GENERAL CATALOGUE Vol.3

Voltage detector

Auxiliary device for voltage detection

Voltage detector checker

Phase tester

Grounding hook

Discharge stick

Discone hook stick

Illuminator

Measuring instrument

Railway products

HASEGAWA ELECTRIC CO., LTD.

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

QUALITY ASSURANCE JIC
REGISTERED ORGANIZATION
No.0921-ISO 9001
No.E635-ISO 14001

MS
JAB
CM002

HASEGAWA

HASEGAWA ELECTRIC CO., LTD.

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CATALOGUE-H01-0005-4 '19.03.3000D

Note: Specifications and prices are subject to change for improvement without prior notices.

A NEW CHALLENGE AS PIONEER

Rising to New Challenges as a Pioneer

HASEGAWA ground-fault relays, voltage detectors, phase testers, and measuring instruments are essential to protect the safety of human lives and our society.
In this age of electronics, one that continues to progress in complexity, the importance of these products are increasing at an alarming rate.
From extra-high voltage to low-voltage products and AC to DC products used in a variety of scenes from power companies, railway companies, and FA factories for manufacturing companies to various households, our company's products play a key role in creating safe electrical environments.

We contribute to "safe electricity" by providing high-level technical skills and wholehearted devotion. We make full use of our sensing technology to make greater leaps in our development.

Since its founding in 1925, our company has strived to develop and produce products that are key to creating safe electrical environments through products such as ground-fault relays, voltage detectors, and phase testers.
As a result, we have been able to establish ourselves as the top manufacturer in the voltage detector field, and through our original research and technology in both AC and DC relays, we have developed one-of-a-kind products and have received high praise. This is simply a result of our thorough application of "worksite principles", and it is precisely because our entire company takes a position of wholeheartedly responding to the demands of our customers under the motto of "the truth is in the worksite" that we have been able to grow as a total-solutions consulting company for "electrical safety".
Additionally, in recent years we have been grabbing attention in the overseas market and not just in Japan. Notably, in Southeast Asia, the HASEGAWA brand is recognized as proof of safety and reliability. We take pride in being able to contribute to our customers, which include many infrastructure-related enterprises that support people's lives, such as power, gas, sewer, railroad, and communication companies, and in the future, we would like to make full use of our sensing technology to make great leaps in our development. We at Hasegawa believe that it is our social duty to create "a society free of electrical accidents", and it is our intention to continue this duty with untiring efforts. It is our hope that you will continue to support and guide us in our endeavors from now and into the future.

PRESIDENT
吉田洋二郎
Yojiro Yoshida

We are in constant pursuit of technological innovation in order to create a society of comfortable and safe electronics.

Society ever marches forward, and globally, changes are occurring at such an intensely rapid rate that even the words "IT" and " digital" are becoming obsolete in the world of electronics. HASEGAWA is able to respond to the changes of these times while continuing to be the top manufacturer of voltage detectors and relay-related products now and into the future.
To achieve this, we are resolved to never feel satisfied with our current knowledge and technology, and we are engaged in research and development with the aim of creating technology for the next generation and beyond.
The first step of creating ideas for the future starts from our "worksite". We begin by accurately understanding product usage and the demands of our customers. Following this, we continue to listen to our customers and implement their opinions through our processes of development and design, production, quality control, and sales…
Through this constant, cyclical workflow, HASEGAWA aims for greater heights and is working to make "a society free of electrical accidents" a reality.

At HASEGAWA, our work never stops.
Through a never-ending cycle of activity,
we respond to the demands
of the next generation.

Development

We develop our products after giving our full attention to the opinions of our customers and thoroughly analyzing what is being demanded by the market and the times.

Client

We walk in step with our customers and provide support through a 24-hour full-support system. We support our customers through reliable consulting.

Design

We work with the ideas of the product being developed and proceed with design that considers a variety of applications. We also take universal design into account and pursue ease of use.

Sales

Not only do we sell products, we also regularly make proposals that can contribute to the work of our customers.

Production

We take the needs of our customers and when products will be used into account to realize a production system that is able to quickly get products on the market.

Quality

We implement strict product testing and checks that reflect the reliability of the HASEGAWA brand to deliver products with confidence.

Company Overview

Founded:	July 1925
Established:	September 20, 1971
Capital:	41.6 million yen (authorized capital: 64 million yen)
Representatives:	Chairman: Osamu Yoshida President: Yojiro Yoshida

[Locations]

Head Office:	5-8-17, Shioe, Amagasaki-city, Hyogo 661-0976 TEL: +81-6-6429-6144 FAX: +81-6-6429-0016 JR: (071) 3710 FAX: (071) 3710
Tokyo Branch:	Nikko-Ozu Bldg. 3-9-4 Nihonbashi-Honcho, Chuo-ku, Tokyo 103-0023 TEL: +81-3-3662-2715 Fax: +81-3-3662-2716
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General Testing Office:	5-6-20, Shioe, Amagasaki-city, Hyogo 661-0976

[Business Contents]

Voltage detectors:	Low voltage detectors, high voltage detectors, extra-high voltage detectors, DC voltage detectors, and other auxiliary devices for voltage detection
Phase testers:	Low voltage phase testers, high voltage phase testers, extra-high voltage phase testers
Relays:	Bus relays, ground-fault directional relays, ground-fault overvoltage relays, high voltage ground-fault relays, short-circuit relays, DC ground-fault relays, etc.
Current transformers:	Zero-phase current transformers
Grounding transformers:	Low voltage grounding transformers, high voltage grounding transformers
Measuring instrument-related:	Leakage monitors, ωC measuring instruments, etc.
Grounding tools:	Grounding hook sticks, discharge sticks
LED-related:	Working lights, helmet lights, etc.
Other:	Consulting related to ground-fault relay systems, measuring systems, etc. Research, design, and production for co-development with customers

[Major Clients]

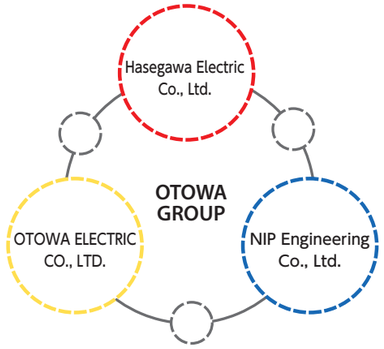
Various power companies and related enterprises, various electrical safety associations, various electric construction firms, various companies related to Japan Railways and private railways, NTT, electronic material trading firms, etc.

[Banks]

MUFG Bank, Amagasaki Ekimae Branch
Resona Bank, Dojima Branch
Sumitomo Mitsui Bank, Umeda Branch

We work with our group company to aid in providing stable electrical power.

We work with our group company to contribute to the stability and safety of electrical power supply with a focus on relays, voltage detectors, and other devices that are essential for the protection and maintenance of devices related to electrical power and industrial equipment as well as solar power generation.



OTOWA ELECTRIC CO., LTD.

Provides total solutions for lightning-related products, including lightning-resistant elements,the first SPDs for direct lightning hits in Japan, SPDs for power sources, and lightning-resistant transformers.

NIP Engineering Co., Ltd.

Provides total solutions for anti-lightning measures, including the manufacture, sales, design, construction, and lightning-damage solutions consultation for lightning arrestor equipment (lightning rods), as well as the maintenance of solar power generation systems

Ceraon Co., Ltd.

Manufactures and sells ceramic devices

Meneon Co., Ltd.

Performs electrical work as well as maintenance and management for electrical facilities

Geological Assessment Tech Co., Ltd.

[Geological survey and water quality survey], [grounding design, grounding resistance reduction work and consulting], [planning, design, and consultation of external and internal lightning protection measures]

Otowa Korea Co., Ltd.

Sells various lightning arrestors as well as other electronic machinery and devices.

Our Company's Journey

[Company History]

1925	Founded in Osaka as the Hasegawa Toshihiko Trading Company Imports and sells relays, fuses, and voltage detectors
1942	Moves to Higashi Yodogawa, Osaka. Begins development and manufacture of bus relays and other ground-fault protection relays as well as voltage detectors
1949	Reorganizes as Hasegawa Electric Co., Ltd. (Hasegawa Denki)
1971	Changes trade name to Hasegawa Electric Co., Ltd. (Hasegawa Denki Kogyo) Kametaro Yoshida becomes President and Representative Director
1975	Begins sale of the "HS-7 audible, light-emitting voltage detector"
1986	Osamu Yoshida becomes President and Representative Director
1995	Issues "The Great Hanshin Earthquake for Our Company"
1996	Begins sale of the "HT-610α low voltage detector"
1997	Begins sale of the "RRG-1 ωC measurement type ground fault protection relay"
1999	The HT-600 series of low voltage detectors achieves 1 million units in sales
2001	Receives ISO 9001 certification
2003	Receives ISO 14001 certification
2008	Main factory moves to Shioe, Amagasaki City
2011	Issues the technical periodical "Understanding ωC Ry"
2013	Establishes Sendai Sales Office
2014	Tatsuo Matsuoka becomes President and Representative Director
2015	First appearance at the Korea Expo (actively participates in international exhibitions after this)
2017	Head office and factory moves to new building
2018	Yojiro Yoshida becomes President and Representative Director

[Awards Received]

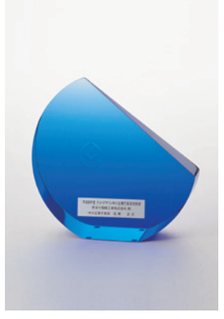
1981	"HS Series" wins award at the Japan Electrical Construction and Materials Fair
1983	"HP Series" wins award at the Japan Electrical Construction and Materials Fair
1986	"HT-600 voltage detector" selected for the Good Design Award G Mark
1988	"HSS-6 voltage detector" wins award at the Japan Electrical Construction and Materials Fair
1989	"HT-610 voltage detector" selected for the Good Design Award G Mark
1990	"HPI-A6 phase tester" wins award at the Japan Electrical Construction and Materials Fair
1993	"HX-6 hot line proximity alarm" wins award at the Japan Electrical Construction and Materials Fair
1993	"HST Series voltage detector" selected for the Good Design Award G Mark
1994	"VG-UI2T instant ground-fault directional relay" wins award at the Japan Electrical Construction and Materials Fair
1995	"Research and development of wireless voltage detectors and phase testers" wins the Shibusawa Award
1996	"Development of ωC measurement type ground fault protection relay equipment" wins Ohm Technology Award
1996	"HT-610α voltage detector" wins Good Design Award Commissioner's Special Prize for Products of Small and Medium Enterprises
1999	"Development of lead-less voltage detectors" wins the Shibusawa Award
1999	"RRG-1B relay" wins award at the Japan Electrical Construction and Materials Fair
2000	"Lead-less phase tester" wins award at the Japan Electrical Construction and Materials Fair
2001	"Development of extendable voltage detectors" wins the Shibusawa Award
2003	"HSE-7T voltage detector for high voltage" wins award at the Japan Electrical Construction and Materials Fair
2005	"RRG-3 ωC measurement type ground fault protection relay" wins the Shibusawa Award
2007	Selected as one of the Small and Medium Enterprise Agency's "300 Small and Medium Enterprises Engaged in Spirited Manufacturing"
2007	"HT-610α voltage detector" wins Good Design/Long Life Design Award
2010	Recognized as a leading technology enterprise in the Southern Hanshin area
2013	"Development of contactless AC voltage detectors" wins Railway Electrical Engineering Award
2013	"HXR contactless AC voltage detector" wins award at the Japan Electrical Construction and Materials Fair
2014	Presented with a "Certificate of Excellence in Declaration as a Corporation" by the Amagasaki Tax Office

Shibusawa Awards

Various awards from the Japan Electrical Construction Association

The Small and Medium Enterprise Agency's 300 Small and Medium Enterprises Engaged in Spirited Manufacturing

Ohm Technology Award



Good Design Commissioner's Special Prize for Products of Small and Medium Enterprises

High voltage

Voltage detector P.23 to 25
Portable live part detector P.26
Phase tester P.36 to 37
Grounding hook P.38 to 43
Discone hook rod P.44

Wind force power generation system

For electric substation equipment

Extra-High Voltage Detecting System(VOLTECT) P.47 to 48

Hydroelectric power plant

high voltage substation

154kV～187kV

Primary substation

275kV～500kV

Nuclear power plant

Thermal electric power plant

Low voltage

Voltage detector P.15 to 17
Phase tester P.35

For photovoltaic power generation system (DC)

Voltage detector P.17 to 18, 21

For electric vehicle (DC)

DC Voltage Checker for Electric Vehicle P.28

100～440V

Shopping street

Residences

Medium voltage

66kV～77kV

Substation for electric power distribution

6.6kV～36kV

6.6kV～36kV

6.6kV～36kV

Electricity distribution lines

Factories

Buildings

Voltage detector P.19 to 25
Phase tester P.36 to 37
Hot line proximity alarm P.29 to 32
Portable live part detector P.26
Live-part display unit P.27
Non-live-part display unit P.27

Grounding hook P.38 to 43
Discharge stick P.45 to 46
Discone hook stick P.44

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

Voltage detector P.51 to 56
Induction voltage detector P.56
Grounding hook P.58

Medium voltage hot line proximity alarm P.57

For receiving plant equipment

Extra-High Voltage Detecting System (VOLTECT) P.47 to 48

Common

Voltage detector checker P33 to 34

Illuminator P.49

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

Flashing LED
SPL-Y/R/B/W

APPLICATIONS

HST series
Medium voltage and high voltage detector
P.23

HX-6
Hot line proximity alarm
(Armband type)
P.32

HTE-610
Low voltage detector
volcheck
P.15

HPL-200
LV phase checker
(Insulated wire clamping type)
P.35

APPLICATIONS

HPseries
Medium voltage phase tester
Wireless type
P.37

HX-6S
Hot line proximity alarm
(Helmet fixing type)
P.32

HPI-A6
Medium voltage phase tester
(Optical fiber type)
P.36

Type H
Grounding hook set
Universal type for cubicle
P.43

HXW-6
Hot line proximity alarm
(Wrist band type)
P.31

APPLICATIONS

DC railway

HSN-6A
Voltage detector for LV and MV **P.21**

HVC-1.5N3(For railways)
Voltage detector for DC railway **P.51**

Grounding hook for railways **P.58**

EWL-3
LED working light Ecopika-kun **P.49**

APPLICATIONS

AC railway

HST-L series
Medium voltage and high voltage detector **P.55**

HXR-25(For Shinkansen)
Medium voltage hot-line proximity alarm **P.57**

HST-W80JS
Voltage detector for AC railway **P.56**

How to read this catalog

① HTE-610-Y/M/I
② Low voltage detector volcheck
③ AC 50～600V
④ Audio signaling and light emitting | Contact tip Conductive rubber | Sensitivity adjustment | Voltage detection through covering (sheath) | CE | RoHS

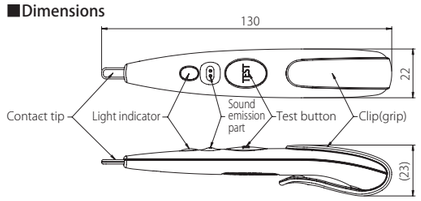
Color code: HTE-610-□ Y: Yellow/M: Marine blue/I: Ivory

Standard Model of the Low Voltage Detector

■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 mm²) according to Hasegawa standard
Battery	LR44(1.5V) × 2 pcs
⑤ 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 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

Voltage detection over the insulation *AC only
*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.

Product list

Voltage Detectors as per working voltages

■ For Low Voltage to Medium Voltage

Model	Feature	Voltage	Listed page
HTE-610		AC50～600V	15
HTE-610L	With LED lighting	AC50～600V	15
HT-680D/DS		AC50～600V DC50～600V	17
HT-680DB/DBS		AC50～600V DC12～600V	17
HT-670	Voltage discrimination function of 100 V•200 V (* When option is used)	AC50～600V DC50～600V	17
HSF-7		AC80～7000V	19
HSE-7G		AC60～7000V	22
HSE-7T1		AC80～7000V	19
HSS-25B1	Telescopic type	AC 80 ～ 25,000V	20
HSG-6	Telescopic type	AC80～7000V	20
HSN-6A	Telescopic type	AC100～7000V ～AC10.5kV※ DC50～7000V ～DC21kV※	21
HST-1.5N		AC600～7000V DC600～7000V	21

※ Applied only at withstand voltage test

■ For Medium Voltage to Extra High Voltage

Model	Feature	Voltage	Listed page
HST-30	Telescopic type	AC3kV～34.5kV	23
HST-70	Telescopic type	AC20kV～80.5kV	23
HST-170	Telescopic type	AC60kV～195.5kV	23
HST-250	Telescopic type	AC150kV～287.5kV	23
WM-22	Pinwheel type /Telescopic type	AC6.6kV～22kV	24
WM-33	Pinwheel type /Telescopic type	AC6.6kV～33kV	24
WM-77A/B/C	Pinwheel type /Telescopic type	AC11kV～77kV	24
WM-154A/B	Pinwheel type /Telescopic type	AC11kV～154kV	24
WM-275	Pinwheel type /Telescopic type	AC33kV～275kV	24
HS-500		AC250kV～550kV	24
HST-20N		AC3kV～25kV DC3kV～25kV	25
HS-90N		AC6kV～90kV DC6kV～90kV	25

■ For Railway (for trolley wire)

Model	Feature	Voltage	Listed page
HVC-1.5N3	Digital display Function for checking earth wire disconnection	DC1500V * Measurement range is 0 to 1999 V	51
HVC-750N3	Digital display Function for checking earth wire disconnection	DC600/750V * Measurement range is 0 to 999 V	52
HS-1.5NJ		AC6600V DC600～7000V	54
HS-1.5NR	Residual electric charge checking function Standby display function	AC6600V DC1000～7000V	54

Model	Feature	Voltage	Listed page
HST-W80JS	Telescopic type/ Standby display function	AC20kV～80.5kV	56

General Catalog of Voltage Detectors

INDEX

HTE-610-Y/M/I

Low voltage detector

volcheck

AC 50～600V

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

Low Voltage Detector, Standard Model

HTE-610-M (Marine blue)

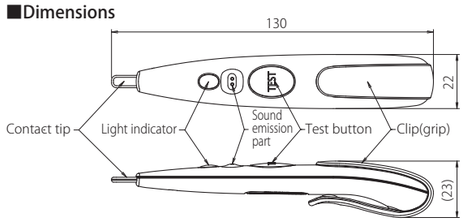
HTE-610-I (Ivory)

HTE-610-Y(Yellow)

■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 mm²) 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

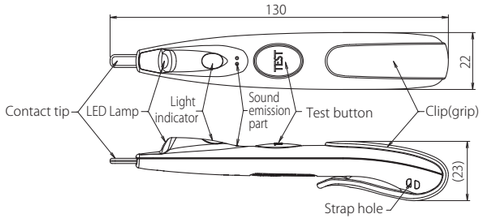
Audio signaling and light emitting | Contact tip Conductive rubber | Sensitivity adjustment | Voltage detection through covering (sheath) | LED lighting | CE | RoHS

Volcheck Lineup with a LED Light

■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.

