Measurement is possible on the insulated wire sheath.
Testing operation is possible through voltage detection terminals or on the wire insulation. * Cannot be used on the shielded cable.
- In-phase/different phase, and phase sequence are indicated by sound and light indications.



■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		2000MΩ or more		
Dielectric strength		20 kV, 1 min		75 kV, 1 min
Operating temperature range		-10℃~+40℃		
Indication of operation	Light	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			
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

Medium voltage phase tester
Wireless type

AC 3.3kV~33kV

Easy-to-use with Wireless pair

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

[Attention]

There is no phase sequence (phase rotation) checking function.
(Only indicating 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	It shall be able to confirm in the luminance of 8,000 lux.							
	Sound	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	20 kV, 5 min
	Contact tip - Grip	HP-U20	50 kV, 5 min
		HP-T3, HP-T6	14 kV, 5 min

HP-UK6R

Voltage detector & Phase tester for Medium voltage
with phase sequence (phase rotation) check function,
Wireless type

AC 6.6kV

■Features

- With Phase sequence (phase rotation) checking function
- Angle of tip metal fitting is adjustable. (20° in all directions)
- Can be used even without attaching an the extending insulating stick.

[Attention]

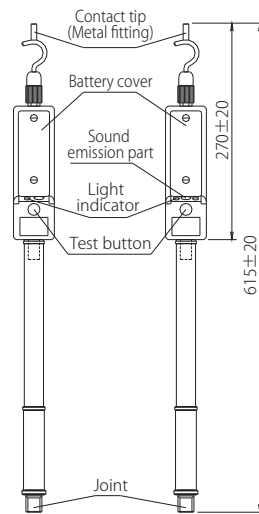
Please designate the frequency of 50 Hz or 60 Hz.

■Accessory

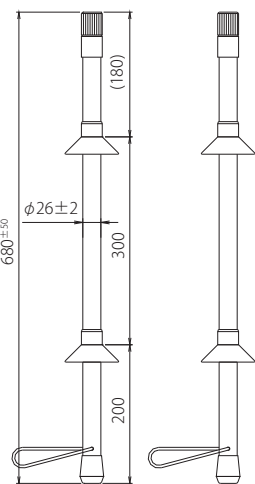
Bag for housing

■Specifications

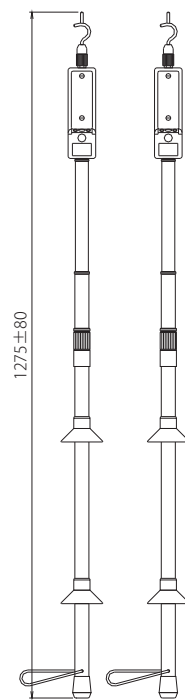
Frequency		50 Hz or 60 Hz (Either one is to be designated.)			Indication	Light	It shall be able to confirm luminance of 8,000 lux.
Dielectric strength	Phase tester	Drying	Between contact tip (metal fitting) and joint	20 kVAC - 1 min		Sound	
		Pouring water	Ditto	12 kVAC - 1 min	Phase test function	Phase test	Discrimination of in-phase or different phase of 120°
	Insulating stick	Drying	Between tip part and grip	20 kVAC - 5 min		Phase rotation	Discrimination of advance or delay of 120°
		Pouring water	Ditto	13.8 kVAC - 5 min		Structure of detector	Water shall not ingress.
Leakage current		Phase tester: 1 mA or less Insulating stick: 0.5 mA or less			Operating temperature range		-10℃~+40℃
Possible distance of phase test		Distance between transmitting and receiving sides: Within 5 m			Battery		6R61 or 6F22(9V), each 1 pcs



Phase tester



Insulating stick



Phase tester
with insulating stick

Grounding hook

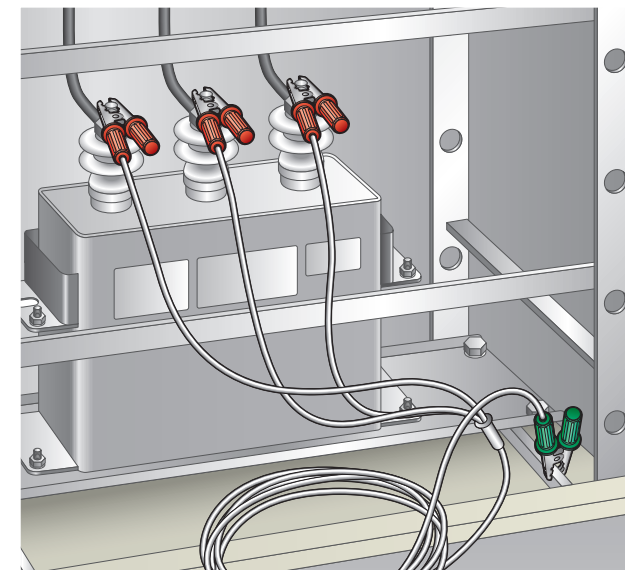
A wide variety of lineup according
to the application

■When ordering, please determine the followings.

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 (31 ϕ) + 2.0m (34 ϕ)	1.5m (31 ϕ) + 2.0m (34 ϕ)	1.5m (31 ϕ) + 2.0m (34 ϕ)
4.0m (connection of 2 rods)	2.0m (31 ϕ) + 2.0m (34 ϕ)	2.0m (31 ϕ) + 2.0m (34 ϕ)	2.0m (31 ϕ) + 2.0m (34 ϕ)
4.5m (connection of 2 rods)	2.5m (31 ϕ) + 2.0m (34 ϕ)	2.5m (31 ϕ) + 2.0m (34 ϕ)	2.5m (34 ϕ) + 2.0m (39 ϕ)
5.0m (connection of 2 rods)	2.5m (31 ϕ) + 2.5m (34 ϕ)	2.5m (31 ϕ) + 2.5m (34 ϕ)	2.5m (34 ϕ) + 2.5m (39 ϕ)
6.0m (connection of 2 rods)	3.0m (34 ϕ) + 3.0m (39 ϕ)	3.0m (34 ϕ) + 3.0m (39 ϕ)	3.0m (34 ϕ) + 3.0m (39 ϕ)
6.0m (connection of 3 rods)	2m (34 ϕ) + 2m (39 ϕ) + 2m (39 ϕ)	2m (34 ϕ) + 2m (39 ϕ) + 2m (39 ϕ)	2m (34 ϕ) + 2m (39 ϕ) + 2m (39 ϕ)
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

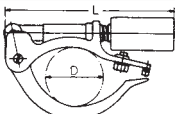

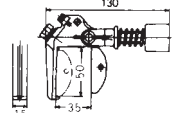
When ordering the earth hook, please determine the following.

- 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	φ8 to 40		710g	For round bus bar
	MA121-AS Special large size	φ30 to 80		800g	For round bus bar
	MA121-AG Strong large size	φ20 to 52, L=195 φ40 to 80, L=195 φ70 to 150, L=225 φ100 to 180, L=225		1200g 1920g	For round bus bar (Earth wire: 60 mm ² or more)
	MA121-C Slanted large size	φ8 to 40		930g	For round bus bar
	MA111-A Universal type	φ8 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	φ20 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	φ8 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	φ5 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	φ5 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	φ8 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	φ5 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	φ5 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


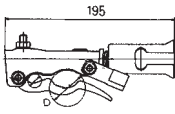

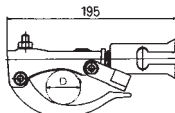

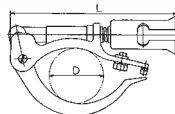

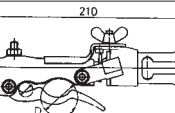

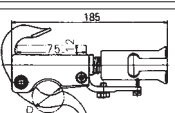

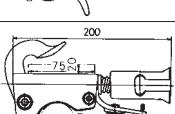

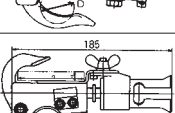

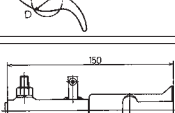

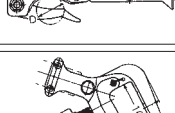

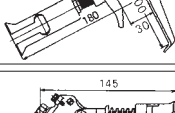

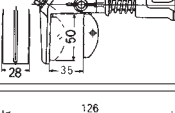

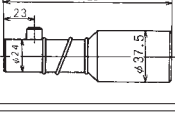
When ordering the earth hook, please determine the following.

- 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	φ8 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-B5 Special large size	φ30 to 80		860g	For round bus bar
	MA121-BG Strong large size	φ20 to 52, L=200 φ40 to 80, L=200 φ70 to 150, L=200 φ100 to 180, L=230		1250g 1950g	For round bus bar (Earth wire: 60 mm ² or more)
	MA121-D Large slanted type	φ8 to 40		930g	For round bus bar
	MA111-B Universal type	φ8 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	φ20 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	φ8 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	φ5 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	φ5 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 determine the following.