■Dimensions



■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.

●Good

●Bad

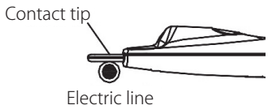
Holding only with finger tips

●Bad

Holding end of the grip

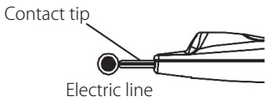
■How to make contact with the detector

●Correct



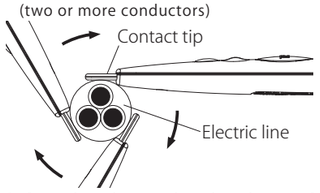
Make contact with wide side of the tip to ensure large contact area.

●Wrong



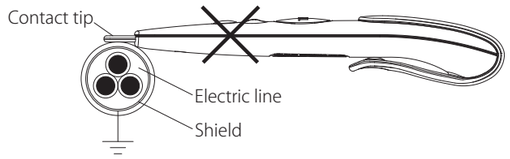
Making contact just by the end of the contact tip.
(Capacitance decrease, and operating sensitivity becomes low.)

●In the case of detection on a multicore cable (two or more conductors)



Perform voltage detection throughout the circumference.

■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.

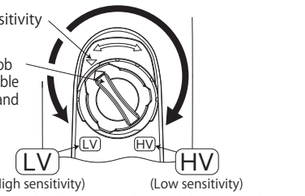
The products are adjusted to the standard sensitivity at shipment (as default). However, sensitivity adjustment can be made when it is required for some reasons such as: When the detection is not possible over the outer surface of the insulated cable; When it is required to reduce the influence of induced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

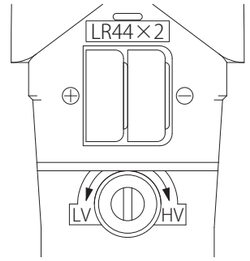
＊ Pay attention to excessively high or low sensitivity. If it is excessively high, there is a risk that an correct judgment would not be possible, because the product responds to too small voltage and static electricity etc.

■HTE-610/610L



(If the volume knob is rotated out of the range shown by the arrow mark, it will break.)

■HT-670



HT-680D/DS/DB/DBS

Low voltage detector

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

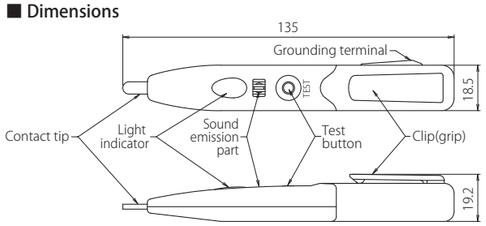
※HT-680D/DB
Audio signaling and light emitting | Contact tip: Conductive rubber | AC DC

AC/DC Low Voltage Detector (for bare conductors)

■ 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



■ 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

※AC only
Audio signaling and light emitting | Contact tip: Conductive rubber | Sensitivity adjustment | Voltage detection through covering (sheath) | AC DC

Optimized for works at Photovoltaic Facilities

Without grounding wire

With grounding wire

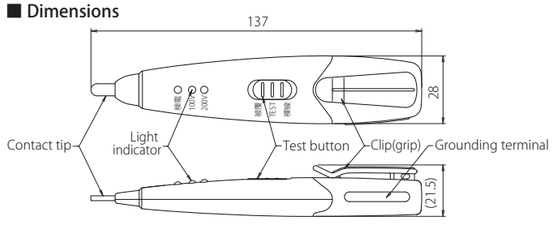
■ Features

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



■ Specifications

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

* Without the casing

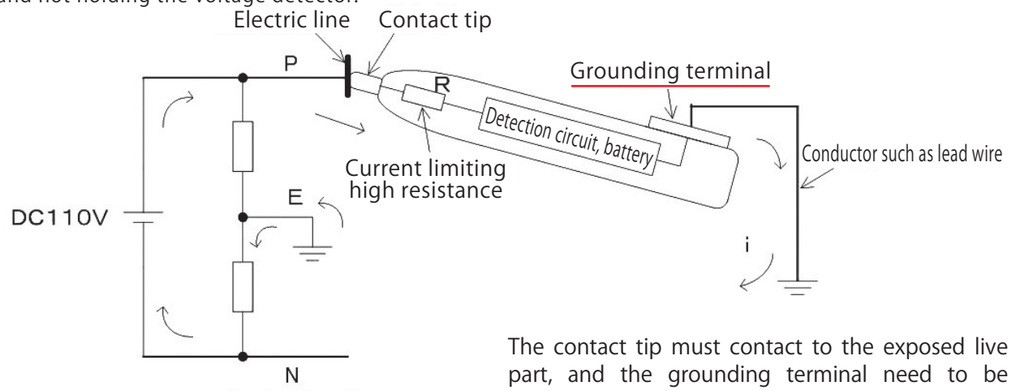
How to use the LV Voltage Detector for DC

(For AC, refer to P.16.)

■ 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.



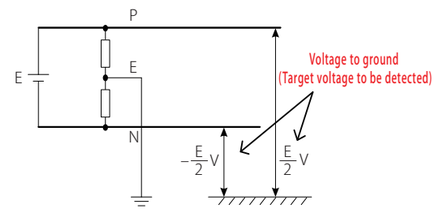
Voltage detection of a DC circuit

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.

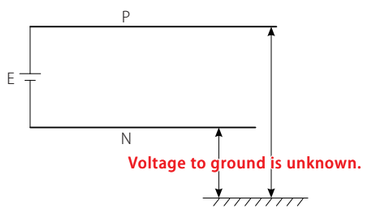
③ Since the detected voltage between the live part and ground is depending on the condition of connection from grounding terminal to earth, it is necessary to understand about the circuit formed for detection. (cf. Voltage detection for un-earthed circuit is not possible.)

* 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.)

[Mid-point grounding type]

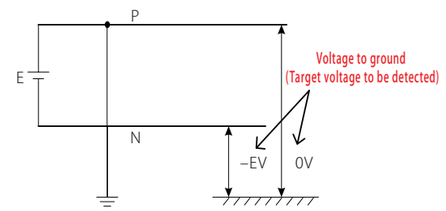


[Ungrounded type]



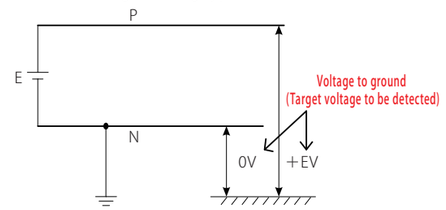
* Voltage detection is not possible.

[One-side line grounding type]
+ side grounding type



* No detection for Grounded plus (+) side.

Minus (−) side grounding type



* No detection for Grounded minus (−) side.

HSF-7

Voltage detector for Medium/Low voltage

AC 80～7000V

Standard Model for 6 kV

Audio signaling and light emitting | Waterproof

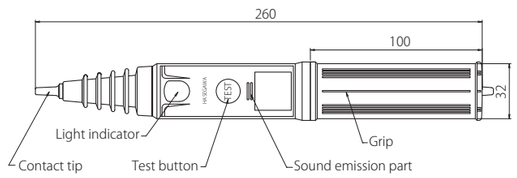
■ Features

- 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.

■ Accessory

Storage case

■ Dimensions



■ 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

Compact, Lightweight and Handy

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

■ Features

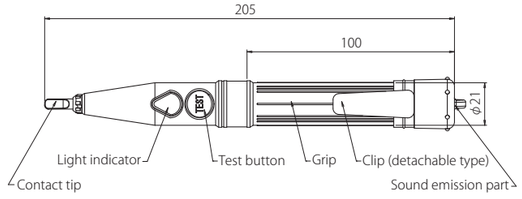
- Compact enough to carry in the pockets of working clothes.
- The contact tip made of conductive rubber is replaceable.
- Medium voltage and low voltage can be identified with the indication (Sound/Light).
  Low voltage detection is indicated by intermittent sound & light and medium voltage is indicated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

■ Option

Storage case (DA04003)

Contact tip for replacement (UH05004)

■ Dimensions



■ 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-25B1

Voltage detector for Medium/Low voltage

AC 80～25000V

Telescopic type, Standard model for Medium Voltage

Audio signaling and light emitting | Telescopic type | Waterproof

■ Features

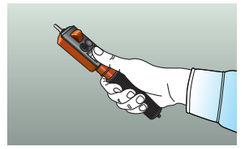
- Voltage detection from a remote place is possible by extending it

* Low voltage cannot be detected on stick extension mode.

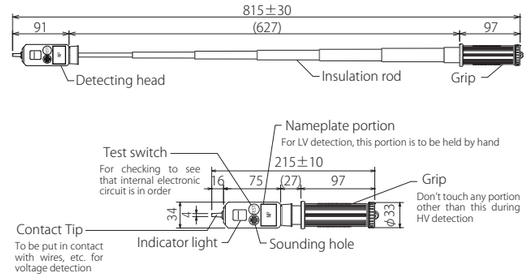
■ Accessory

Storage case

■ Detecting at low voltage



■ Dimensions



■ 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℃～+50℃
Weight		About 140 g

HSG-6

Voltage detector for Medium/Low voltage

AC 80～7000V

Telescopic Type, Lightweight and Compact

Audio signaling and light emitting | Contact tip Conductive rubber | Contact tip Replaceable | Telescopic type | Waterproof

■ 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.

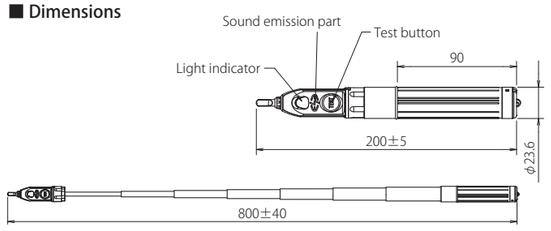
* Low voltages cannot be detected on stick extension mode.

■ Option

Storage case (DA04003)

Contact tip for replacement (UH05003)

■ Dimensions



■ 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

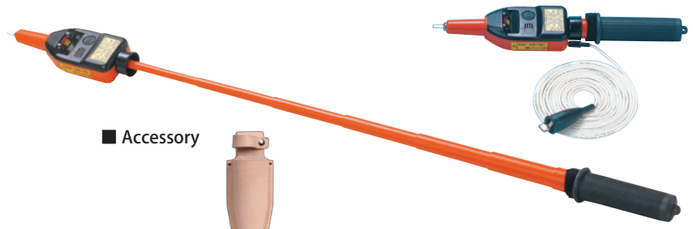
HSN-6A

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

Recommended for Withstand Voltage Test



■ Accessory

Storage case

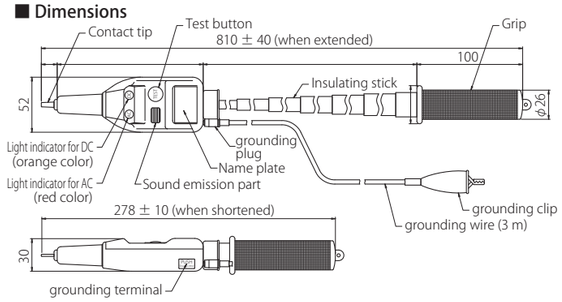
grounding wire (3 m)

■ Detecting at low voltage

■ 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.66.)

■ Dimensions



■ Specifications

Working voltage range	Without grounding wire	AC	100 V to 600 V (Voltage detection by touching the name plate with a hand)
			3 kV to 7 kV (With extended insulating stick)
	With grounding wire	AC	100 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
			(Insulating stick: Extended) 50 kVAC, 1min, 100 μA or less
	Between contact tip and grounding clip		26 kVAC, 1 min, 1 mA or less
	Between core of the grounding plug and outside the covering		22 kVDC, 1 min
Battery			LR44(1.5V) × 2 pcs
Operating temperature range			−10℃～+50℃
Weight			About 290 g

HST-1.5N

Medium voltage detector

AC 600～7000V
DC 600～7000V

Audio signaling and light emitting | AC DC | Waterproof

Robust and Lightweight, FRP for Insulating Stick

■ Features

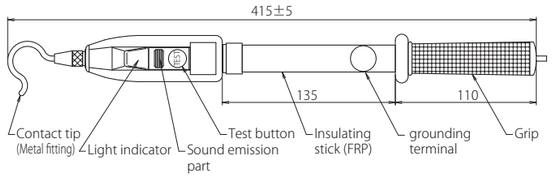
- With 7-m grounding wire

■ Accessory

Bag for housing

grounding wire (7 m)

■ Dimensions



■ Specifications

Working voltage range	AC 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℃～+40℃
Weight		About 340 g (main body only)

HSE-7G For communication

Voltage detector for Medium/Low voltage

AC 60～7000V

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

Recommended for Telecom workers on the pole

■ Features

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

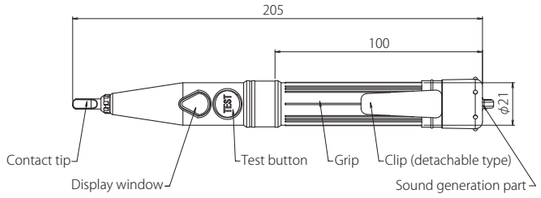
■ Accessory

Storage case

■ Option

Contact tip for replacement (UH05004)

■ Dimensions



■ Specifications

Working voltage range		AC60V～7000 V
Operation starting voltage (Voltage to ground)	Low voltage	Exposed live part 60 V (in contact with live part)
	High voltage	Exposed live part 400 V (in contact with live part)
	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

HSN-6N For communication

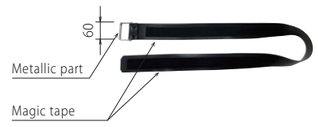
Voltage detector for Medium/Low voltage

AC 60～7000V

Audio signaling and light emitting | Telescopic type | Waterproof

Voltage Detector used on Bucket Cars

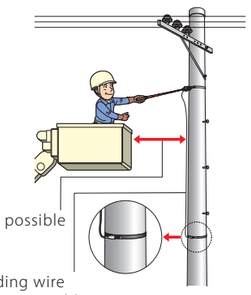
■ Accessory



Conductor band

Storage case

Extend to maximum length, and hold the grip.

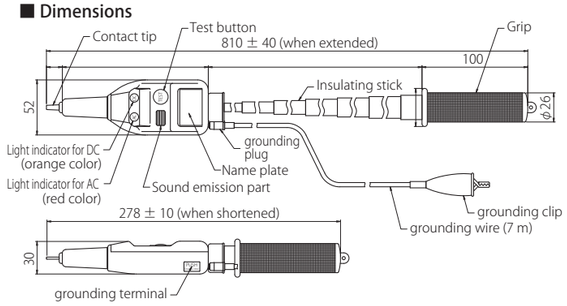


Keep as much distance as possible from the grounding wire.

Arrange the route of the grounding wire along the utility pole to the extent possible.

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

■ Dimensions



■ 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 Between contact tip and grounding clip: Ditto
Leakage current	100 μA or less at dielectric strength test
Battery	LR44(1.5V) × 2 pcs
Operating temperature range	−10℃～+50℃
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

For Medium voltage and High voltage, light weight and easy to use

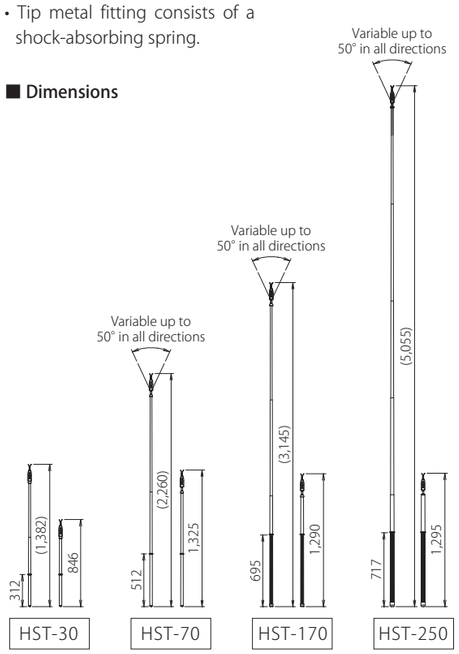
Because the angle at the detector is adjustable, it can be set up so that the light emission is easy to see. (HST-70、HST-170、HST-250)

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



■ Accessory

Bag for housing

HST-30 (Shortened state)

HST-170 (Shortened state)

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

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

■ Specifications

Model		HST-30	HST-70	HST-170	HST-250
Working voltage range	AC	3kV～34.5kV	20kV～80.5kV	60kV～195.5kV	150kV～287.5kV
Operation starting voltage (Voltage to ground)	Bare wire	500V±20%	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

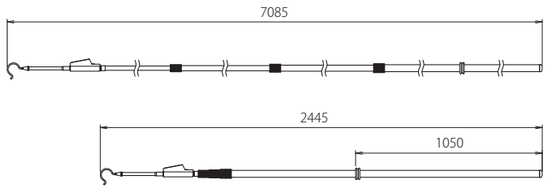
Voltage Detector for 500 kV Transmission Lines

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

Voltage Detection Check with Rotation of Pinwheel.

Contact tip (Metal fitting): Spring

Telescopic type | Waterproof | Battery -less

■ Features

- Battery-less voltage detector operating with energy to be detected.

■ 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

Audio signaling and light emitting | Waterproof | AC DC

Voltage Detector of Dual Use for AC/DC

■ Features

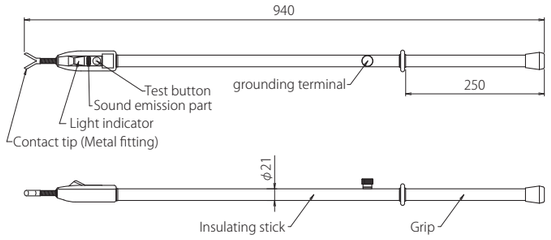
• New model with reduced weight of HS-20N

■ Accessory

Bag for housing

grounding wire (7 m)

■ Dimensions



■ 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

Audio signaling and light emitting | Waterproof | AC DC

Wide Range type for both AC and DC

■ Features

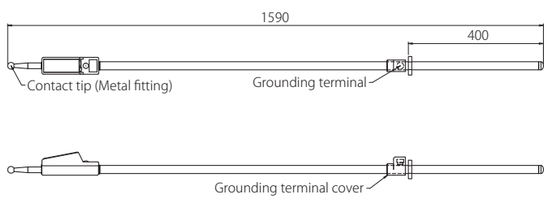
• It operates over wide range from medium voltages to high voltages

■ Accessory

Bag for housing

grounding wire (7 m)

■ Dimensions



■ Specifications

Working voltage range	AC	6～90kV
	DC	
Operation starting voltage (Voltage to ground)	AC	1000V±20%
	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)

HXG-1

Portable live part detector

AC 3.3kV ～ 77kV

Audio signaling and light emitting | Waterproof | Auxiliary device for voltage detection

Determine whether the Substation Facilities arecharged

【Attention】
This device is not a voltage detector.

■ Accessory

Storage case

■ Voltage & distance to be separated, and detectable distance

Voltage (kV)	3.3	6.6	11	22	33	66	77
Detectable distance (m)	0.2	0.5	1.0	1.7	2.2	2.9	3.0

Operation distance is varied depending on the actual surrounding environment.
Please confirm operation distance in actual use environment before using.

■ Specifications

Working voltage range		3.3 kV to 77 kV
Operating temperature range		−10℃～+40℃
Frequency		50/60Hz
Battery		LR44(1.5V) × 2 pcs
Dielectric strength		Between contact tip and grip: Extended state 20 kVAC, 1 min
Detection performance		Operation Voltage-Distance:3.3kV - 0.2m * Operation Voltage-Distance are theoretical value.
Operation status display	Light	Can be confirmed at the distance of 50 cm in the luminance of 8,000 lux.
	Sound	50dB or more (1m apart)
Weight		85g

HXC-3K

Portable live part detector

AC 3.3kV～77kV

Audio signaling and light emitting | Waterproof | Auxiliary device for voltage detection

Determine whether the Substation Facilities are charged

【Attention】
This device is not a voltage detector.

■ Features

• Compact size and lightweight make it convenient to carry

■ 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.
	Sound	50dB or more (1m apart)
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

Alarm on Charging State with Voice signaling and Light

Audio signaling and light emitting | Waterproof | Auxiliary device for voltage detection

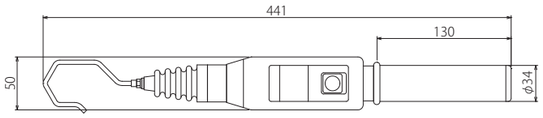
■Features

- 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		AC7000 V
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℃～+40℃
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

Uncharged State is Notified by Sound and Light Indications.

Audio signaling and light emitting | Waterproof | Auxiliary device for voltage detection

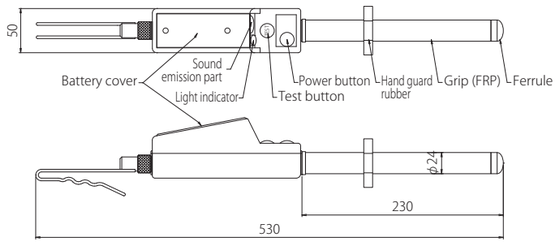
■Features

- 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℃～+40℃
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

Easy to Check Voltage of EV, HV, PHV

Audio signaling and light emitting

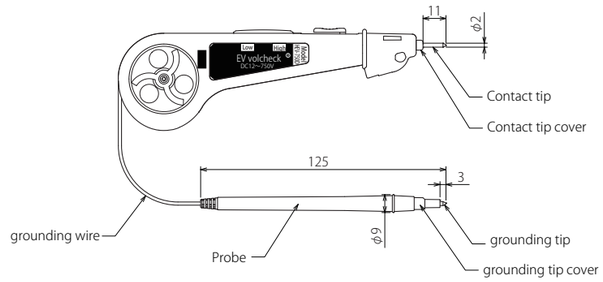
■Features

- 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

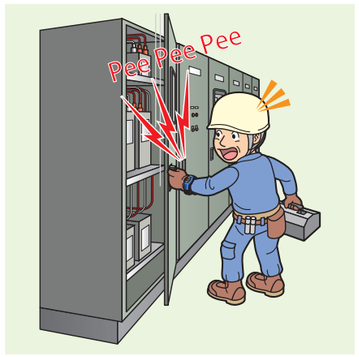
Working voltage range		DC12V～750V
Operation starting voltage (No polarity)		Low　: DC 6V±3V High　: DC35V±5V
Indication of operation	Light	Red LED, 2 pcs　Low : Low lamp flashes. High : High + Low lamps flash. It shall be possible to confirm luminance of 8,000 lux.
	Sound	Piezoelectric buzzer: Intermittent sound (High only) 50dB/30cm
Battery		LR44(1.5V) × 2 pcs
Operating temperature range		−10℃～40℃
Dimensions	Main body	165mm×50mm×22mm (except for protruding part)
	Probe	ϕ9mm×125mm
Weight		About 70 g

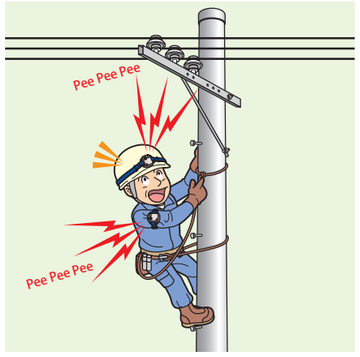
Hot line proximity alarm

AC 6.6kV

Waterproof | Auxiliary device for voltage detection

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





■**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.

Hot line proximity alarm

■What is a Hot line proximity alarm?

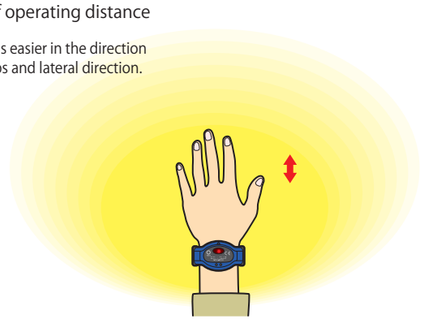
- It is a product that generates an alarm when it detects a voltage at a distance to prevent accident of electric shock.
  Unintended access due to human errors such as preconception or misconception can be prevented.
- This product cannot be used as a voltage detector.

■Precautions before purchasing the Hot line proximity alarm

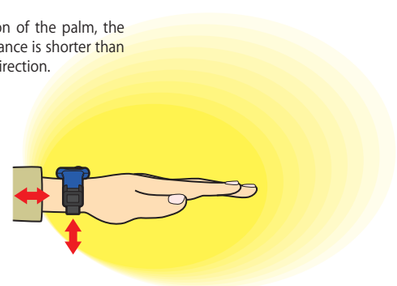
- Please use proper model according to the applications, because detection sensitivity has been adjusted for cubicle works and overhead line works respectively assuming the general site conditions.
- The specification "○V–○cm" of this product is a distance under the "standard condition" set in the factory.
  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.

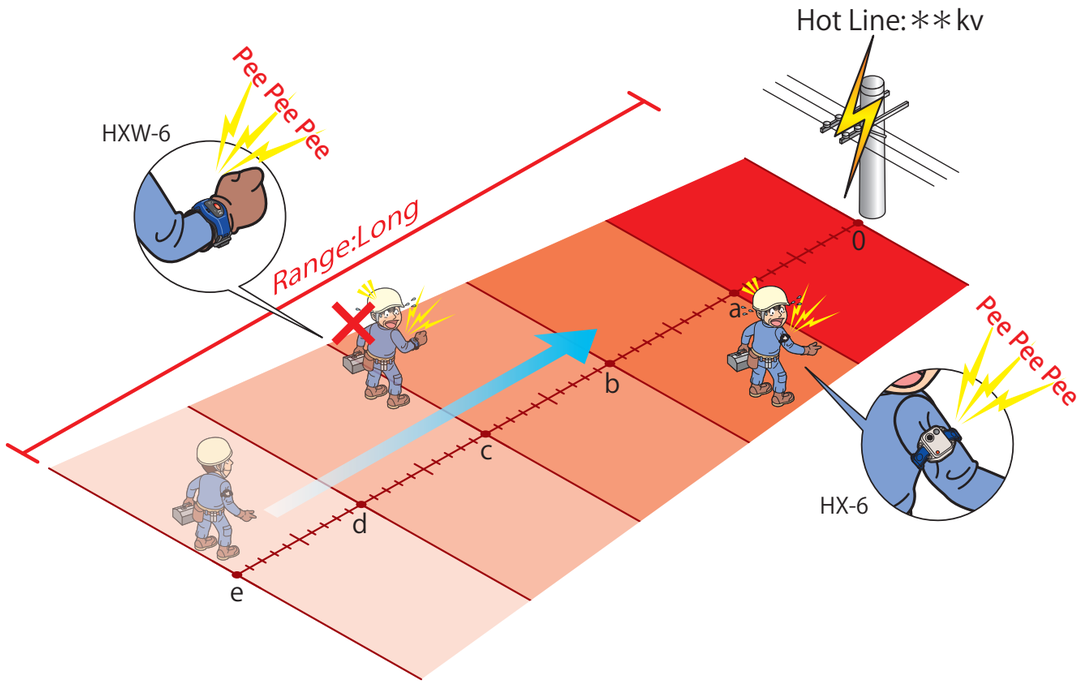


In the direction of the palm, the detecting distance is shorter than in the upper direction.

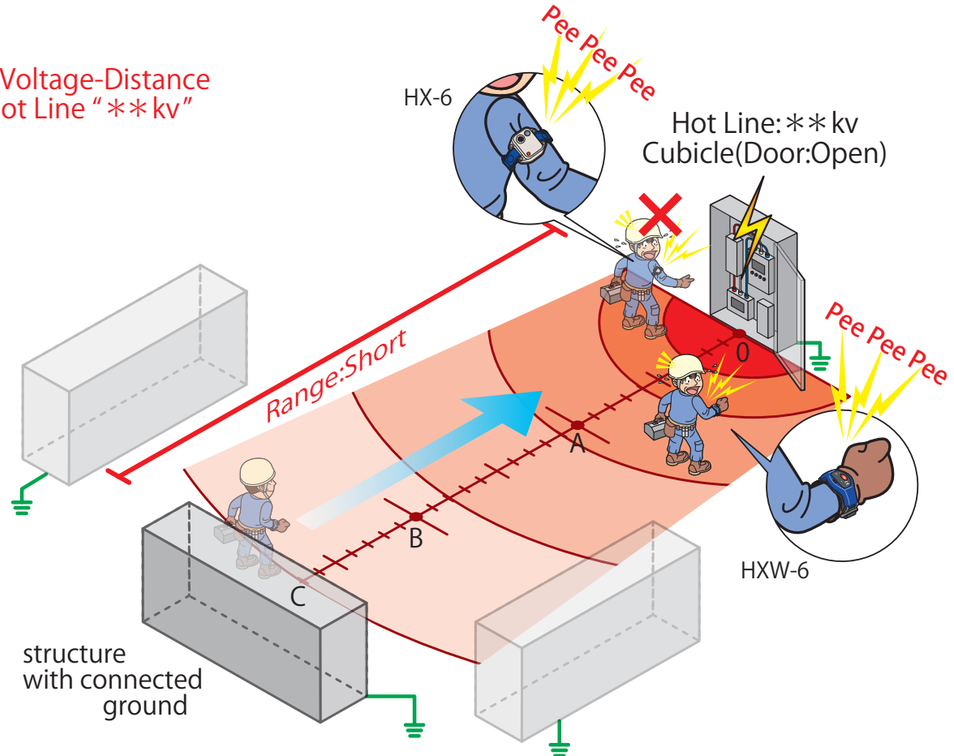


About Field Intensity (Changing of Operation Voltage Distance)

"Operation Voltage Distance is Flux by the surroundings."



Operation Voltage-Distance against Hot Line "＊＊kv"



HXW-6

(Both 50Hz and 60Hz)

WRIST ALARM

AC 6.6kV

Exclusively for cubicle works

CE RoHS

■Specifications

Model		HXW-6
Location of use		Exclusively for work relating to cubicles
Alarm starting distance (Under standard condition)		60cm
Frequency		Both 50Hz and 60Hz
Sound volume		65dB or more (60cm apart)
Battery		CR1620(3V) × 1 pcs
Battery life (with new battery)	Continuously operating state	About 15 hr.
	Unused state	About 10 months
Operating temperature range		−10℃～+40℃

■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.

HXW-6W

(Both 50Hz and 60Hz)

WRIST ALARM

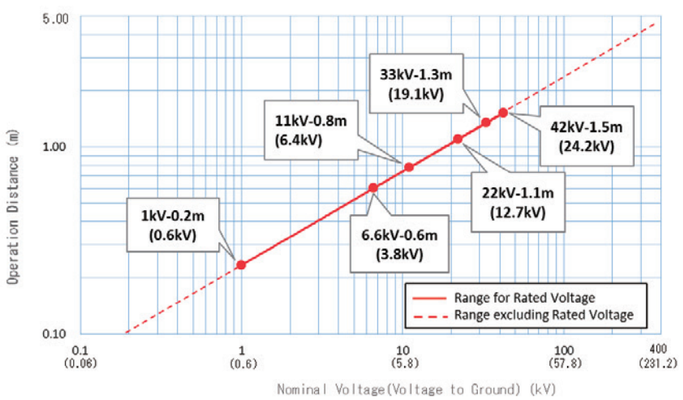
AC 1kV to 42kV

Exclusively for cubicle works

CE RoHS

■Specifications

Model		HXW-6W
Working Voltage range		1kV to 42kV
Alarm starting distance (Under standard condition)		60cm against 6.6kV (3.8kV to ground)
Frequency		Both 50Hz and 60Hz
Sound volume		65dB or more (60cm apart)
Battery		CR1620 (3V) × 1pcs
Battery life (with new battery)	Continuously operating state	About 15 hr.
	Unused state	About 10 months
Operating temperature range		−10℃～+40℃



Operation Voltage Distance graph (Theoretical value)

■Operation Voltage Distance Table (Theoretical value)

Normal Voltage	Operation Distance
6.6kV	0.6m
11kV	0.8m
22kV	1.1m
33kV	1.3m

Operation Voltage-distance table and graph are theoretical value.
Operation distance is varied depending on the actual surrounding environment.
Please confirm operation distance in actual use environment before using.

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.

■Specifications

Model		HX-6
Location of use		Exclusive for work with overhead lines
Alarm starting distance (Under standard condition)		80cm
Frequency		Either 50 Hz or 60 Hz, whichever is designated
Sound volume		65dB or more (1m apart)
Battery		CR2025 or CR2032(3V) × 1 pcs
Battery life (with new battery)	Continuously operating state	About 50 hr.
	Unused state	About 2 years
Operating temperature range		−5℃～+45℃

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

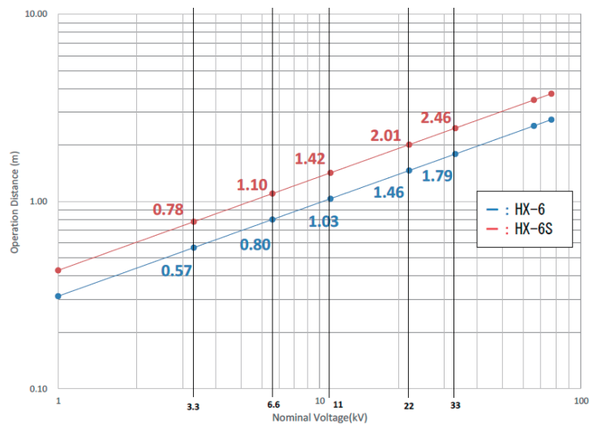
* Please designate the frequency (50 Hz or 60 Hz).