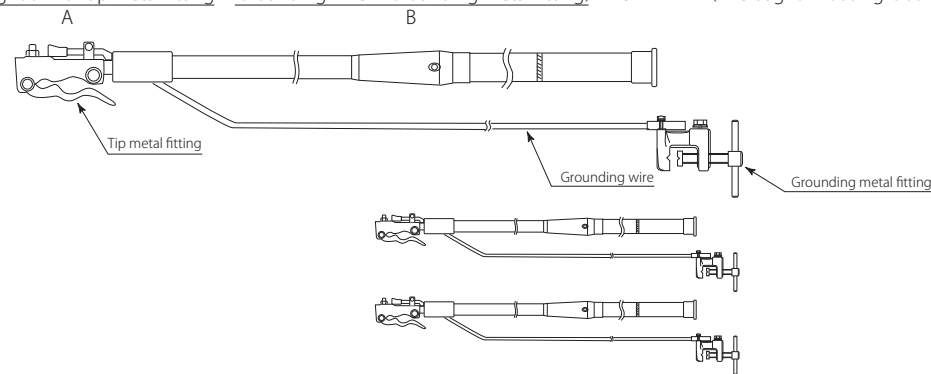
- 1.Type of tip metal fitting
- 2.Type of insulating stick (supplementary connecting type, telescopic type)
- 3.Length and diameter of insulating stick
- 4.Cross-sectional area and length of earth wire
- 5.Type of grounding metal fitting
- 6.Working voltage

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.)

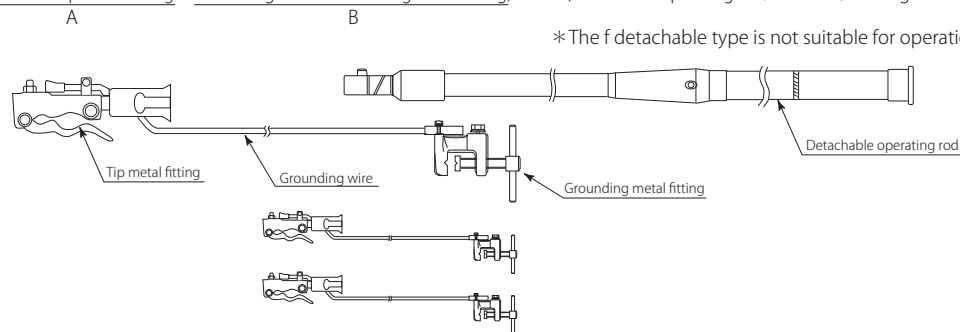


A	Model of tip metal fitting	B	Class	Breakdown of class		Grounding wire	Grounding metal fitting	Applicable voltage
				Length, kind of operating rod				
Large fixed type MA121-A (MA121-C)		Type 5	Neo pipe	0.5m	Single rod	22mm ² ×3m	SA107C	6.6kV
		Type 10	〃	1.0m	〃	〃	〃	〃
		Type 15	〃	1.5m	〃	22mm ² ×4m	〃	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)	〃	〃	〃	〃
		Type 5	〃	0.5m	1本もの	14mm ² ×3m	SA107B	6.6kV
		Type 10	〃	1.0m	〃	〃	〃	〃
Medium-sized fixed type MA122-A Fixed type for cubicle MA115-A		Type 15	〃	1.5m	〃	14mm ² ×4m	〃	22kV
		Type 20	〃	2.0m	〃	〃	〃	〃

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

Detachable type

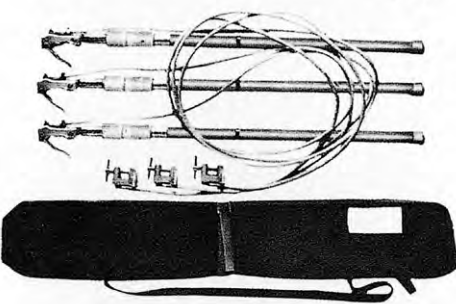
(Closed stock) = (Detachable tip metal fitting + Grounding wire + Grounding metal fitting) × 3 + (Detachable operating rod) × 1 (The bag for housing is sold separately.)



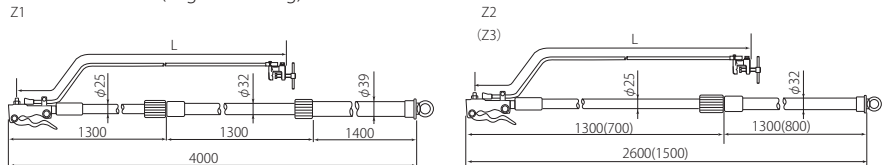
A	Model of tip metal fitting	B	Class	Breakdown of class			Grounding wire	Grounding metal fitting	Applicable voltage
				Length, kind of operating rod					
Large detachable type MA121-B (MA121-D)		Type 5	Neo pipe	0.5m	Single rod	22mm ² ×3m	SA107C	6.6kV	
		Type 10	〃	1.0m	〃	〃	〃	〃	
		Type 15	〃	1.5m	〃	22mm 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

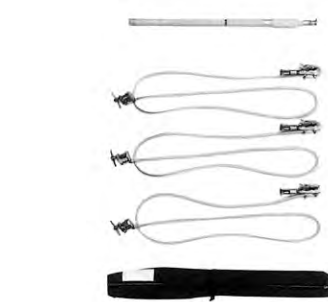


■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

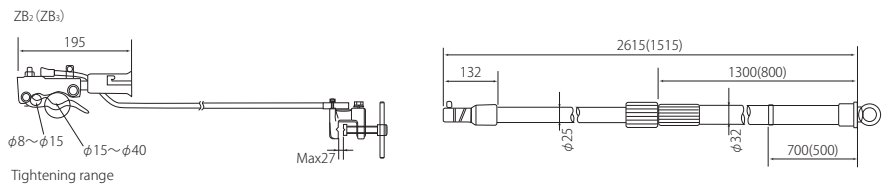
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
Z1	275kV	MA121-A	22mm ² ×5m	4.0m	1.8m	3	Capacity of 1 phase portion	15.5kg
Z2	154kV	"	22mm ² ×4m	2.6m	1.5m	2	Capacity of 3-phase portion	11.0kg
Z3	77kV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

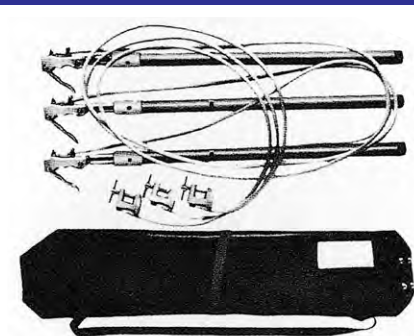


■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

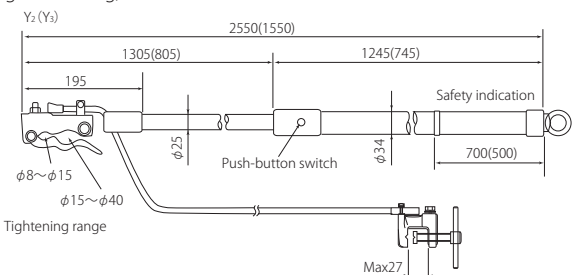
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
ZB2	154kV	MA121-B (Groove: 5.5 mm)	22mm ² ×4m	2.6m	1.4m	2	Capacity of 3-phase portion for 1800 × 1200	9.3kg
ZB3	77kV	"	22mm ² ×3m	1.5m	0.9m	2	Capacity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

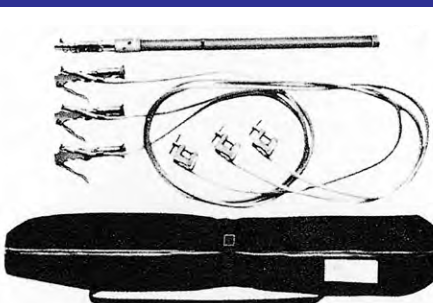


■Grounding metal fitting SA107-C Insulating stick: Neo pipe

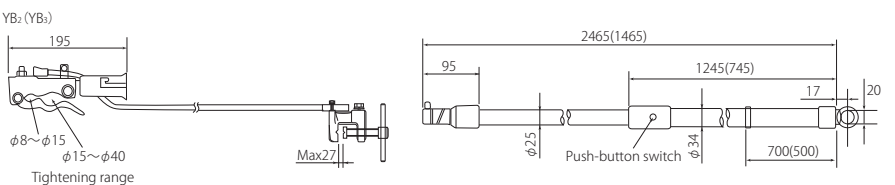
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
Y2	154kV	MA121-A	22mm ² ×4m	2.5m	1.4m	2	Capacity of 3-phase portion	11.5kg
Y3	77kV	"	22mm ² ×3m	1.5m	0.9m	2	"	9.0kg