【Attention】
This is not suitable for cubicle works.

■Specifications

Model		HX-6S
Location of use		Exclusive for work with overhead lines
Alarm starting distance (Under standard condition)		110cm
Frequency		Either 50 Hz or 60 Hz, whichever is designated
Sound volume		65dB or more (1m apart)
Battery		CR2025 or CR2032(3V) × 1 pcs
Battery life (with new battery)	Continuously operating state	About 50 hr.
	Unused state	About 2 years
Operating temperature range		−5℃～+45℃

HX-6/HX-6S Operation Voltage-distance table and graph



Operation Voltage Distance graph (Theoretical value)

■Operation Voltage Distance Table (Theoretical value)

Normal Voltage	Operation Distance	
	HX-6	HX-6S
6.6kV	0.8m	1.1m
11kV	1.0m	1.4m
22kV	1.5m	2.0m
33kV	1.8m	2.5m

Operation Voltage-distance table and graph are theoretical value.
Operation distance is varied depending on the actual surrounding environment.
Please confirm operation distance in actual use environment before using.

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

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-1
Voltage detector checker

Wall Fitting Type for 100 VAC Power Supply

■Features

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

■Specifications

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

HLL-6D
Voltage detector checker

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

■Features

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

■Specifications

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

HLA-N2
DC voltage detector checker

Handy Type with Built-in Battery

■Features

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

■Specifications

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

CL-1-06
Voltage detector checker

Handy Type with Piezoelectric device

■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. 7,500 V 30. Output voltage: Approx. 11,500 V
Dimensions	190mm×65mm×32mm
Weight	300g
Accessory	Lead wire for connection, bag for housing

■Correspondence table of voltage detector checker

○:Suitable

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

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

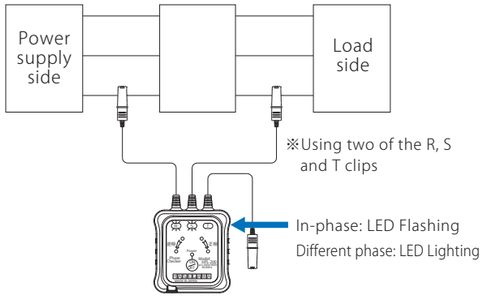
*As of June 2015, own company investigation

■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 ø2.8 mm - 22 mm)
- The magnet attached on the rear of the product makes hands-free checking possible

■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)



■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 MΩ 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 μA or less
Power supply display	Red LED × 1 (Automatic power OFF approx. 5 minutes)
Sound volume	50 dB or more (50 cm apart)
Battery	LR03(1.5V)×2 Continuous use approx. 15 hours
Electric line	IV, DV, OW 2 mm² to 100 mm² (Finished external diameter ø2.8 mm to 22 mm)
Weight	About 190 g (including batteries)

■Indications

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

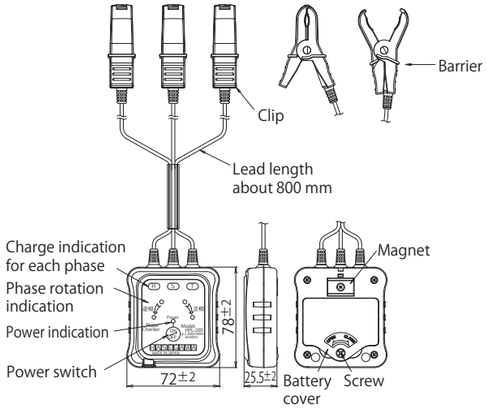
＊1 If voltage to ground is 80 V or lower ＊2 If ground phase or open-phase

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

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

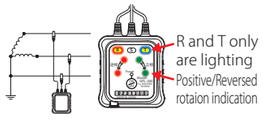
※Display of two clips used, light off when unused

■Dimensions

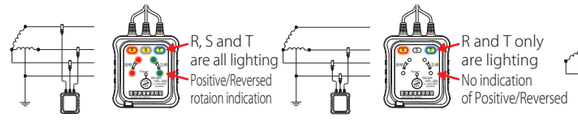


■Example indications

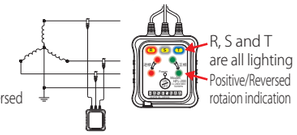
a） 3-phase 3-line system (200 V)



b） 3-phase 4-line system (100 V/200 V)



C） 3-phase 4-line system (400V)



HPI-A6/S6/S20

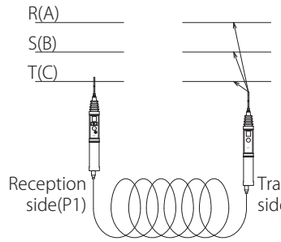
Medium voltage phase tester,
Optical fiber type

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

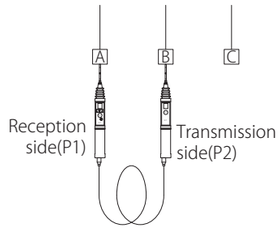
Detector pairs insulated with optical fiber

■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.



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



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

■Accessory

Storage case

Attaché case
HPI-A6

Contact tip (Metal fitting)

Bag for housing
HPI-S6/S20

Hook type×2 pcs Flat plate type×2 pcs
HPI-A6
HPI-S6/S20

Insulating stick

×2pcs
HPI-A6

Optical cable

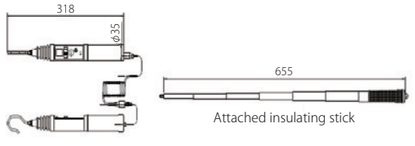
×2pcs
HPI-A6
HPI-S6/S20

Joint for optical cable

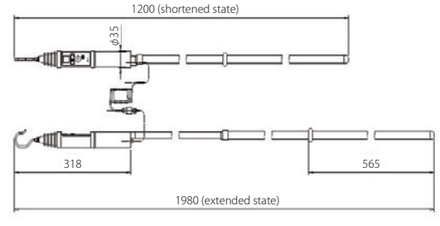
HPI-A6
HPI-S6/S20

■Dimensions

HPI-A6



HPI-S6/S20



■Specifications

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

■Option

Optical fiber cable

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

＊Use extended with a joint is not possible.

HPseries

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

[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.

■Accessory

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

■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 (without telescopic structure)	1220mm	1480mm	550mm (without telescopic structure)	1220mm	1480mm	1220mm	3470mm
	When shortened		850mm	1090mm		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
		HP-U20	50 kV, 5 min
	Contact tip – Grip	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

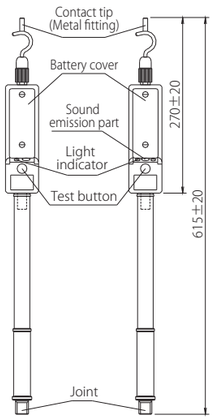
- With Phase sequence (phase rotation) checking function
- Angle of tip metal fitting is adjustable. (20° in all directions)
- Can be used even without attaching an the extending insulating stick.

[Attention]

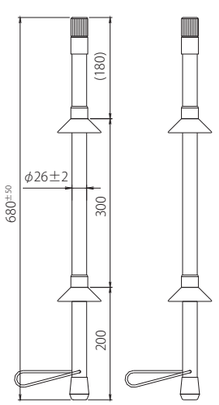
Please designate the frequency of 50 Hz or 60 Hz.

■Accessory

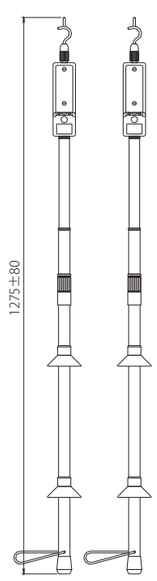
Bag for housing



Phase tester



Insulating stick



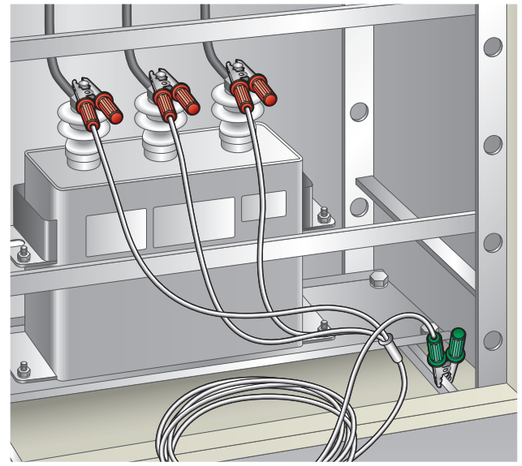
Phase tester
with insulating stick

■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	50 dB or more at a distance of 2 m
		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

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 mm2 or less is used.		In the case of using earth wire of 60 mm2 or more
		In the case of using a strong type tip metal fitting	
3.5m (connection of 2 rods)	1.5m (31ϕ) +2.0m (34ϕ)	1.5m (31ϕ) +2.0m (34ϕ)	1.5m (31ϕ) +2.0m (34ϕ)
4.0m (connection of 2 rods)	2.0m (31ϕ) +2.0m (34ϕ)	2.0m (31ϕ) +2.0m (34ϕ)	2.0m (31ϕ) +2.0m (34ϕ)
4.5m (connection of 2 rods)	2.5m (31ϕ) +2.0m (34ϕ)	2.5m (31ϕ) +2.0m (34ϕ)	2.5m (34ϕ) +2.0m (39ϕ)
5.0m (connection of 2 rods)	2.5m (31ϕ) +2.5m (34ϕ)	2.5m (31ϕ) +2.5m (34ϕ)	2.5m (34ϕ) +2.5m (39ϕ)
6.0m (connection of 2 rods)	3.0m (34ϕ) +3.0m (39ϕ)	3.0m (34ϕ) +3.0m (39ϕ)	3.0m (34ϕ) +3.0m (39ϕ)
6.0m (connection of 3 rods)	2m (34ϕ) +2m (39ϕ) +2m (39ϕ)	2m (34ϕ) +2m (39ϕ) +2m (39ϕ)	2m (34ϕ) +2m (39ϕ) +2m (39ϕ)
Kind of joint	uses an insulating joint, and others use a metallic joint.		

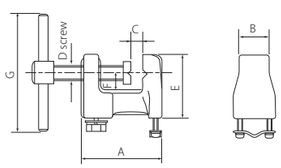
■Type of grounding wire (transparent vinyl covered electric wire)

Cross-sectional area	8mm²	14mm²	22mm²	38mm²	60mm²	100mm²
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

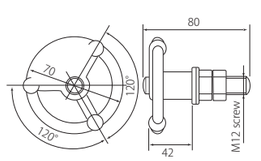
■Grounding metal fitting

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	8mm²～ 14mm²	51	18	18	10	39	13	65	280g
SA107-C	Screw tightening method	22mm²～ 38mm²	66	24	27	12	53	14	95	570g
SA107-D	Screw tightening method	60mm²～100mm²	90	30	38	12	75	23	95	1080g
SA110	Stud bolt type	M12 stud	Valve type grounding handle							320g

Grounding hook component
Table 1

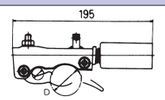
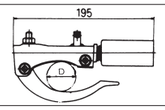
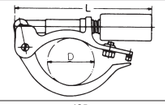
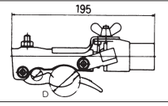
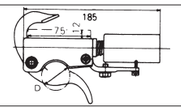
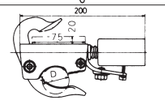
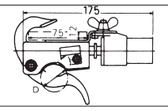
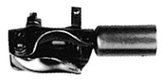
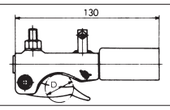
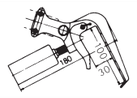
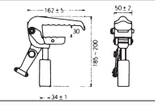
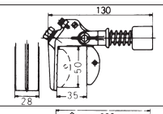
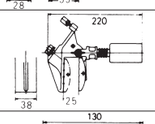
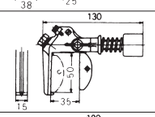
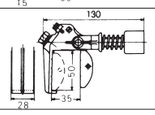
●When ordering the earth hook, please determine the following.

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 mm² 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 mm² 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 mm² 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 mm² 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

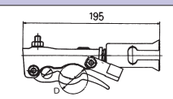
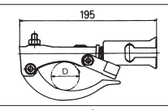
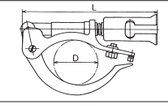
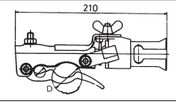
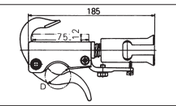
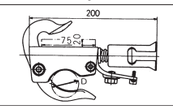
●When ordering the earth hook, please determine the following.

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-BS** 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 mm² 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 mm² 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

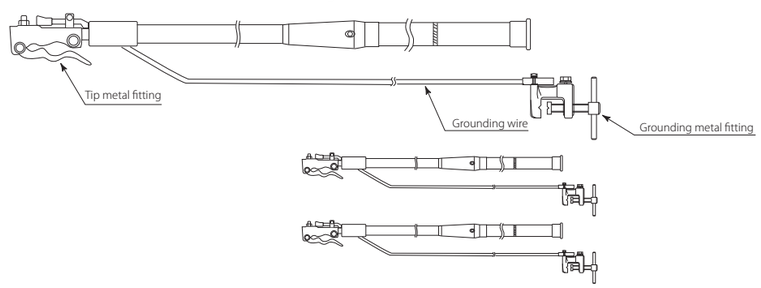
●When ordering the earth hook, please determine the following.

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 (A) + Grounding wire + Grounding metal fitting (B)) ×3 (The bag for housing is sold separately.)



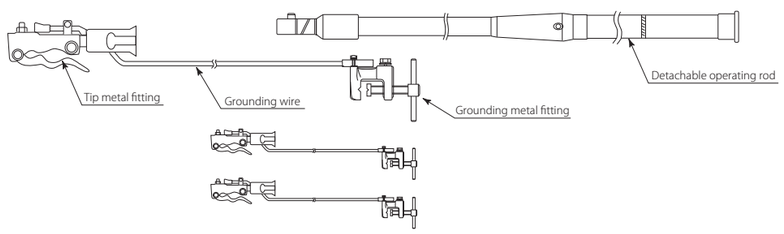
A Model of tip metal fitting	B Class	Breakdown of class: Length, kind of operating rod		Grounding wire	Grounding metal fitting	Applicable voltage
Large fixed type MA121-A (MA121-C) / Universal fixed type MA111-A (MA111-C)	Type 5	Neo pipe 0.5m	Single rod	22mm²×3m	SA107C	6.6kV
	Type 10	〃 1.0m	〃	〃	〃	〃
	Type 15	〃 1.5m	〃	22mm²×4m	〃	22kV
	Type 20	〃 2.0m	〃	〃	〃	〃
	Type 25	〃 2.5m	〃	22mm²×5m	〃	77kV
	Type 30	〃 3.0m	〃	〃	〃	〃
	Type 35	〃 3.5m (1.5+2)	Connecting type	22mm²×6m	〃	〃
	Type 40	〃 4.0m (2+2)	〃	〃	〃	154kV
	Type 45	〃 4.5m (2.5+2)	〃	22mm²×7m	〃	〃
	Type 50	〃 5.0m (2.5+2.5)	〃	〃	〃	〃
	Type 60	〃 6.0m (3+3)	〃	〃	〃	275kV
	Type 60	〃 6.0m (2×3)	〃	〃	〃	〃
Medium-sized fixed type MA122-A / Fixed type for cubicle MA115-A	Type 5	〃 0.5m	1本もの	14mm²×3m	SA107B	6.6kV
	Type 10	〃 1.0m	〃	〃	〃	〃
	Type 15	〃 1.5m	〃	14mm²×4m	〃	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 (A) + Grounding wire + Grounding metal fitting (B)) × 3 + (Detachable operating rod) ×1 (The bag for housing is sold separately.)

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

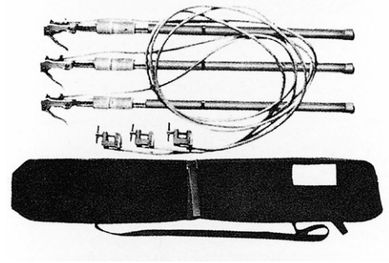


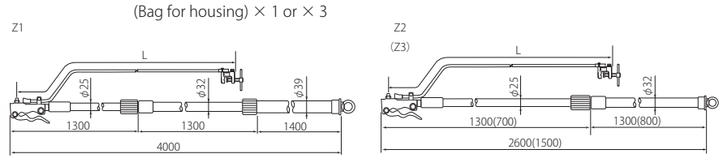
A Model of tip metal fitting	B Class	Breakdown of class: Length, kind of operating rod		Grounding wire	Grounding metal fitting	Applicable voltage
Large detachable type MA121-B (MA121-D) / Universal detachable type MA111-B (MA111-D)	Type 5	Neo pipe 0.5m	Single rod	22mm²×3m	SA107C	6.6kV
	Type 10	〃 1.0m	〃	〃	〃	〃
	Type 15	〃 1.5m	〃	22mm²×4m	〃	22kV
	Type 20	〃 2.0m	〃	〃	〃	〃
	Type 25	〃 2.5m	〃	22mm²×5m	〃	77kV
	Type 30	〃 3.0m	〃	〃	〃	〃
	Type 35	〃 3.5m (1.5+2)	Connecting type	22mm²×6m	〃	〃
	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





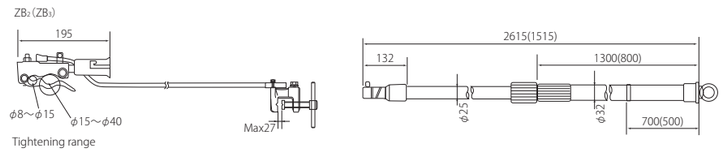
■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

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	22mm²×5m	4.0m	1.8m	3	Capacity of 1 phase portion	15.5kg
Z2	154kV	〃	22mm²×4m	2.6m	1.5m	2	Capacity of 3-phase portion	11.0kg
Z3	77kV	〃	22mm²×3m	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



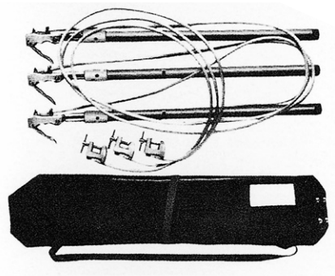
■Grounding metal fitting SA107-C Insulating stick: Epoxy pipe

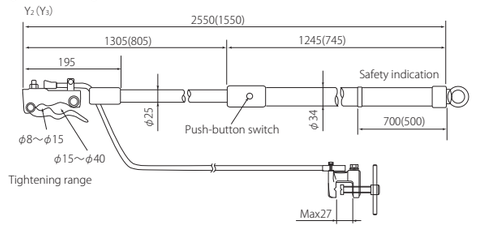
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
ZB2	154kV	MA121-B (Groove: 5.5 mm)	22mm²×4m	2.6m	1.4m	2	Capacity of 3-phase portion for 1800 × 120□	9.3kg
ZB3	77kV	〃	22mm²×3m	1.5m	0.9m	2	Capacity of 3-phase portion for 1200 × 120□	7.8kg

Operating rod of button type telescopic model

Type Y

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





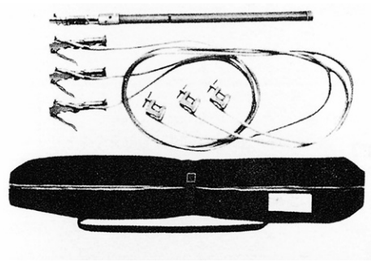
■Grounding metal fitting SA107-C Insulating stick: Neo pipe

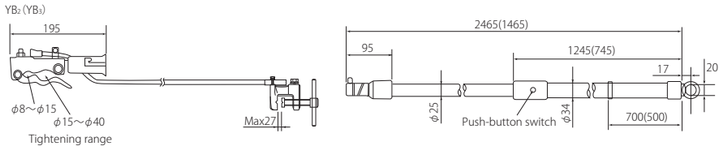
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
Y2	154kV	MA121-A	22mm²×4m	2.5m	1.4m	2	Capacity of 3-phase portion	11.5kg
Y3	77kV	〃	22mm²×3m	1.5m	0.9m	2	〃	9.0kg

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

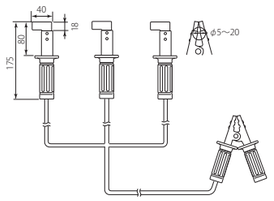
Type	Applicable voltage	Tip metal fitting	Grounding wire	Length at extended state	At storage	No. of connections	Bag for housing	Weight of contents & bag
YB2	154kV	MA121-B	22mm²×4m	2.4m	1.4m	2	Capacity of 3-phase portion	9.6kg
YB3	77kV	〃	22mm²×3m	1.4m	0.9m	2	〃	8.1kg

Type H

Universal type for cubicle

For 6.6 kV with carrying case

■Dimensions



■Accessory

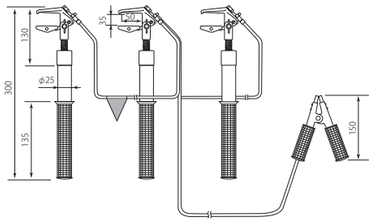
Bag for housing

Type C

Universal type for cubicle

For 6.6 kV (narrow space type) with carrying case

■Dimensions



■Accessory

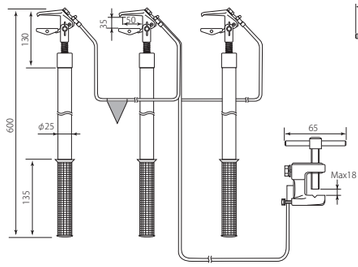
Bag for housing

Type F

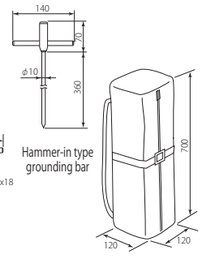
Universal type for cubicle

For 6.6 to 22 kV with carrying case

■Dimensions



■Accessory



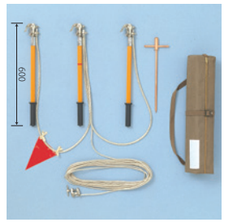
Hammer-in type grounding bar

Bag for housing

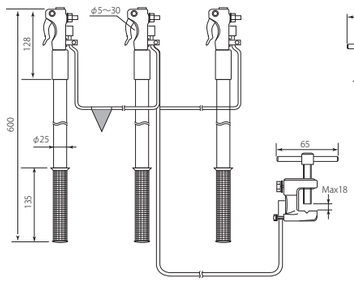
Type S

For round bus bar

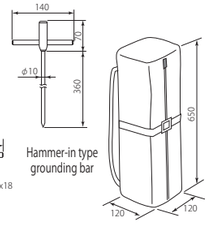
For 6.6 to 22 kV with carrying case



■Dimensions



■Accessory



Hammer-in type grounding bar

Bag for housing

■Specifications

Type	Tip metal fitting	Length of insulating stick	Grounding wire	Grounding metal fitting	Hammer-in type grounding bar	Bag for housing	Weight
H	Insulation rubber clip	With rubber grip	22mm²×1.7m×3 wires 8mm²×5 m×1 wire	Clip	None	Portable type 300×360×110	4.0kg
C	MA115−AN	Neo pipe (ϕ25×35mm) with rubber grip	14mm²×0.7m×2 wires (with red triangular flag) 8mm²×7m×1 wire	Clip	None	Portable type 300×360×110	3.4kg
F	MA115−AH	Neo pipe (ϕ25 ×335mm) with rubber grip	22mm²×1.5m×2 wires (with red triangular flag) 8mm²×15m×1 wire	SA107-B	ϕ10 steel bar	Portable type 700×120□	5.6kg
S	MA122−A	Neo pipe (ϕ25×337mm) with rubber grip	22mm²×1.5m×2 wires (with red triangular flag) 8mm²×15m×1 wire	SA107-B	ϕ10 steel bar	Portable type 650×120□	5.0kg

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

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

＊Without the casing

SA109□-□

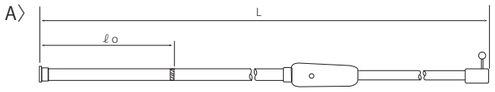
Hook Stick for D/S (Disconnecting Switch)

AC 10kV～110kV

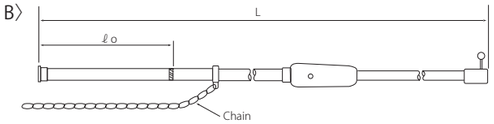
■Features

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

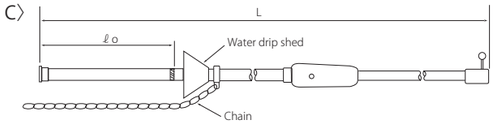
〈Type A〉



〈Type B〉



〈Type C〉



■Specifications

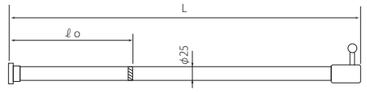
Model (SA109)		A-1	A-1.5	A-2	A-3	A2-4	A2-5	A2-6	A3-6
	Indoor	B-1	B-1.5	B-2	B-3	B2-4	B2-5	B2-6	B3-6
	Outdoors	C-1	C-1.5	C-2	C-3	C2-4	C2-5	C2-6	C3-6
Applicable voltage		10kV	20kV	30kV	40kV	70kV		110kV	
Length of hook rod(L)		1.0m	1.5m	2.0m	3.0m	4.0m (connection of 2 rods)	5.0m (connection of 2 rods)	6.0m (connection of 2 rods)	6.0m (connection of 3 rods)
Rod dia. & connecting method	ϕ31	1.0m	1.5m	2.0m	3.0m	2.0m	2.5m	—	—
	ϕ34	—	—	—	—	2.0m	2.5m	3.0m	2.0m
	ϕ39	—	—	—	—	—	—	3.0m	2.0m+2.0m
Length of grip(ℓo)		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	

		Chain	Water drip shed
Type A	Indoor	None	None
Type B	〃	Exist	None
Type C	Outdoors	Exist	Exist

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 (ℓo)	0.3m	0.3m	0.5m	0.5m
Applicable voltage	6.6kV	10kV	20kV	30kV

HRD-27S
Residual electric charge discharging stick

- Voltage detection functions
- Built-in resistance

DC 27kV (Maximum discharge voltage)

Uses sound and light to visualize the complete discharge of accumulated charge

Emits sound and light

■Features

- Allows for residual electric charge to be discharged safely and easily
- When discharging, allows for visual and auditory confirmation of discharge status through an audio and light emitting display at the center of the detector
- The metal fitting can be switched according to application (2 types)

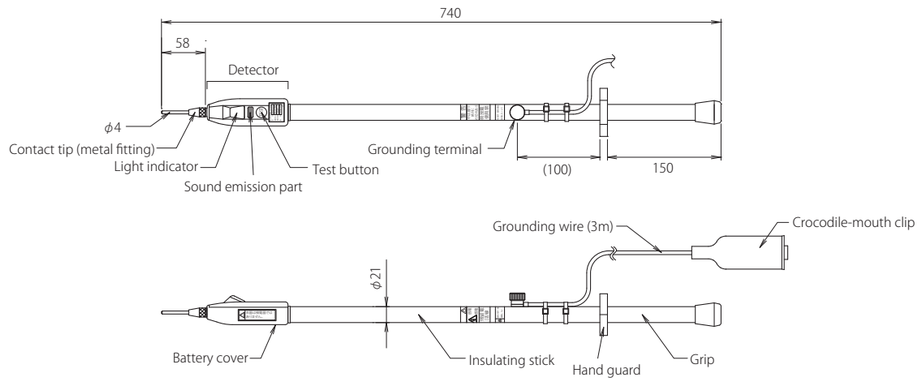
This device is not a voltage detector. Use a voltage detector on the circuit to confirm that the power is not running before using this device.

■Detector

■Accessory

Bag for housing (DA16003)

■Dimensions



■Specifications

Discharge voltage	DC27kV (Max)
Discharge capacity	1 μF (Max)
Discharge time	5 seconds or less (DC27 kV, 50 V or less at 1 μF)
Discharge resistance	600kΩ
Operation stop voltage	DC40V ±20%
Indication (Light/sound)	Light: It shall be able to confirm in the luminance of 8,000 lux Sound: 50 dB or more at a distance of 2 m
Battery	LR44 alkaline button cell (1.5 V) x2 pcs.
Battery life	Approx. 4 hours of continuous operation
Operating temperature range	-10℃ ~ +40℃
Weight	About 800 g
Accessories	Bag for housing , contact tip (hook metal fitting), each 1 pc.
Price	¥ 65,000

HRD-27
Residual electric charge discharging stick

- Built-in resistance

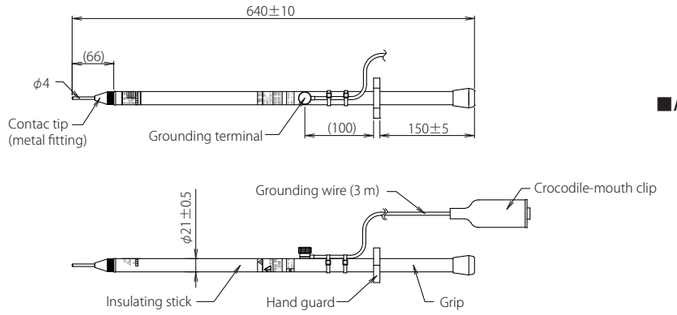
DC 27kV(Maximum discharge voltage)

Built-in resistance type

■Features

- Allows for residual electric charge to be discharged safely and easily
- The metal fitting can be switched according to application (2 types)

■Dimensions



■Accessory

Bag for housing (DA16003)

■Specifications

Discharge voltage	DC27kV (Max)
Discharge capacity	1 μF (Max)
Discharge time	5 seconds or less (DC27 kV, 50 V or less at 1 μF)
Discharge resistance	600kΩ
Operating temperature range	-10℃ ~ +40℃
Weight	About 660 g
Accessory	Bag for housing , contact tip (hook metal fitting) , each 1 pc.
Price	¥ 39,000

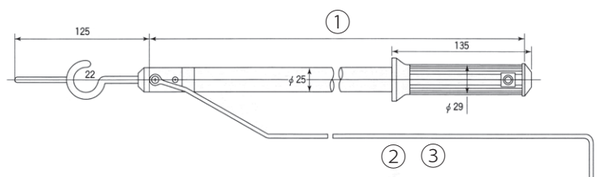
Order-made
residual electric charge discharging stick

- No built-in resistance

*Select from the following specifications

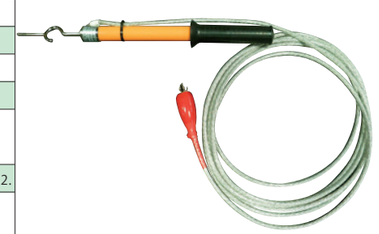
AC 6.6kV

Simple Discharge stick with no built-in Internal Resistance



- This product is custom built according to the following selected specifications ((1) to (4))

(1)Length of insulation stick
☐0.5m ☐1.0m ☐1.5m ☐2.0m
(2)Cross-sectional area of grounding wire
☐8mm² ☐14mm²
(3)Length of grounding wire
☐2m ☐3m ☐4m ☐5m ☐6m ☐7m ☐8m ☐9m ☐10m
(4)Grounding metal fitting type *For the Dimensions, refer to P32.
☐Crocodile-mouth clip ☐Vise type (SA107-B)



VOLTECT

Extra-High Voltage Detecting System

AC 3.3kV～550kV

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.

* 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.

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

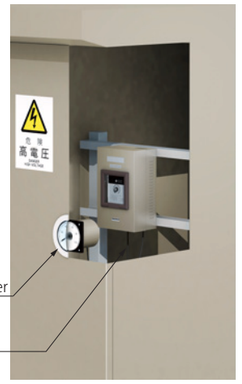
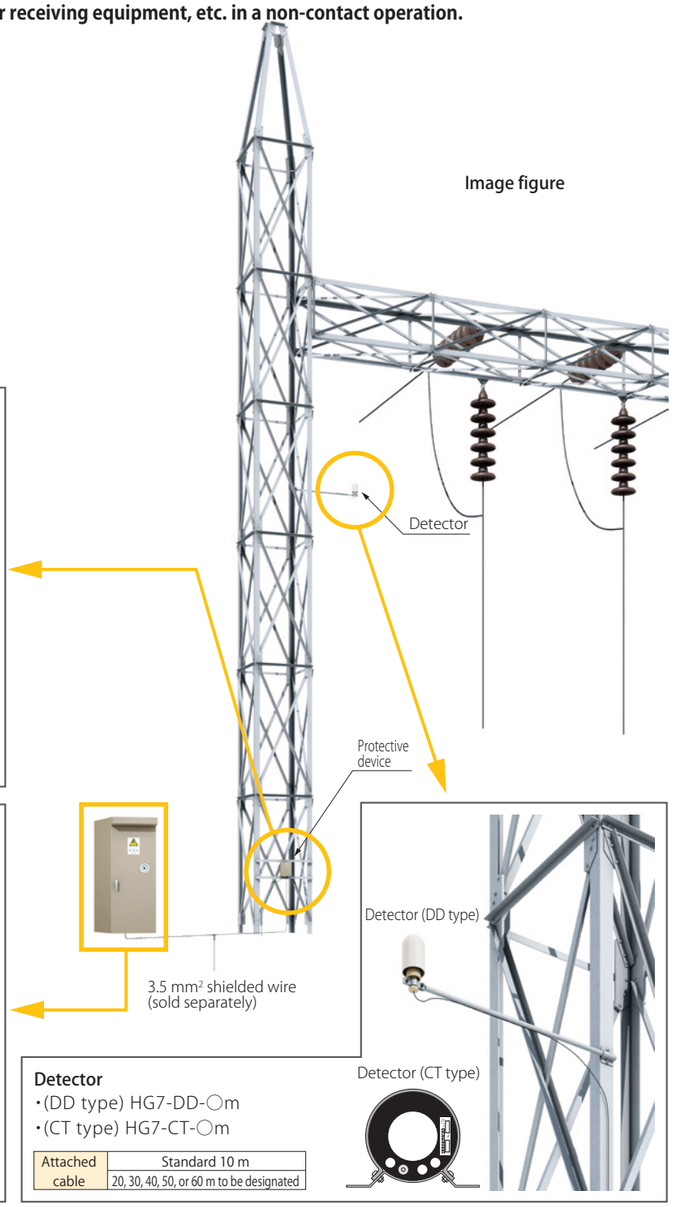


Image figure



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

■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 k V		
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		About 1.5kΩ
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 MΩ 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	H	DD
22kV	H, ST		H, ST			
33kV	ST		ST		ST	
40～160kV						
161kV～550kV	Low sensitivity (L)		Low sensitivity (L)		—	—

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

VOLTECT SPECIFICATION TABLE

VOLTECT SPECIFICATION TABLE

Note: When your receipt of client order or when your offering quotation to the client, please write its q'ty and check ☐ in for your confirmation.