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



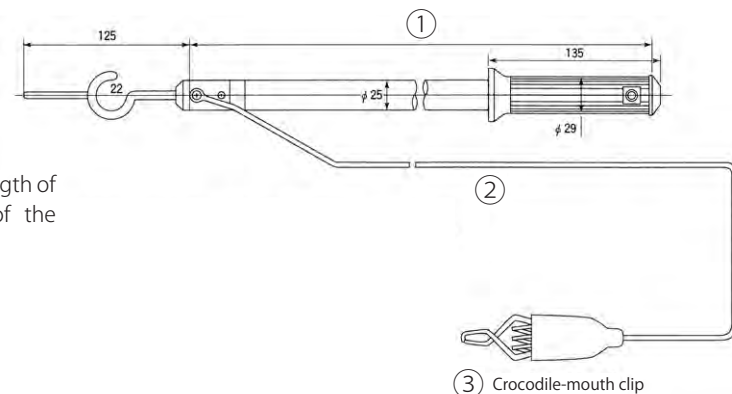
■Grounding metal fitting SA107-C Insulating stick: Neo pipe

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

Discharge stick

Simple Discharge stick with no built in Internal Resistance

AC 6.6kV



- (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

Enhance Work Safety and Efficiency



Features

- Work safety and efficiency are improved by combining the voltage-detecting function to the medium 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	Light emission: It shall be able to confirm luminance of 8,000 lux
	Sound	Sound: 50 dB or more at a distance of 2 m

Operating temperature range	−10°C~+40°C
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

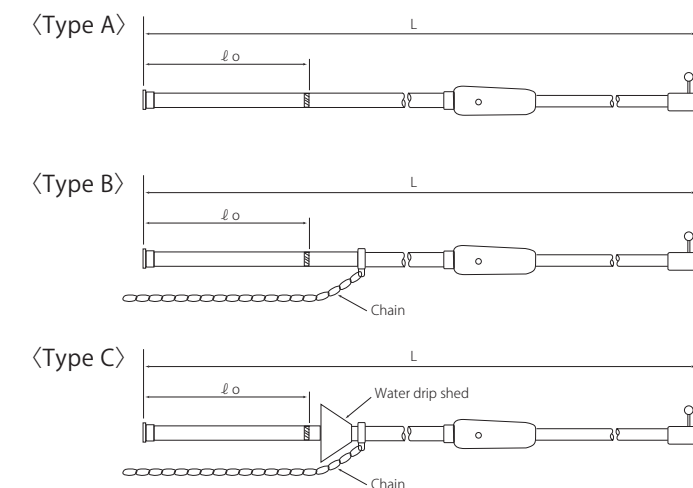
SA109□-□

Hook Stick for D/S (Disconnecting Switch)

AC 10kV~110kV

Features

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



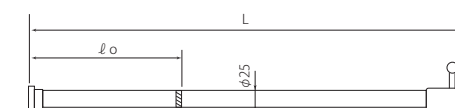
Specifications

Model (SA109)	Indoor	A-1	A-1.5	A-2	A-3	A2-4	A2-5	A2-6	A3-6	Chain	Water drip shed
	Outdoors	B-1	B-1.5	B-2	B-3	B2-4	B2-5	B2-6	B3-6		
Applicable voltage		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 3 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□

Hook stick for D/S in Cubicle

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)

Impact
resistance

Chemical
resistance

Waterproof

Rechargeable
type

Magnet

RoHS

- Features
- The working light has 2 modes; lighting mode and flickering mode.
 - The spotlight enables visual recognition at a distance of 10 m.
 - With the built-in magnet in the hand guard, the irradiation angle can be easily adjusted.
 - Shoulder belt and S-shaped hook.

■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	φ60mm×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.

Robust, Professional Specification



EWL-2B
Battery unit
It is installed in the main body

EWL-2C
AC adapter
To charge the battery unit.

EWL-3D
Charging stand
Holding unit for battery charging to hold the main body upright position. (EWL-2C is required.)

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
RED color filter cover to use the work light as a warning lamp.



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

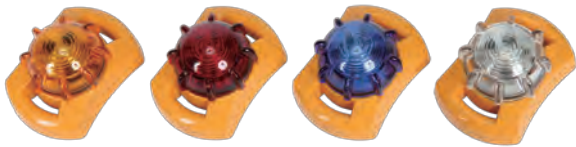


■ Work/operation at hand and foot is easy with shoulder belt.



■ 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

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

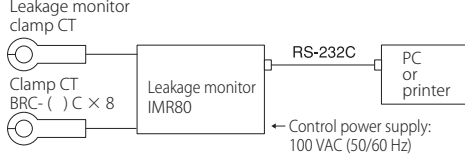
Conventional leakage current and fundamental wave component of leakage current from which the harmonic component has been removed can be measured and displayed at the same time, by combining analog filter and high-performance digital filter. Therefore, measurement in accordance with the frequency characteristics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



■Features

- Labor savings when researching leakage accidents are possible by simultaneously measuring eight circuits.
- Leakage current (Io) and fundamental wave component (Io 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



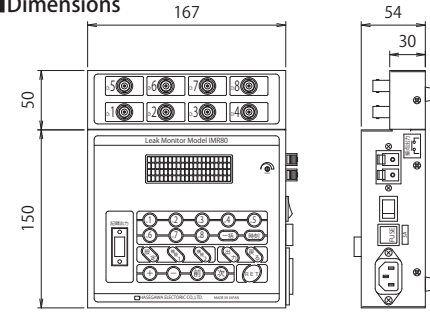
■Accessory

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

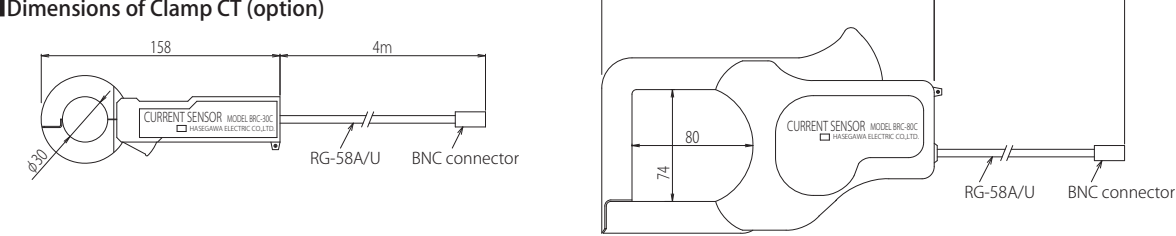
■Option (sold separately)

	Name	Model
Sensor relations	Clamp CT (hole dia. φ30 mm)	BRC-30C
	Clamp CT (hole dia. vertical 80 mm × lateral 74 mm)	BRC-80C
	Clamp CT extension cord (10 m)	BRCD-10B
	Clamp CT carrying case (380 × 422 × 160 mm)	IMR-OP03
Printer relations	Conversion connector (when CT for IMR50 is used)	BNCP-FJ
	Thermal printer (including AC power supply & AC cable)	BL-58RS
	Recording paper (1 box = 10 rolls)	TP211C-3

■Dimensions



■Dimensions of Clamp CT (option)



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 : ±5% ±5 mA Current of Io fundamental wave : ±5% ±5 mA	Temperature range	0~50℃
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	170×167×54 (mm)
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	Weight	About 1.5 kg (main body only)

VOLTECT

Extra-High Voltage
Detecting System

AC 3.3kV~550kV

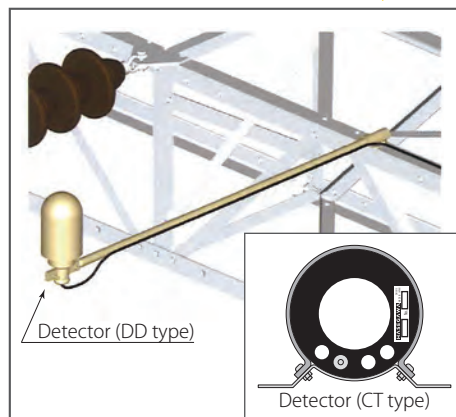
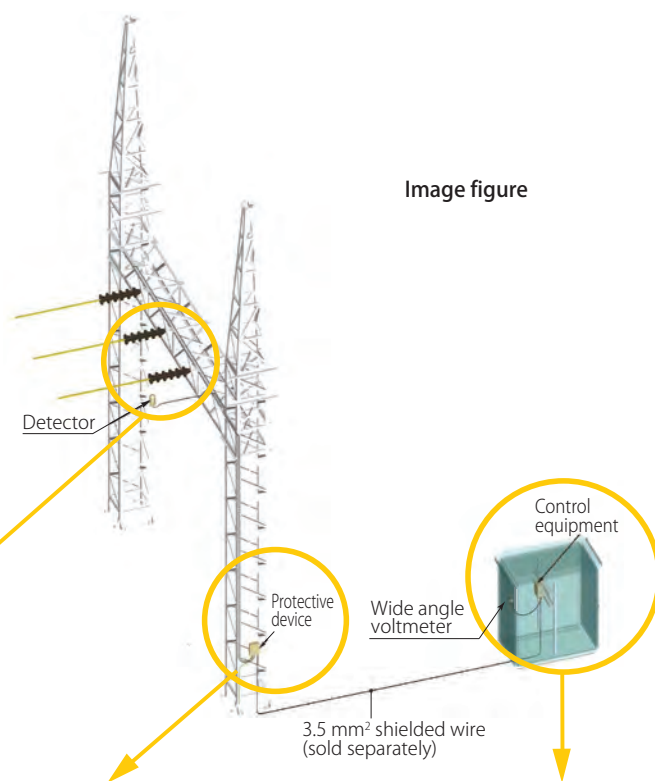
* This apparatus is produced and sold by our company, having inherited inheriting technologies of former Million Electric Mfg. Co. Ltd.