Date:

Order: ☐	Quotation: ☐	Delivery date:
Customer' name and address: Tel/Fax:		Delivery place: Tel/Fax:
The person in charge(Name & Sec.) Tel/Fax:		Installation place name & address:

Normal line voltage kV	Detector insalltion place:	Outdoor ☐	Indoor ☐
		In board ☐	
		Internal GIS sensor equipped ☐	

※Check instruction manual P.12 (Notice for Interval Distance Table), and please select the sensitivity of the controller.

In case changing a installed Voltect,please write its controller' manufacturing number and so on for avoiding its mis-specification and for its confirmation;	
Installed controller type:HG7- M A	Manufacturing No.
Q'ty set	Made by: date and year

Controller;	Type	Controller Sensitivity	Q'ty	Operation power	Color	Special specification
Single	HG7-SM1A	Standard	set	(Standard) 110V.DC ☐ (75～143V) (Non standard) 24V.DC ☐ (21～32V) Below,built-in converter 110V.DC ☐ (90～170V) 220V.DC ☐ (110～250V) 110V.AC ☐ (85V～132V)	(Standard) 5Y7/1(Glossy) ☐ (Non standard) 7.5BG6/1.5(Glossy) ☐ N7(Glossy) ☐ Others ☐ ＿＿＿＿	English name plate ☐ Convertor inaide ☐ Others: ☐
	HG7-SM1AH	High	set			
	HG7-SM1AL	Low	set			
	HG7-DM1A	Standard	set			
Two phase	HG7-SM2A	Standard	set			
	HG7-SM2AH	High	set			
	HG7-SM2AL	Low	set			
	HG7-DM2A	Standard	set			

Protector;	Type	Q'ty	Color	Special specification
Single	HG7-P1B	set	(Standard)5Y7/1(Glossy) ☐ (Non standard) N7(Glossy) ☐ 7.5BG6/1. 5 (Semi Glossy) ☐ Others; ☐	English name plate ☐ Others; ☐
Two phase	HG7-P2B	set		

Detector;	Type	Q'ty	Lenghts of shield cable	Color(Only for DD Type)
	HG7-DD- m	set	Write in Type'lined m. (Standard) 10m Example :HG7-DD-10m	(Standard)N7(Glossy) ☐ (Non standard) 5Y7/1 (Glossy) ☐ Others ☐
	HG7-CT- m	set		

Wide range AC Voltmeter	Type	Scale	Q'ty	Cover color
	DVF-11M	It's different depending on the line voltage, so please refer to a wide angle meter specification (VHG07-S-001).	set	(Standard) N1.5 ☐ (Non standard)7.5BG4/1.5 ☐

Shield Cable	Type	Conductor'section area	Conductor'inner core	Length	Piece
	CVV-SB	3.5mm2	1c	m	pc.

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

Robust, Professional Specification

■Option

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.

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

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

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

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

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

SPL-Y/R/B/W

Flashing LED

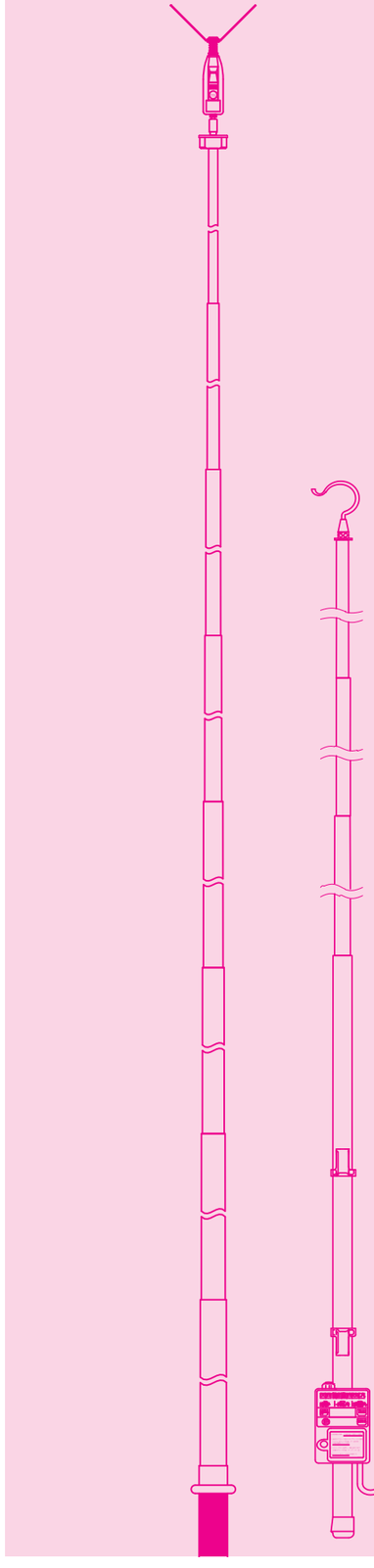
Color code	SPL-□ Y: Yellow/R: Red/B: Blue/W: Clear

■Features

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

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



Railway products

HVC-1.5N3

Voltage detector for
DC overhead contact wire

DC 1500V

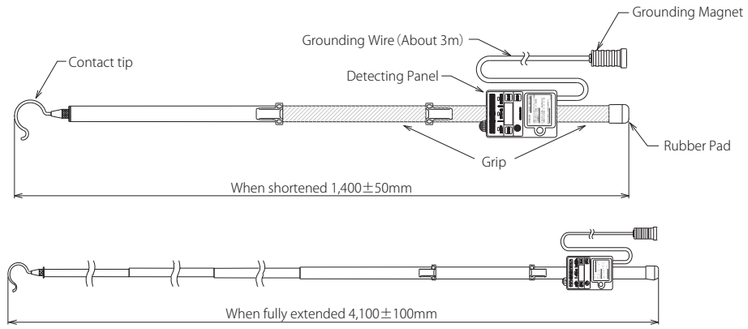
Audio signaling and light emitting | Telescopic type | Waterproof

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

■ Features

- Light weight body [About half weight compared with previous product.]
- Promote the checking before detect the voltage.
- Memolize the setting of volume control.
- Simplified the checking before detect the voltage.
- Adopt a strong Grounding magnet.
- Large Indication.

■ Dimensions



■ Specifications

Working voltage range		DC 1500V * Voltage detection of negative potential is not possible.
Operation starting voltage (Voltage to ground)		DC750V±50V
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 ±5%±5V
Volume adjustment for buzzer sound		Each time when the sound volume push-button switch is pressed, the cycle of High → Medium → Low → High ----- is repeated. Sound volume at a distance of 1 m High: 75 dB or more Medium: 55 to 70 dB, Low: 50 dB or less
Output voltage at test		DC1000V±200V
Dielectric strength		Contact tip (Metal fitting) – Grounded part 4 kVAC, 1 min
Leakage current		1 mA or less at dielectric strength test
Battery		R6 or LR6(1.5V) × 4 pcs
Operating temperature range		0℃～+50℃
Weight		About 2.3kg

■ Accessory

Bag for housing

HVC-750N3

Voltage detector for
DC overhead contact wire

DC 750V

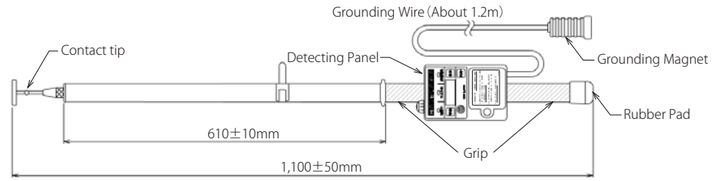
Audio signaling and light emitting | Telescopic type | Waterproof

Voltage Detector for DC 750V Contact Wires, Visualization of decreasing Residual Voltage

■ Features

- Promote the checking before detect the voltage.
- Memolize the setting of volume control.
- Simplified the checking before detect the voltage.
- Adopt a strong Grounding magnet.

■ Dimensions



■ Specifications

Working voltage range		DC600V/750V * Voltage detection of negative potential is not possible.
Operation starting voltage (Voltage to ground)		DC300V±20V
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 ±5%±5V
Volume adjustment for buzzer sound		Each time when the sound volume push-button switch is pressed, the cycle of High → Medium → Low → High ----- is repeated. Sound volume at a distance of 1 m High: 75 dB or more Medium: 55 to 70 dB, Low: 50 dB or less
Output voltage at test		DC500V±100V
Dielectric strength		Contact tip (Metal fitting) – Grounded part 4 kVAC, 1 min
Leakage current		1 mA or less at dielectric strength test
Battery		R6 or LR6(1.5V) × 4 pcs
Operating temperature range		0℃～+50℃
Weight		About 1.4kg

■ Accessory

Bag for housing

HVC-1.5N2A7

Long length for Feeder

Voltage detector for
DC overhead contact wire

DC 1500V

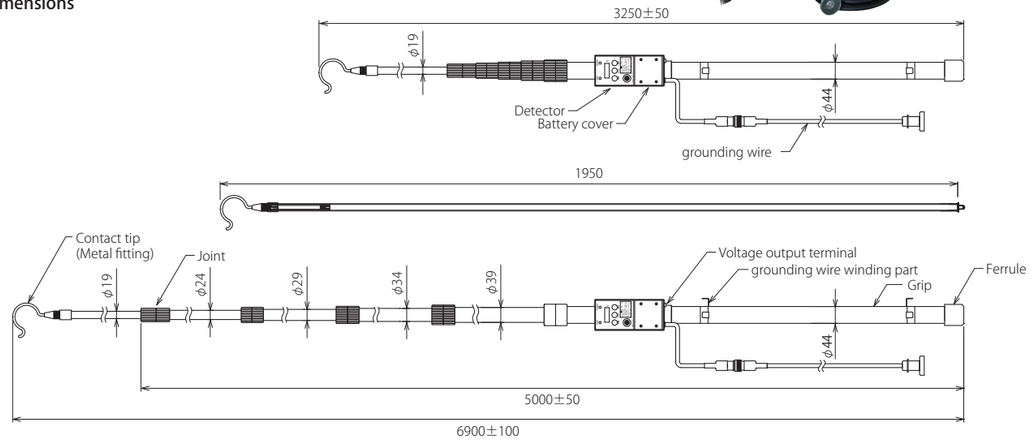
Audio signaling and light emitting | Telescopic type | Waterproof

Contact tip
(UB03003)

■ 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)

■ Dimensions



■ Accessory

Bag for housing (DA12001)

Lead wire for test

grounding wire/3m
(UH09001-1)

■ Option

grounding wire/8m
(UH09001-2)

■ 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
Volume adjustment for buzzer sound		Each time when the sound volume push-button switch is pressed, the cycle of High → Medium → Low → High ----- is repeated. Sound volume at a distance of 1 m High: 75 dB or more Medium: 55 to 70 dB, Low: 50 dB or less

Output voltage at test	DC1000V±200V
Dielectric strength	Contact tip (Metal fitting) – Grounded part 4 kVAC, 1 min
Leakage current	1 mA or less at dielectric strength test
Battery	R6 or LR6(1.5V) × 4 pcs
Operating temperature range	0℃～+50℃
Weight	About 5 kg

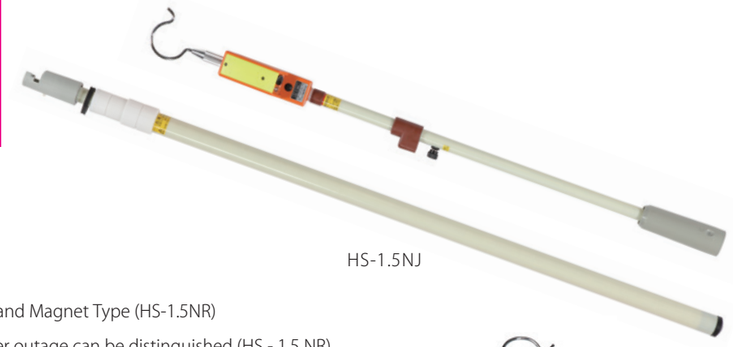
HS-1.5NJ
HS-1.5NR

Voltage Detector of Dual Use for DC Contact Wire and AC 7kV

Medium Voltage detector

AC 6600V
DC HS-1.5NJ：600～7000V
HS-1.5NR：1000～7000V

Audio signaling and light emitting | Telescopic type | AC DC



HS-1.5NJ

■ 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)

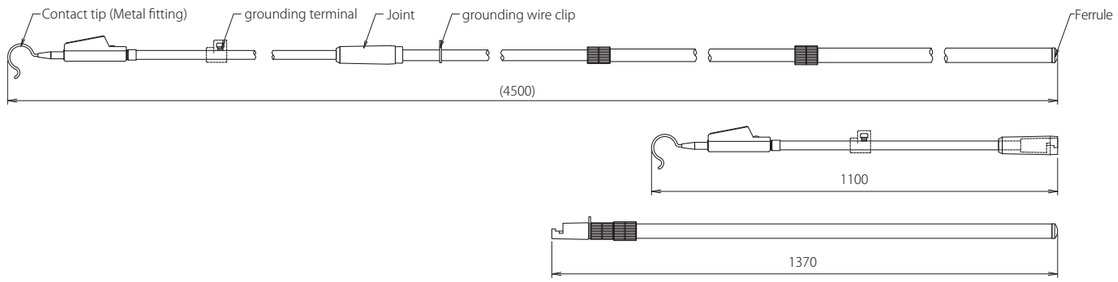
Voltage		Green LED		Red LED and buzzer	
DC	AC	Lighting	Flashing	Lighting	Sound generation
After test and after voltage detection (not charged)		○	–	–	
Approx. 350 to Approx. 750 V	Approx. 1,000 to Approx. 2,000 V	–	○	–	
Approx. 750 V or more	Approx. 2,000 V or more	–	–	○	

- 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

HS-1.5NR

■ Dimensions



■ Accessory

Common bag for HS-1.5NJ/NR

Clip-type grounding wire (7 m)
for HS-1.5NJ

Magnet-type grounding wire (7 m)
for HS-1.5NR

■ 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		

HST-L series

HST-30L/HST-70L/HST-W80L

Medium voltage & High voltage detector

AC	HST-30L	3kV～34.5kV
	HST-70L	20kV～80.5kV
	HST-W80L	20kV～80.5kV

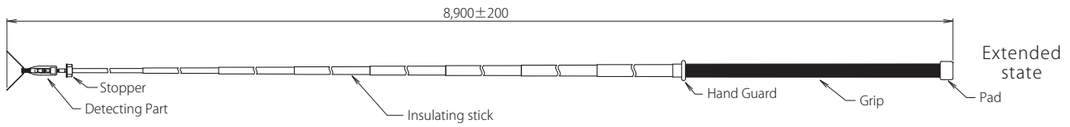
Audio signaling and light emitting / Telescopic type / Waterproof

Long length for Feeder

■ Features

- FRP is used for the insulating stick. It is lightweight and outstanding in operability.
- Tip metal fitting consists of a shock-absorbing spring.
- 全長　約9m

■ Dimensions



■ Accessory

Bag for housing (DA14006)

■ Specifications

Type		HST-30L	HST-70L	HST-W80L
Working voltage range	AC	3kV～34.5kV	20kV～80.5kV	20kV～80.5kV
Operation starting voltage	AC	500V±100V	3,000V±600V	5,000V±1,000V
Frequency		50/60Hz		
Dielectric strength		on insulating stick AC 75kv/300mm for 1minute. (insulating stick excluding contact tip and joint)		
		1 place	3 places	3 places
Leakage current		0.1mA or less during dielectric strength test (1 place)		
Battery		LR44(1.5V) × 2 pcs		
Life of the battery		About 4 hr. under continuously operating state		
Operating temperature range		−10℃～+50℃		
Weight		About 3kg	About 3kg	About 3kg

HST-W80JS

Voltage detector for AC overhead contact wire

AC 20kV～80.5kV

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

Audio signaling and light emitting / Telescopic type / Waterproof

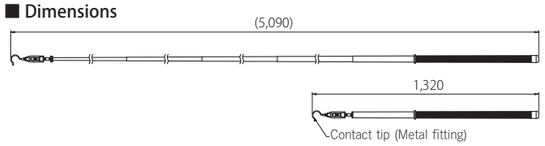
■ Features

- 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)

Charged indication (Red LED lit)

Uncharged indication (Green LED lit)

■ Dimensions



■ Accessory

Bag for housing

■ Specifications

Working voltage range		AC20kV～80.5kV
Operation starting voltage (Voltage to ground)		5 kV ± 20% (bare wire)
Frequency		50Hz/60Hz
Indication of operation	Light	It can be confirmed in the luminance of 8,000 lux.
	Sound	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 μA 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℃ to +50℃ (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.

HST-22JX

Induced voltage detecting instrument

AC 20kV

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

【Attention】

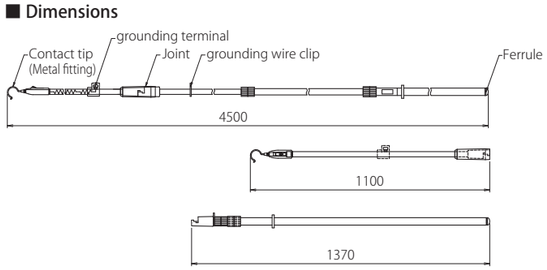
This instrument is not a voltage detector.
The product is to be used with a voltage detector by fitting the grounding hook, after confirming electric power outage of overhead contact line.

Audio signaling and light emitting / Telescopic type / Waterproof

■ Features

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

■ Dimensions



■ Accessory

Bag for housing

grounding wire (8 m)

■ Specifications

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

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

HXR-20 (For normal railways)
HXR-25 (For Shinkansen)

Medium Voltage hot-line proximity alarm

AC HXR-20 20kV
HXR-25 25kV

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

Jointly developed with JR EAST (East Japan Railway Company)

Fiscal 2013 Railway Electrical Technology Award

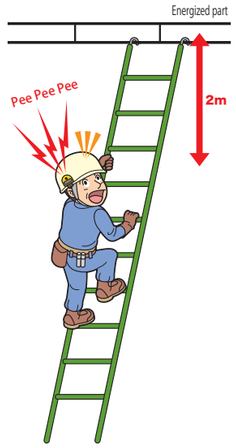
JECA FAIR 2013 Product Contest Award

HXR-20

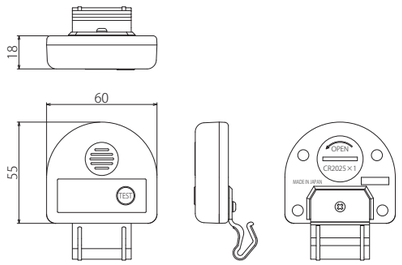
HXR-25

■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)

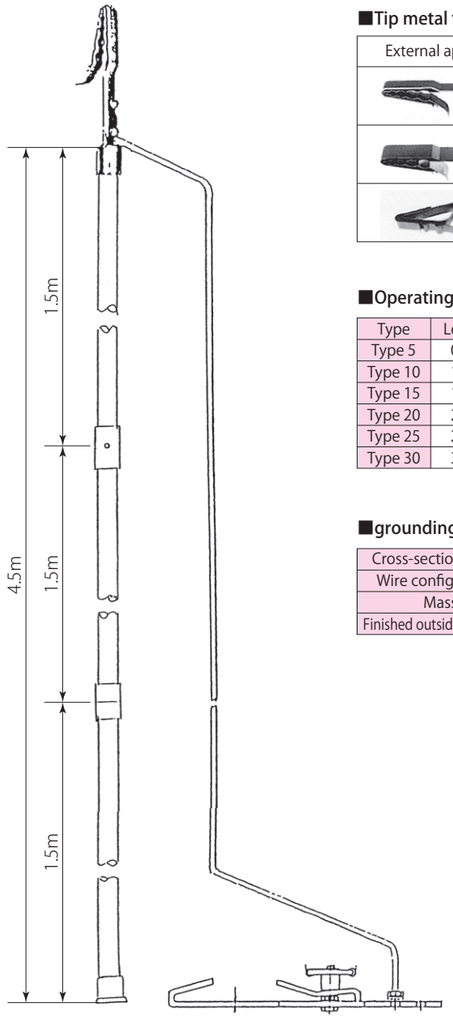


■Specifications

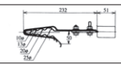
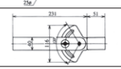
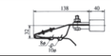
Operating sensitivity (Electric field intensity)	Model HXR-20 For existing railways: 2,500 V/m Model HXR-25 For bullet train: 3,000 V/m
Standard operation starting distance	About 2 m (It differs depending on the environment.)
Alarm operation	Piezoelectric buzzer type
Sound volume	60dB±5dB/10cm
Frequency	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

Grounding hook for railways

Custom production is possible with combination of tip metal fitting, length of operating rod, length and size of earth wire, and grounding metal fitting.



■Tip metal fitting

External appearance	Model name	Range of use (mm)	Dimension	Weight
	SA106-A Insertion type	ϕ10～25		630g
	SA106-C Slanted insertion type	ϕ10～25		720g
	SA106-S Compact insertion type	ϕ4～10		400g

■Operating stick

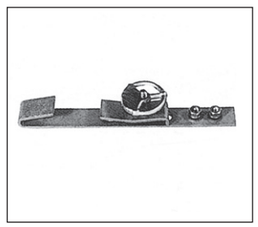
Type	Length	Length
Type 5	0.5m	Single rod
Type 10	1.0m	
Type 15	1.5m	
Type 20	2.0m	
Type 25	2.5m	
Type 30	3.0m	

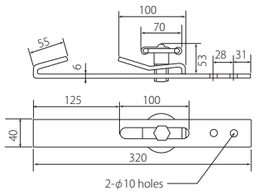
Type	Length	Number of connections
Type 35	3.5m	Connection of 2 rods (1.5 m + 2.0 m)
Type 40	4.0m	Connection of 2 rods (2.0 m + 2.0 m)
Type 45-A	4.5m	Connection of 2 rods (2.0 m + 2.5 m)
Type 45-B		Connection of 3 rods (1.5 m + 1.5 m + 1.5 m)
Type 50	5.0m	Connection of 2 rods (2.5 m + 2.5 m)
Type 60-A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

■grounding wire

Cross-sectional area	38mm²	60mm²	100mm²
Wire configuration	19/38/0.26	19/60/0.26	37/51/0.26
Mass	455g/m	680g/m	1120g/m
Finished outside diameter	12.9mm	15.2mm	19.0mm

■Grounding metal fitting (SA120)





Mass: 1,000g

■Standard model

Type	Tip metal fitting	Grounding wire	Operating rod	Grounding metal fitting	Bag for housing
SA106A Type 45-A	SA106A	60mm²×7m	4.5 m, connection of 2 rods (2.0 m + 2.5 m)	SA120	Sold separately
SA106A Type 45-B	SA106A	60mm²×7m	4.5 m, connection of 3 rods (1.5 m + 1.5 m + 1.5 m)	SA120	Sold separately

Information materials

Medium/Low voltage detector and its correct use

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

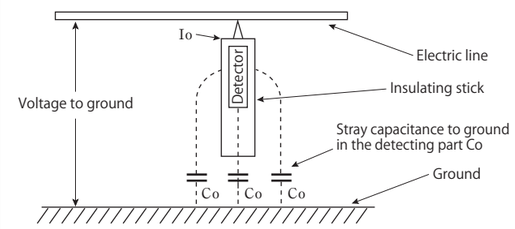
1.1 Voltage detection of AC circuit

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 Io flowing in the Electric line → Detector → Stray capacitance to ground in the detecting part Co of the detector → Ground, and is activated. Then, it identifies the charging or electric power outage status of the circuit, indicating the result by lighting a lamp or sounding an alarm.

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

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

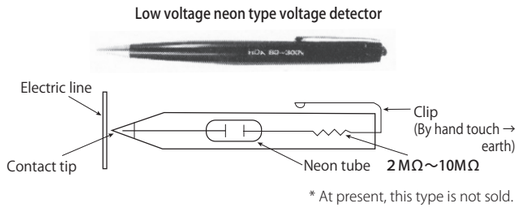
Fig. 1 Principle of voltage detector



◇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)

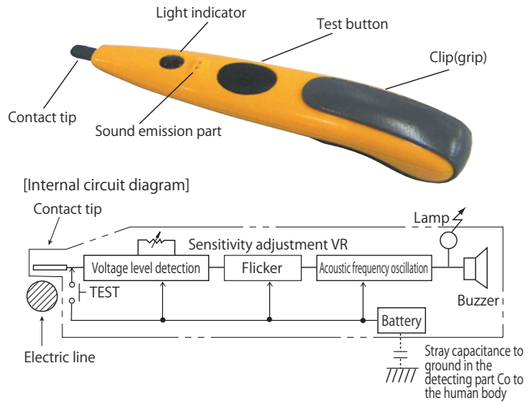
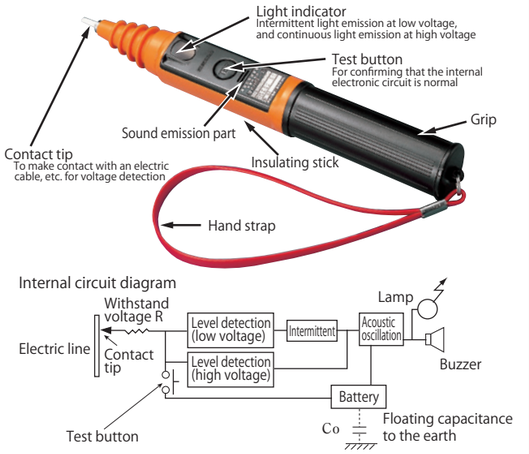


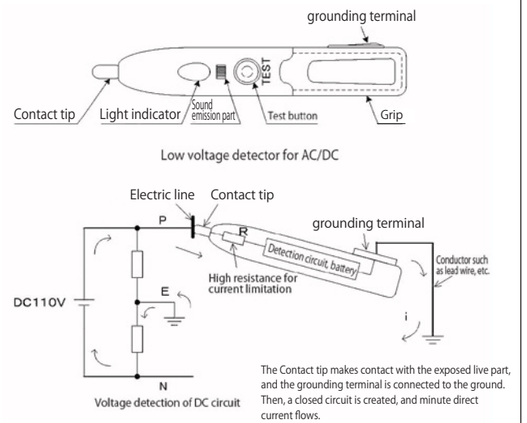
Fig. 4 Audio signaling and light emitting type high/low voltage detector (example)



1.2 Voltage detection of DC circuit

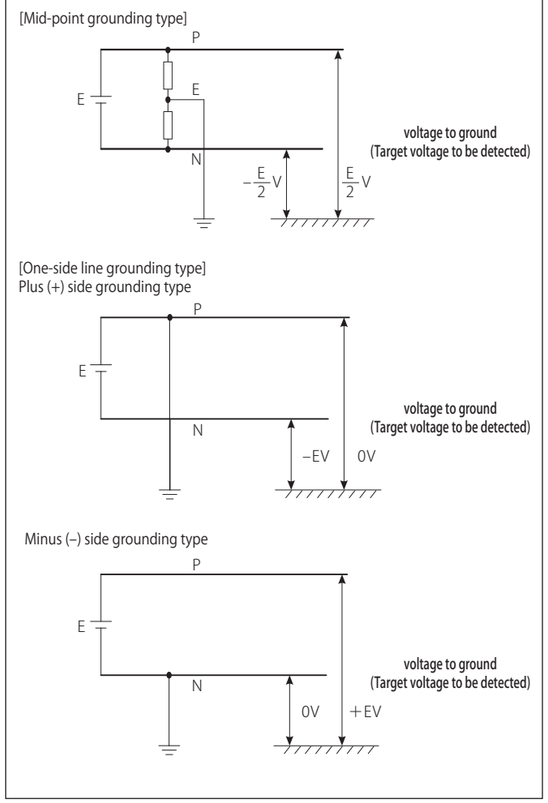
When detecting the voltage of a DC circuit, it is possible to have the contact tip make contact with an exposed live part of a electric line then create a closed circuit by connecting the earth terminal to the ground, and flow a direct current (**Fig. 5**), because the current does not flow via capacitance,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

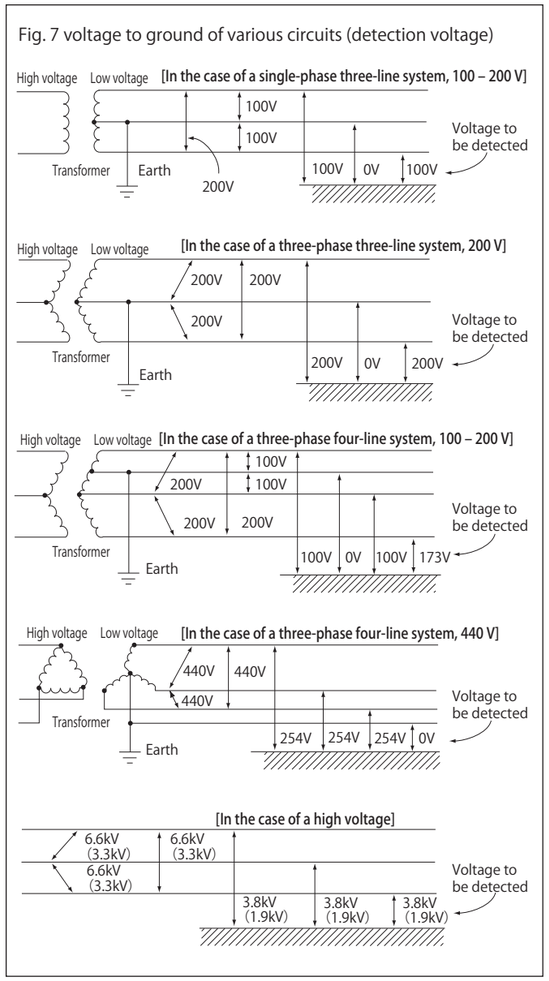
The target voltage to be detected in a low voltage circuit and a high voltage circuit is the voltage to the earth, as shown in **Fig. 7**, which is lower than the line voltage. In addition, voltage detection in a grounded cableway (line) is naturally impossible, because the voltage to earth is zero.

(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.

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



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

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

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

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

2.2 Non-operation distance

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

2.3 Withstand voltage

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

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

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

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

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

3. How to use voltage detectors correctly

3.1 Check carefully before use.

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

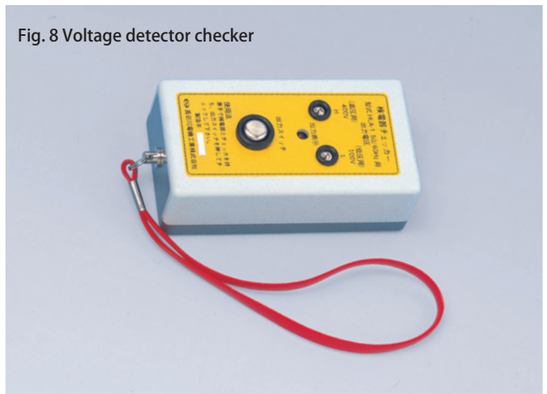
(1) Confirm whether the working voltage range of the voltage detector conforms to electric line or not.

(2) Visually check for the presence or absence of breakages, dirt, flaws, cracks, etc. in the voltage detector.

(3) Confirm that the detecting function of the voltage detector is normal, using a known power supply, voltage detector checker (**Fig. 8**), etc.

(4) For a the voltage detector with a built-in battery, confirm that the internal circuit and battery voltage are normal by checking the mechanism (test button).

Fig. 8 Voltage detector checker



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

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

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

3.2 Points to be noted for voltage detection

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

(2) Set the insulating stick to the normal state by extending and/or tightening it, depending on the type of voltage detector.

(3) During voltage detection, do not touch parts other than the grip of the voltage detector, because this may be dangerous.

(4) When detecting a high voltage, wear insulated rubber gloves when a hand approaches within a distance of 60 cm from the high-voltage part. If an ordinary voltage detector with a length of 25 cm is used, be sure to wear insulated rubber gloves. In the case of an inspection tour, and if protective equipment and/or protective guard are not carried, it is convenient to use a long voltage detector with an insulating stick.

(5) When there is a risk of a surge voltage being generated, such as when a lightning strike occurs or when opening/closing a circuit breaker, switch, etc., stop using the voltage detector.

(6) Voltage detection in the rain should be avoided, in principle. When it is performed from sheer necessity, pay attention to the wet condition of the voltage detector, and whether operation in the rain is reliable or not. It is also necessary to investigate and confirm whether there is a risk of electric shock or not.

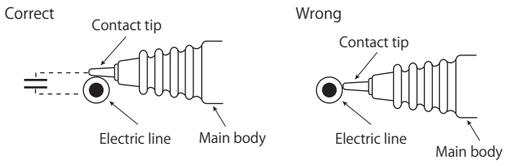
(7) Perform voltage detection for each phase, sequentially.

(8) Perform voltage detection by moving the voltage detector closer from the earth side to the electric line.

3.3 How to make contact with a voltage detector

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

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

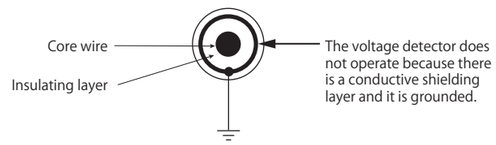


3.4 Voltage detection for a high voltage electric line is not possible.

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

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

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

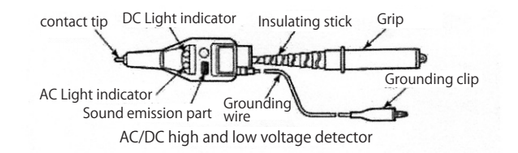


3.5 Electric discharge of residual charge

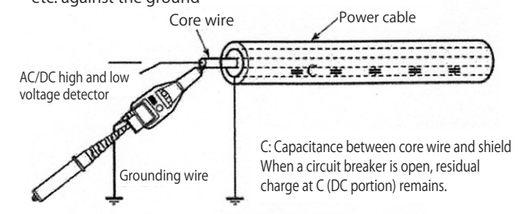
When there are electric power cables, power capacitor, etc. on the cableway, it can be hazardous even with an AC cableway, because a residual DC charge remains after an electric power outage. In the OSH Regulations No. 339 Article 2, it is specified that "Regarding a cableway where its open-circuit has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

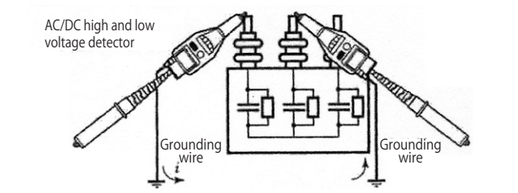
Fig. 11 Method of detecting a residual charge



(1) Voltage detection method for residual charge in power cables, etc. against the ground



(2) Voltage detection method of residual charge between terminals of a phase-advanced capacitor, etc.