■Features

- Economical as it can be simply installed without using PT, PD.
- Easy installation and maintenance.

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.

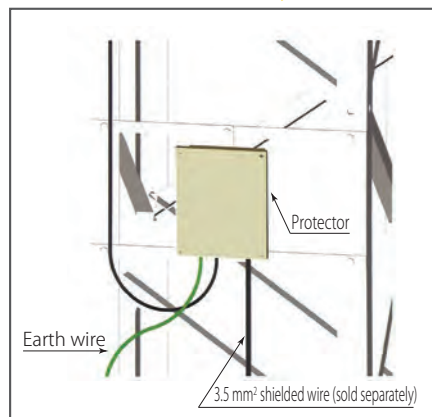
Image figure



Detector

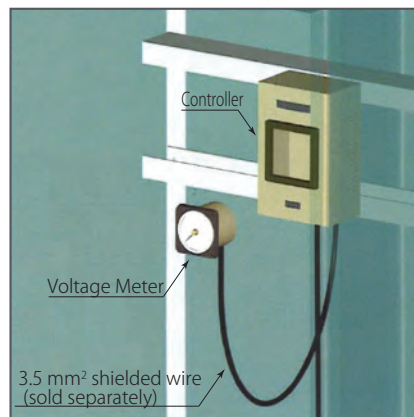
- (DD type) HG7-DD-○m
- (CT type) HG7-CT-○m

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

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



Controller

- HG7-SM○○
- HG7-DM○○

* Refer to the following Rating table.

Voltage Meter

- DVF-11M

■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 × 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 kΩ		
	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 × 50 μs (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 and case. However, terminal E could be included in the terminal group or excluded during the test.

■How to decide the specification

Installation site of detector	Outdoors		Indoor		Inside the cubicle	
Nominal line voltage	Control equipment	Detector	Control equipment	Detector	Control equipment	Detector
3.3kV	—	—	H	CT	H	CT
6.6kV	H	DD	H, ST	CT	H, ST	CT
11kV			H	DD	DD	
22kV			H, ST			
33kV			ST			
40~160kV	ST		ST			
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 normal railways) HXR-25 (For Shinkansen)

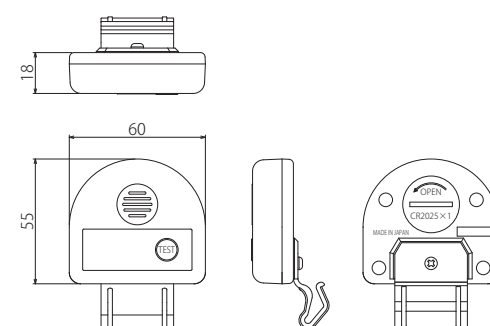
Medium Voltage hot-line proximity alarm

AC HXR-20 20kV
HXR-25 25kV

■Features

- Alarm is generated at a distance of about 2 m from the energized overhead contact lines, normal railways (AC 20kV) and High Speed Railway(AC 25kV).
- It has directionality to 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)



Non-contact Detection of Charging State of AC Overhead Contact Lines

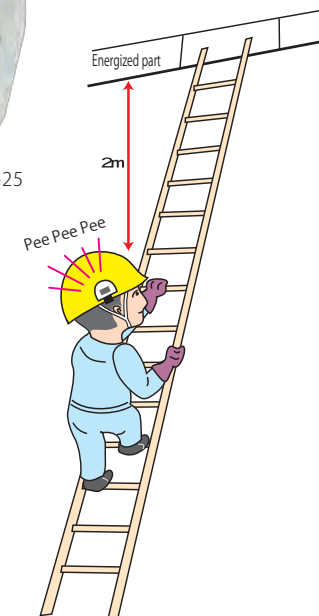
Jointly developed with JR EAST (East Japan Railway Company)



HXR-20



HXR-25



■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
Battery life	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

Index etc.

Voltage detector

Voltage detector

Voltage detector

Voltage detector

Phase tester

Grounding hook

Discharge stick

Discone hook stick

Illuminator

Measuring instrument

Railway products

Relay

Information materials

Information materials

48

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

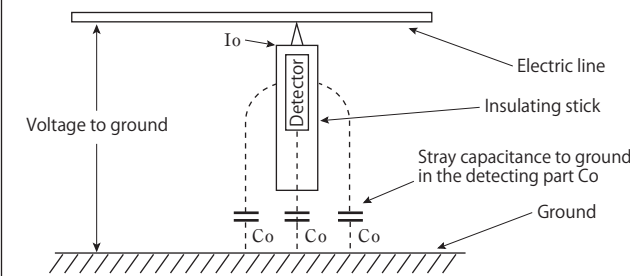
In general, voltage detectors have a structure with a detector built into a casing of insulation material. When the contact tip of the voltage detector makes contact with a cableway (electric circuit) as shown in Fig. 1, it detects minute electric currents I_o flowing in the Electric line \rightarrow Detector \rightarrow Stray capacitance to ground in the detecting part C_o of the detector \rightarrow 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.

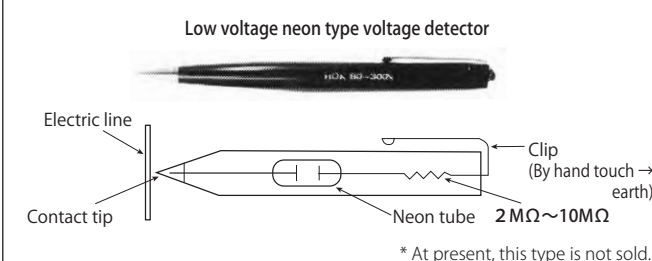
Fig. 1 Principle of voltage detector



◆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.

Fig. 2 Neon light emission type voltage detector



◆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)

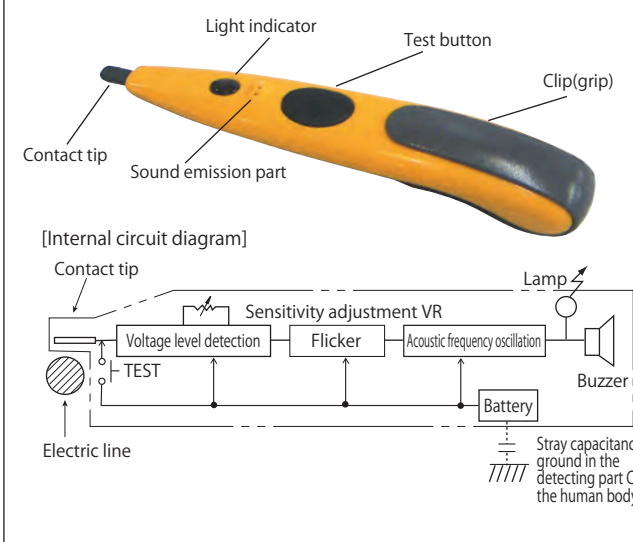
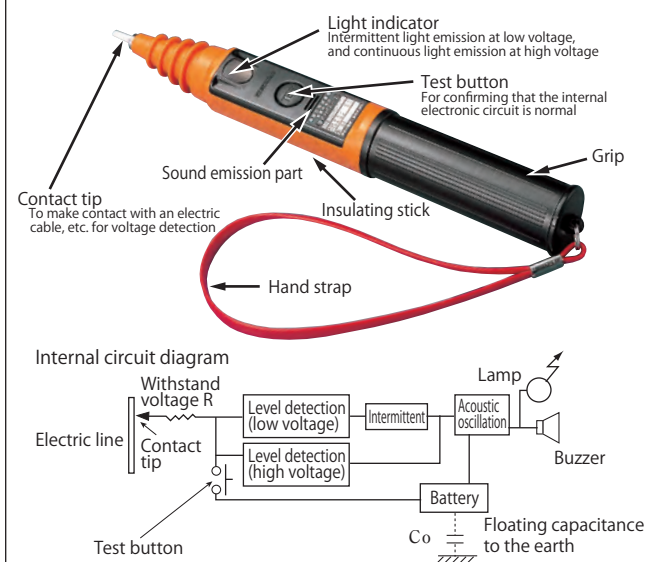


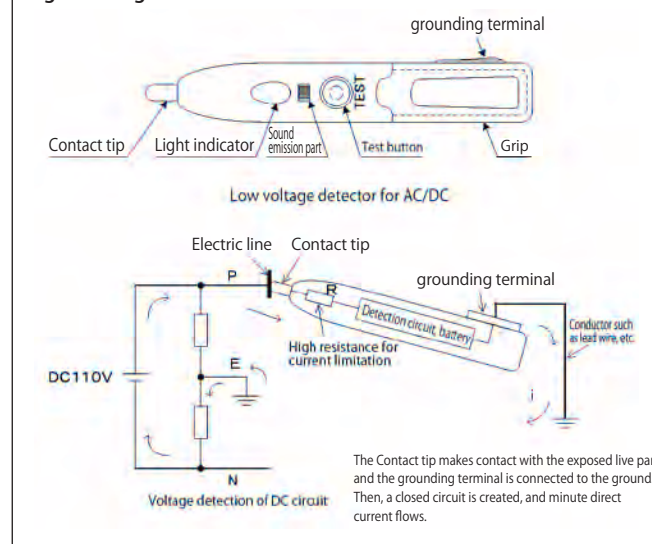
Fig. 4 Audio signaling and light emitting type high/low voltage detector (example)



1.2 Voltage detection of DC circuit

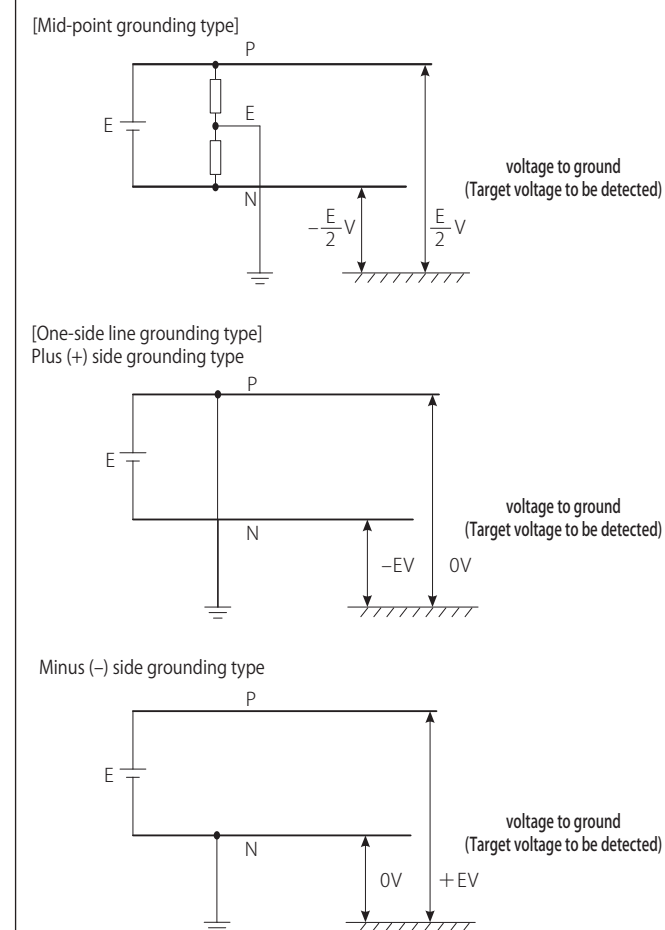
When detecting the voltage of a DC circuit, it is possible to have the contact tip make contact with an exposed live part of a electric line then create a closed circuit by connecting the earth terminal to the ground, and flow a direct current (Fig. 5), because the current does not flow via capacitance, 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

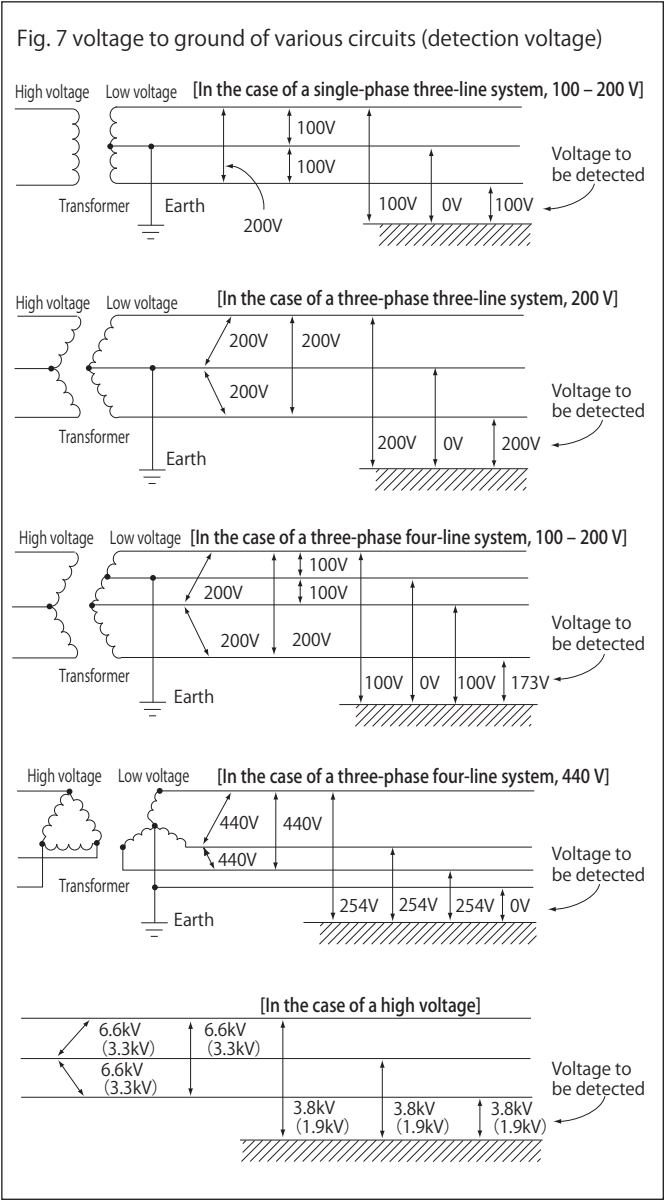
The first main performance priority from the viewpoint of a voltage detector's intended use is voltage detection sensitivity (operation starting voltage). It tends to be considered that as sensitivity increases, performance increases. However, as sensitivity increases, there are concerns that false-positive 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 ± 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



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)

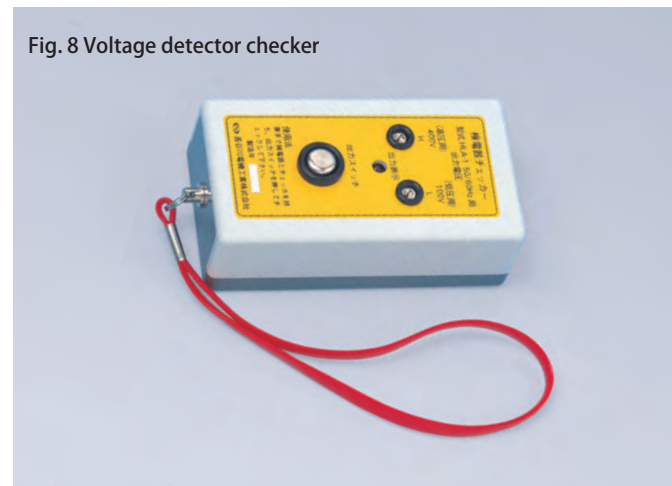
It is specified that detection by voltage detectors shall be indicated by either light emission or sound generation (Safety guideline for voltage detectors). Regarding indication by light emission, it is generally possible for light emissions to be identified if the luminance is 8,000 lux on a practical 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).



■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

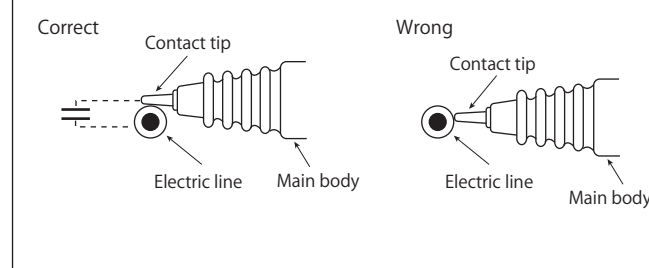
that conforms to the target cableway; (Example: A low voltage detector cannot detect high voltages). Also confirm the status of the cableway, with switches, indication lamps, and circuit diagrams, etc.

- (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

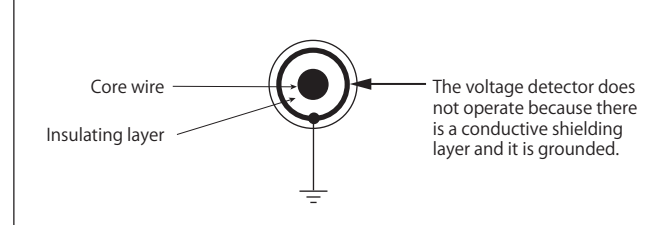


3.4 Voltage detection for a high voltage electric line is not possible.

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.



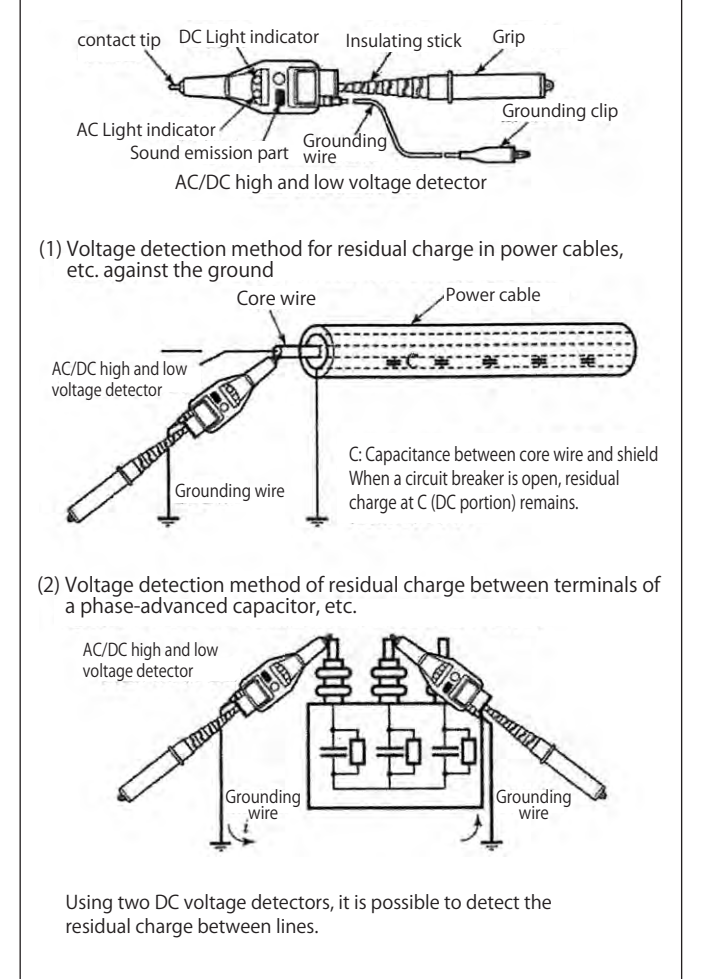
3.5 Electric discharge of residual charge

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.

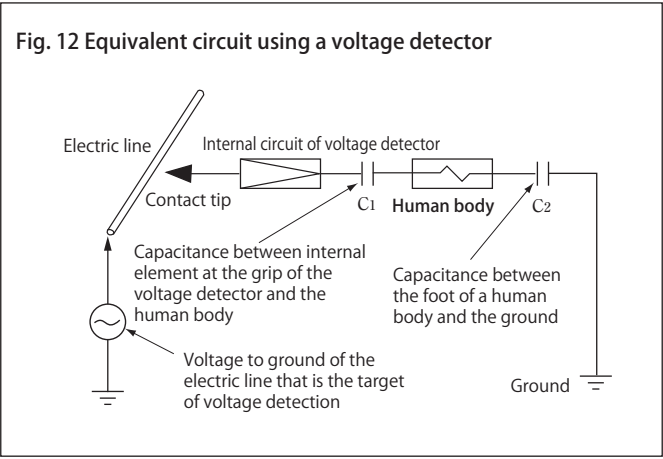
(2) The built-in batteries of voltage detectors are to be checked at periodic inspections and replaced, because there is a natural discharge of individual battery units, even if not used.

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:

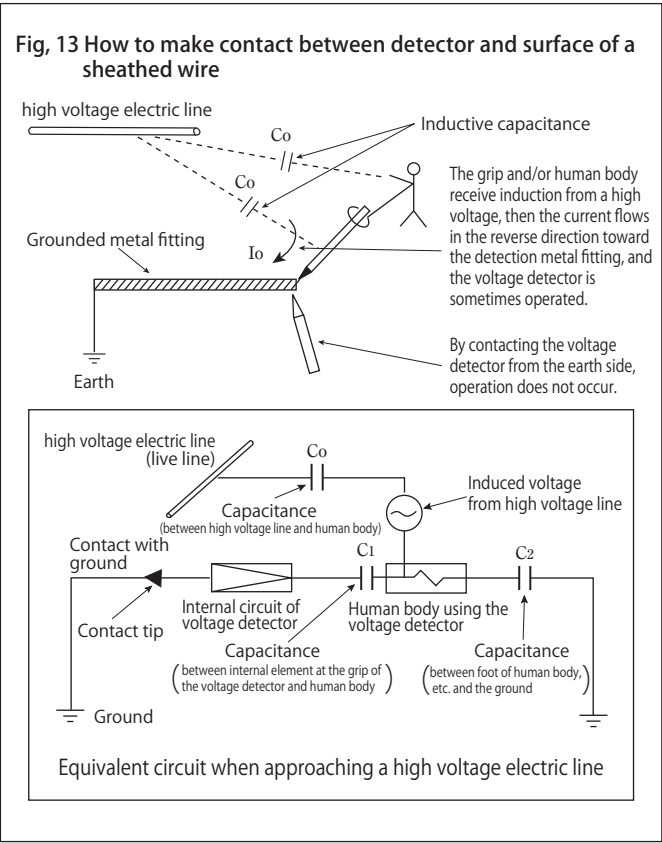
If the grip of a commonly used short voltage detector is not held firmly, and when it is used in a state in which it is only held by finger tips, the operation starting voltage increases because the value of capacitance C_1 , as shown in the equivalent circuit of Fig. 12, decreases.



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.

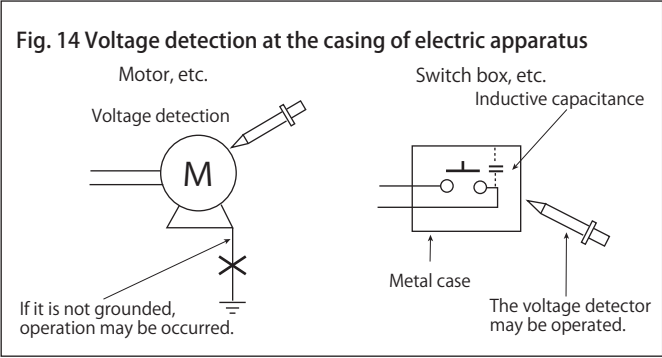
This phenomenon is explained, as shown in Fig. 13, as the human body and/or grip of the voltage detector that approaches the high voltage line having a voltage that flows to the earth due to induction from the live line, and an induction current flows in the reverse direction from the grip of the voltage 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.



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.



※ ※ ※ ※

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.

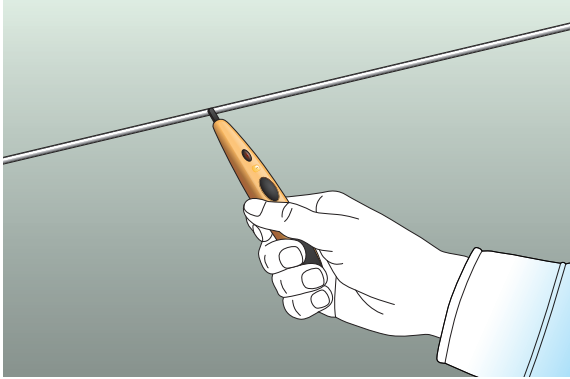
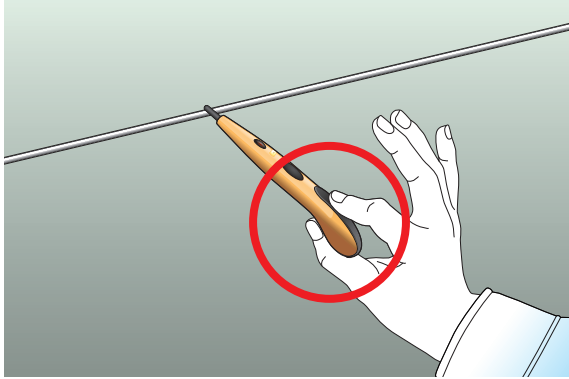
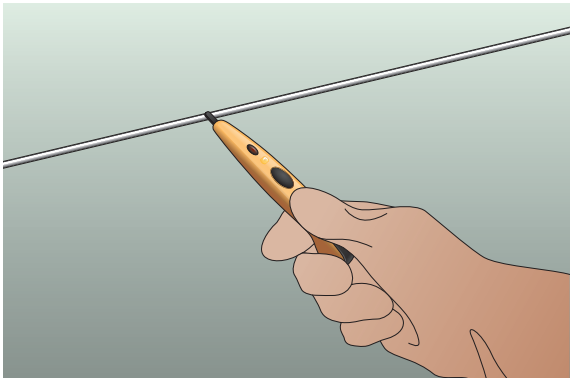
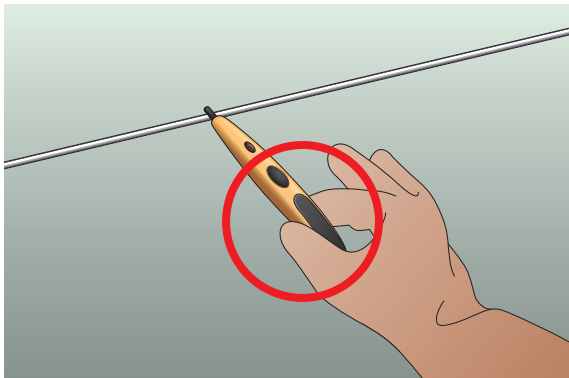
ISO9001 Registration No.: 0921
ISO14001 Registration No.: E635



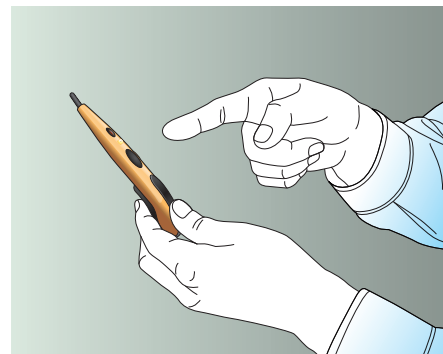
Low voltage use (For AC)

The contact area with the hand affects the sensitivity of the voltage detector. So, appropriate sensitivity cannot be obtained unless it is held firmly. Also, it is not possible to use rubber gloves for high voltages or gloves made from thick fabric.

■Holding the voltage detector correctly

Good	Bad
	
	
<ul style="list-style-type: none"> ●Hold the grip firmly. 	<ul style="list-style-type: none"> ●It is not possible to detect the voltage correctly if the grip is held with the tips of the fingers.

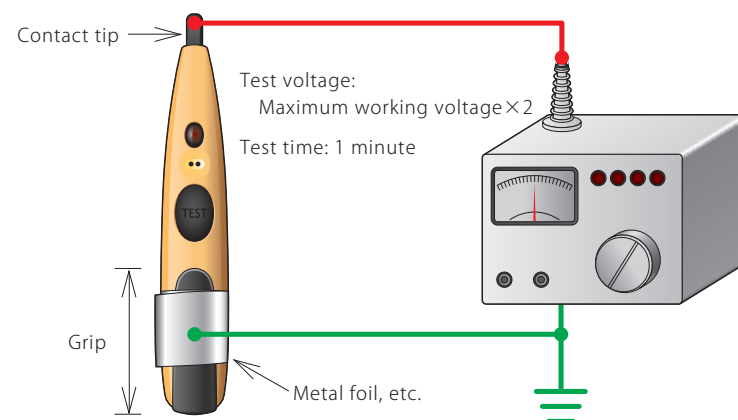
■Visual inspection



Visual inspection items

- Press the test button for about five seconds and check that there is no change in the lamp or the sound.
- Check that there are no problems such as damage, dirt, scratches or cracks.

■Withstand voltage testing

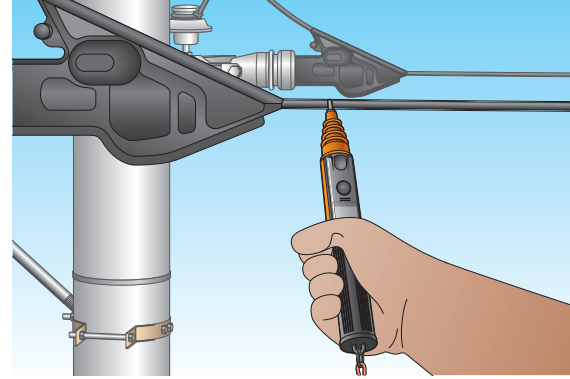
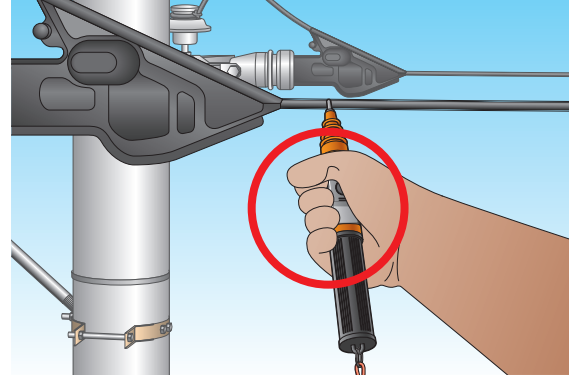

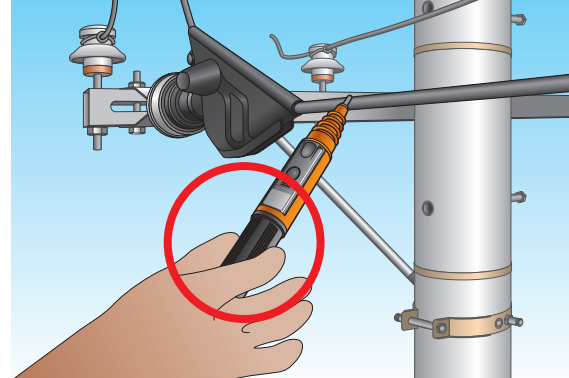


- Apply a voltage between the contact tip and the grip (at a position near the contact tip).

Medium and Low voltage use (For AC)

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

■Holding the voltage detector correctly

Good	Bad
	
	
<ul style="list-style-type: none"> ●Hold the grip firmly. 	<ul style="list-style-type: none"> ●It is not possible to detect the voltage correctly if the grip is held with the tips of the fingers. ●Never hold a part other than the grip when detecting voltages. This is extremely dangerous.

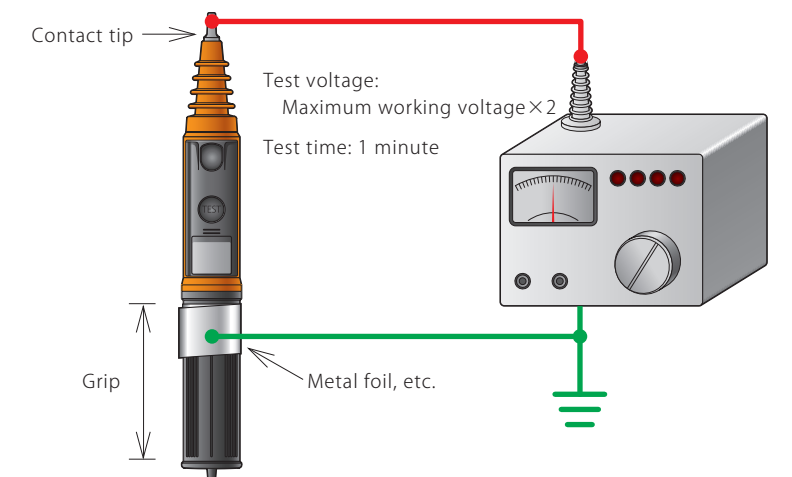
■Visual inspection



Visual inspection items

- Press the test button for about five seconds and check that there is no change in the lamp or the sound.
- Check that there are no problems such as damage, dirt, scratches or cracks.

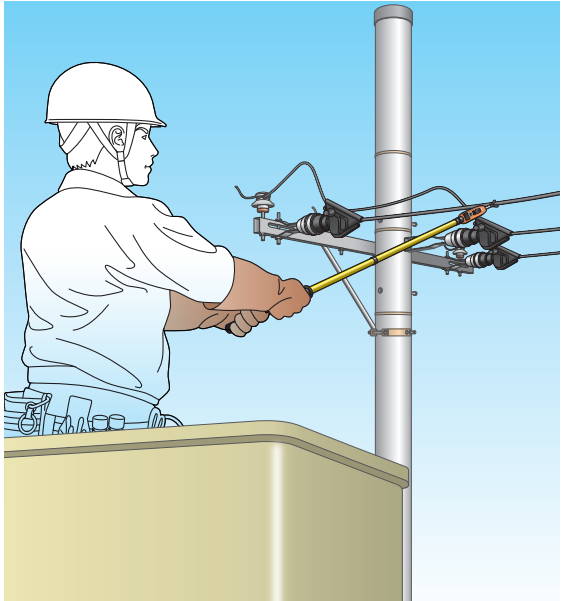
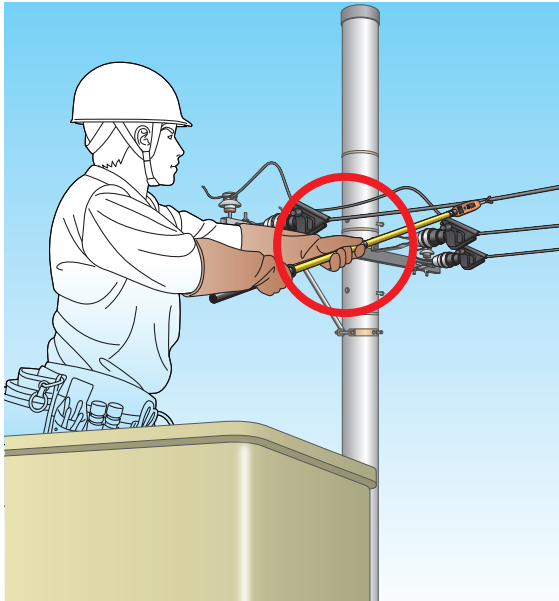


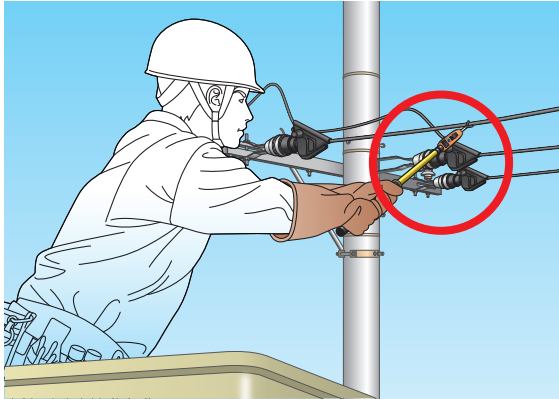
■Withstand voltage testing



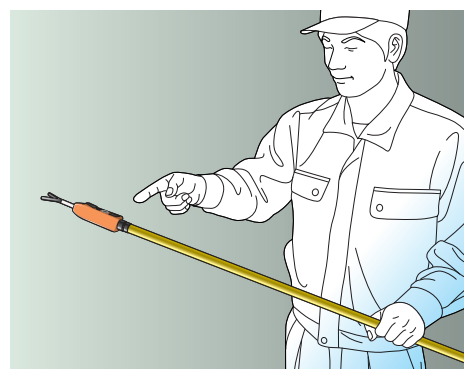
- Apply a voltage between the contact tip and the grip (at a position near the contact tip).

Medium voltage & High voltage detector use

■Holding the voltage detector correctly

Good	Bad
	
<p>■During storage</p>  <p>■During use</p>  <p>Extend as far as possible</p>	
<ul style="list-style-type: none"> ●Hold the grip firmly. ●Telescopic type voltage detectors should be extended as far as possible for use. 	<ul style="list-style-type: none"> ●Never hold a part other than the grip when detecting voltages. ●Do not use a telescopic type voltage detector to detect voltages in its shortened state.

■Visual inspection



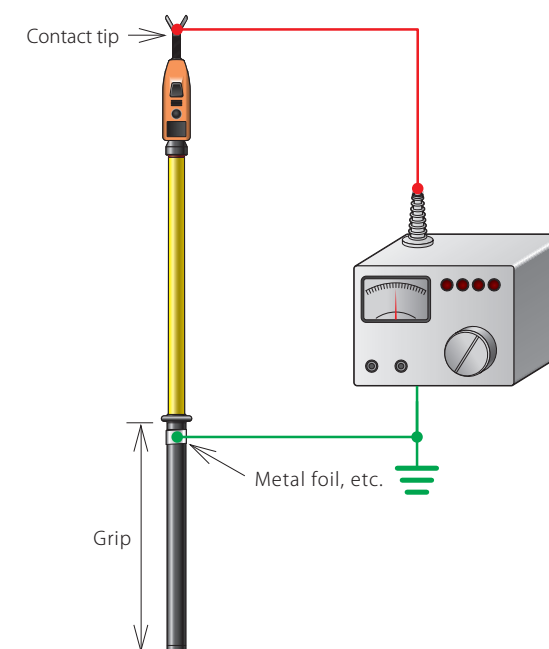
Visual inspection items

- Press the test button for about five seconds and check that there is no change in the lamp or the sound.
- Check that there are no problems such as damage, dirt, scratches or cracks.

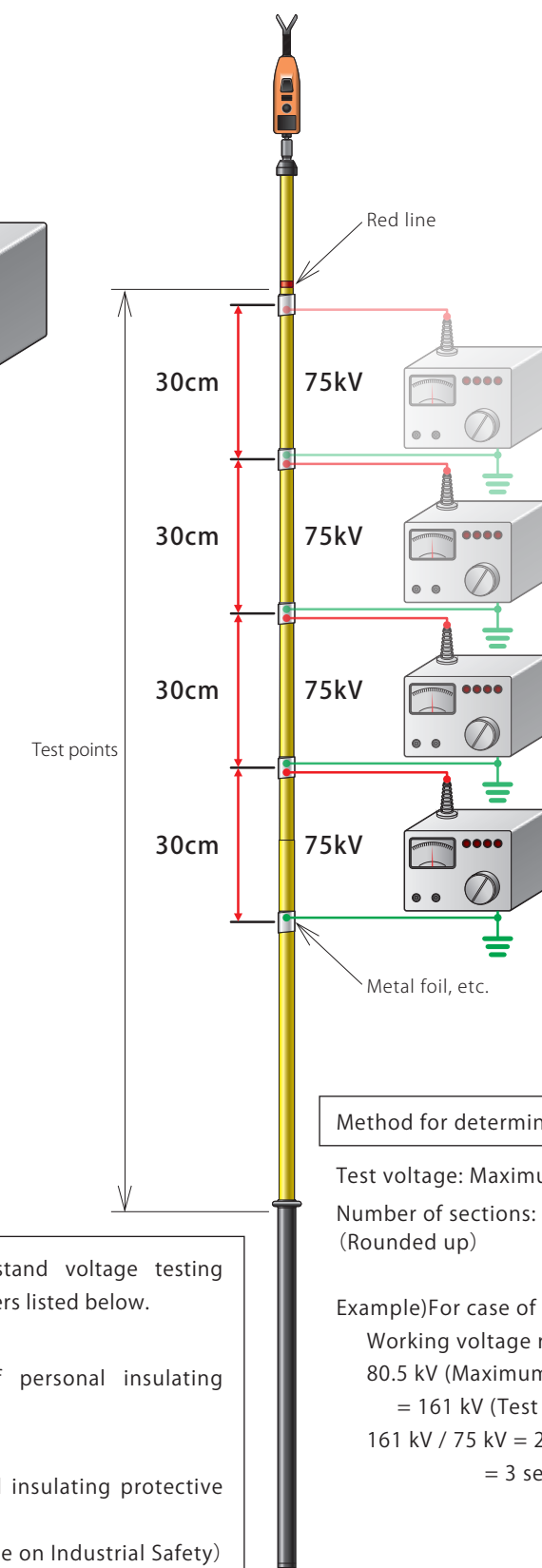
■Withstand voltage testing

■When using a withstand voltage tester output voltage (MAX 75 kV)

■When the test voltage exceeds 75 kV
Divide the test points into parts 30 cm long and apply the test voltage across each of those parts



Test voltage: Maximum working voltage × 2
Test time: 1 minute



Method for determining the number of sections

Test voltage: Maximum working voltage × 2
Number of sections: Test voltage / 75 kV
(Rounded up)

Example) For case of HST-70
Working voltage range: 20 kV to 80.5 kV
80.5 kV (Maximum working voltage) × 2
= 161 kV (Test voltage)
161 kV / 75 kV = 2.15 (Number of sections)
= 3 sections (rounded up)

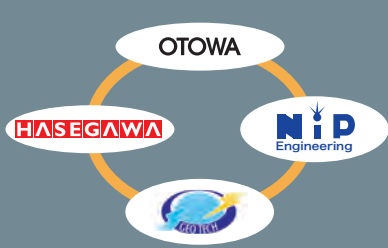
Hasegawa Electric has defined the withstand voltage testing methods by quoting the regulations and others listed below.

- March 28, 1961 LSB Notification No. 247
“Regulations on the performance of personal insulating protective equipment”
(Ministry of Health, Labour and Welfare)
- 4th Edition Test standards for personal insulating protective equipment, etc.
(Issued by: The Expert Group of Expertise on Industrial Safety)
- JIS C 4510-1991 Hook bars for disconnecting switch operation

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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

Introduction to group companies



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Measuring instrument
Railway products
Relay
Information materials



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 <https://www.nip-eng.co.jp/>
 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 **Meneon Co., Ltd.** (Execution of work and maintenance of lightning protection system)

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