Using two DC voltage detectors, it is possible to detect the residual charge between lines.

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 Don't forget to conduct periodic inspections

Voltage detectors are excluded from periodic self-inspections as determined by the law (Ordinance on Industrial Safety and Health). However, unlike work tools such as pliers and screwdrivers, voltage detectors are important safety equipment used to prevent electric shock disasters for workers in electric-related activities. As such, it is preferable to periodically check the voltage-resistance performance of voltage detectors. (Voltage Detector Safety Guidelines)

(1) For high and extra-high voltage detectors, the following periodic self-inspections are recommended according to the product.

- Short-type voltage detectors for high/low voltage (HSF-7, HSE-7T1, HSE-7G)

Please conduct a voltage-resistance test for 1 minute at a test voltage of 10 kV or higher once a year. (Voltage Detector Safety Guidelines RIIS-TR-85-2)

- Other models not included above (including phase testers)

Please conduct a voltage-resistance test for 1 minute at 2x the maximum working voltage once every six months. (In conformance with Article 351 of the Ordinance on Industrial Safety and Health (Periodical Self-Inspection of Personal Insulating Protective Equipment, etc.) and Article 9 of the Standards for Personal Insulating Protective Equipment, etc. (Voltage Resistance Performance of Live Line Work Equipment)) *For testing methods, refer to P. 72 and P. 74.

(2) When conducting a periodic inspection, check and change the batteries that have been included with the voltage detector, as the individual batteries experience natural discharge even if the voltage detector is not used.

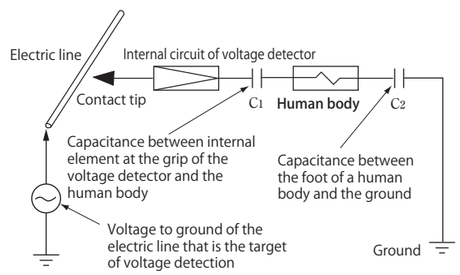
4. Influence of unique usage conditions

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 C1, as shown in the equivalent circuit of **Fig. 12**, decreases.

Fig. 12 Equivalent circuit using a voltage detector

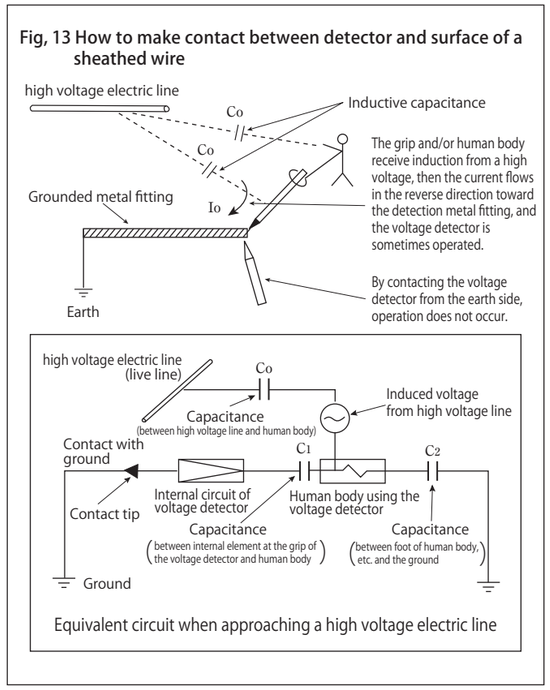


4.2 When voltage detection is performed near a high voltage electric line:

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

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

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

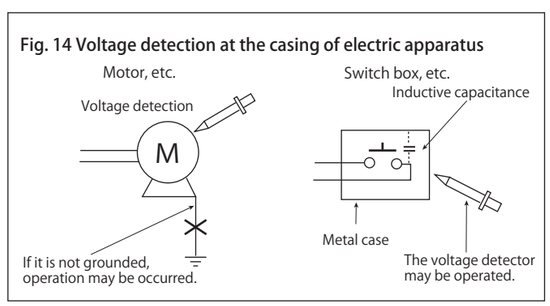


4.3 In the case of apparatus that is not grounded:

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

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

Fig. 14 Voltage detection at the casing of electric apparatus



※ ※ ※ ※

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

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

Product Warranty, Maintenance

■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

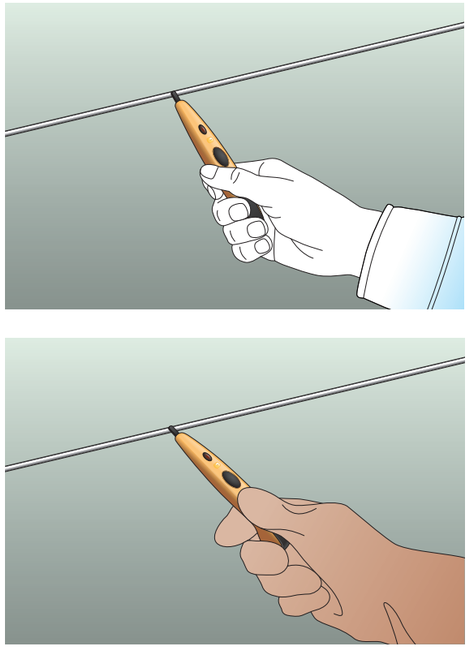
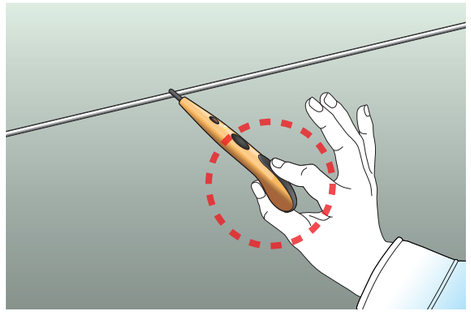
QUALITY ASSURANCE JIC REGISTERED ORGANIZATION No.0921-ISO 9001 No.E635-ISO 14001

MS JAB CM002

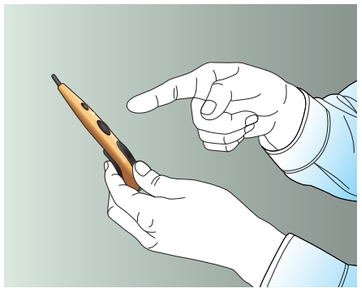
Low voltage use (For AC)

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.

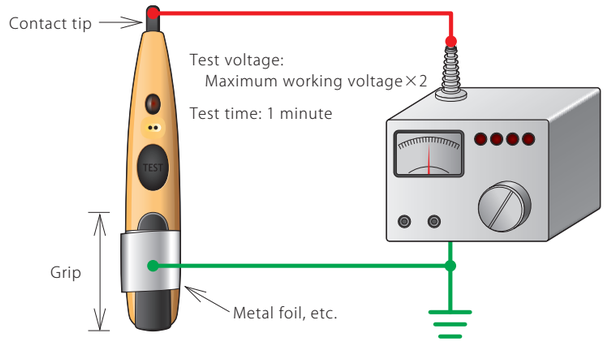
■Holding the voltage detector correctly

Good	Bad
	
●Hold the grip firmly.	●It is not possible to detect the voltage correctly if the grip is held with the tips of the fingers.

■Visual inspection



■Withstand voltage testing



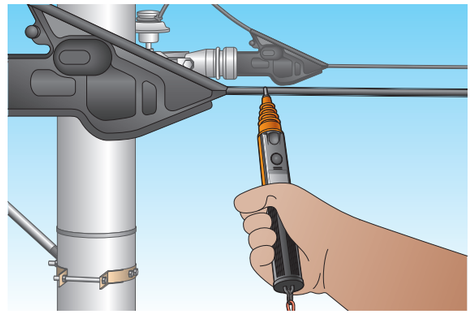
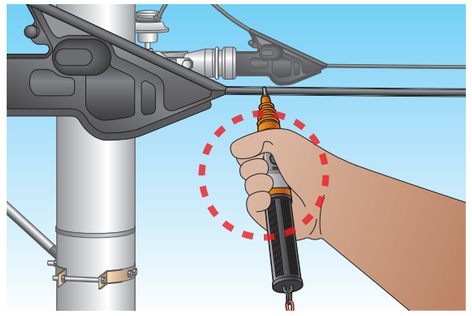
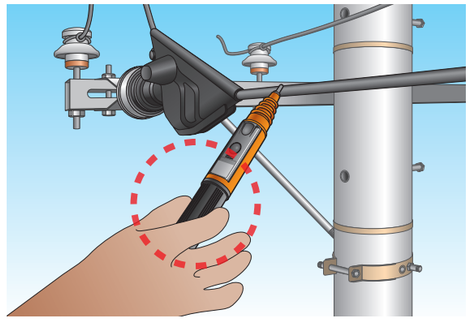
Visual inspection items

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

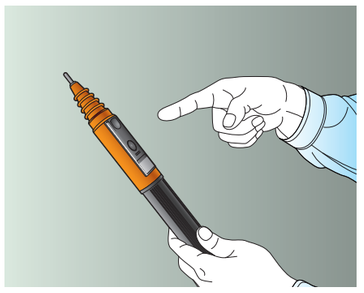
Medium and Low voltage use (For AC)

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

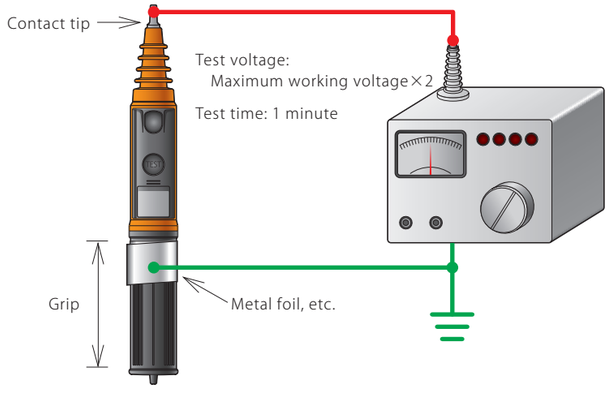
■Holding the voltage detector correctly

Good	Bad
	
	
●Hold the grip firmly.	●Never hold a part other than the grip when detecting voltages. This is extremely dangerous. ●It is not possible to detect the voltage correctly if the grip is held with the tips of the fingers.

■Visual inspection



■Withstand voltage testing

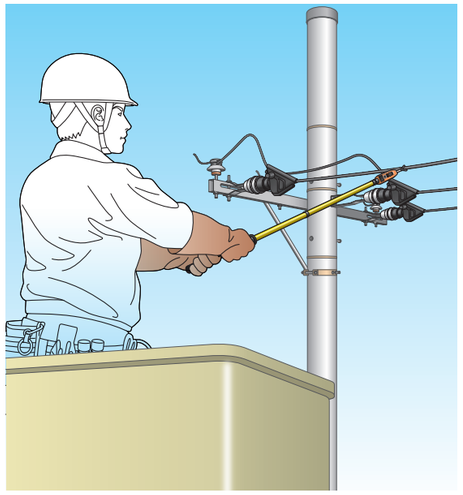
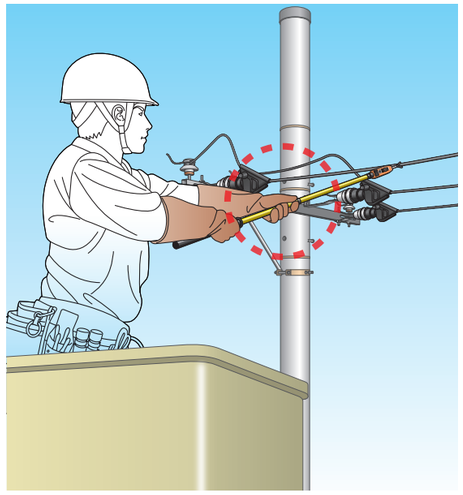
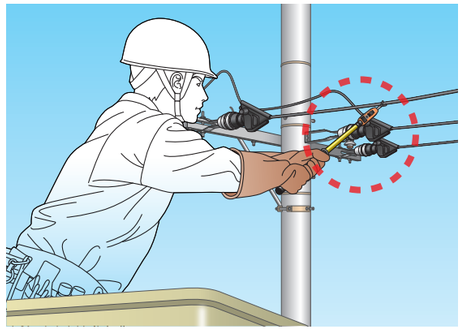


Visual inspection items

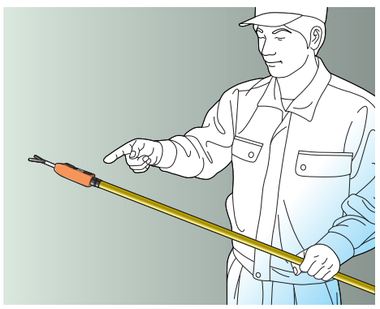
- ●Press the test button for about five seconds and check that there is no change in the lamp or the sound.
- ●Check that there are no problems such as damage, dirt, scratches or cracks.
- ●Apply a voltage between the contact tip and the grip (at a position near the contact tip).

Medium voltage & High voltage detector use

■Holding the voltage detector correctly

○ Good	× Bad
	
■During storage  ■During use  Extend as far as possible	
●Hold the grip firmly. ●Telescopic type voltage detectors should be extended as far as possible for use.	●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

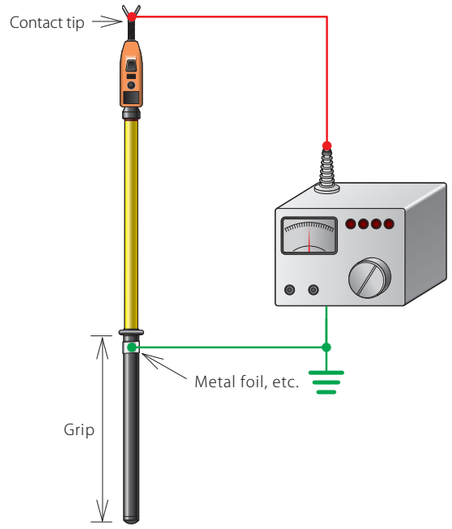


Visual inspection items

- ●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.

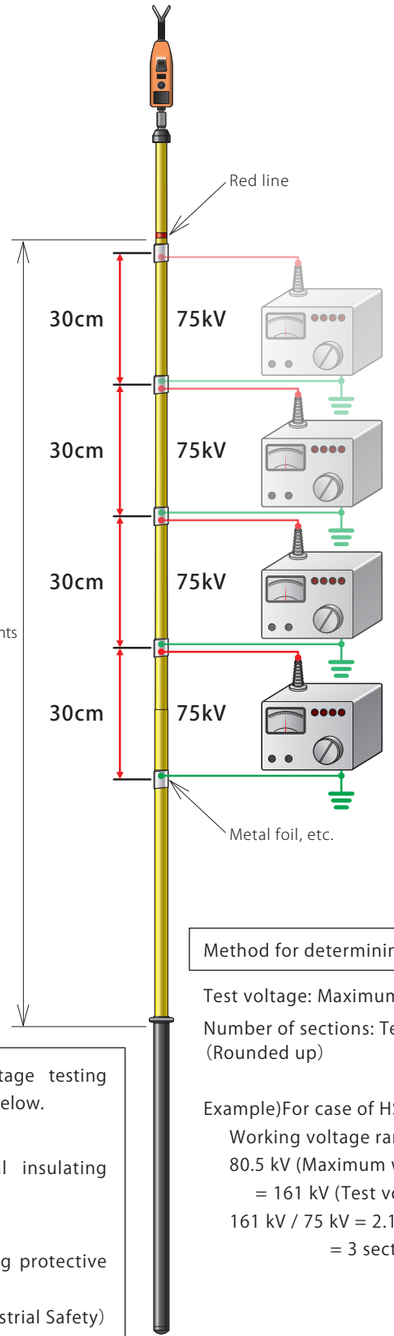
■Withstand voltage testing

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



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

■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



Method for determining the number of sections

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

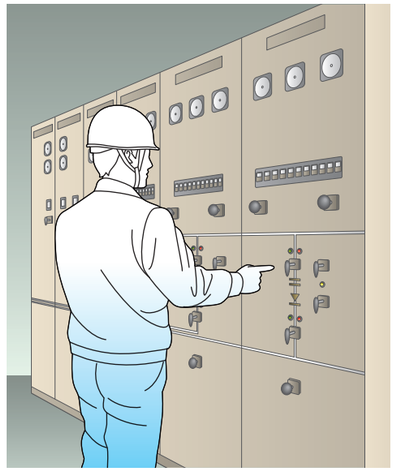
Example)For case of HST-70
Working voltage range: 20 kV to 80.5 kV
80.5 kV (Maximum working voltage) × 2
= 161 kV (Test voltage)
161 kV / 75 kV = 2.15 (Number of sections)
= 3 sections (rounded up)

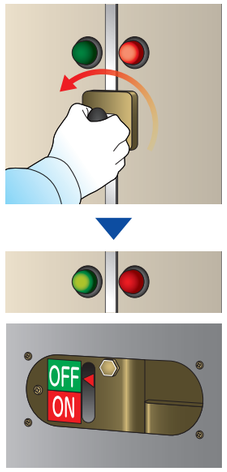
Hasegawa Electric has defined the withstand voltage testing methods by quoting the regulations and others listed below.

- ●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

Confirming dead-line work

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

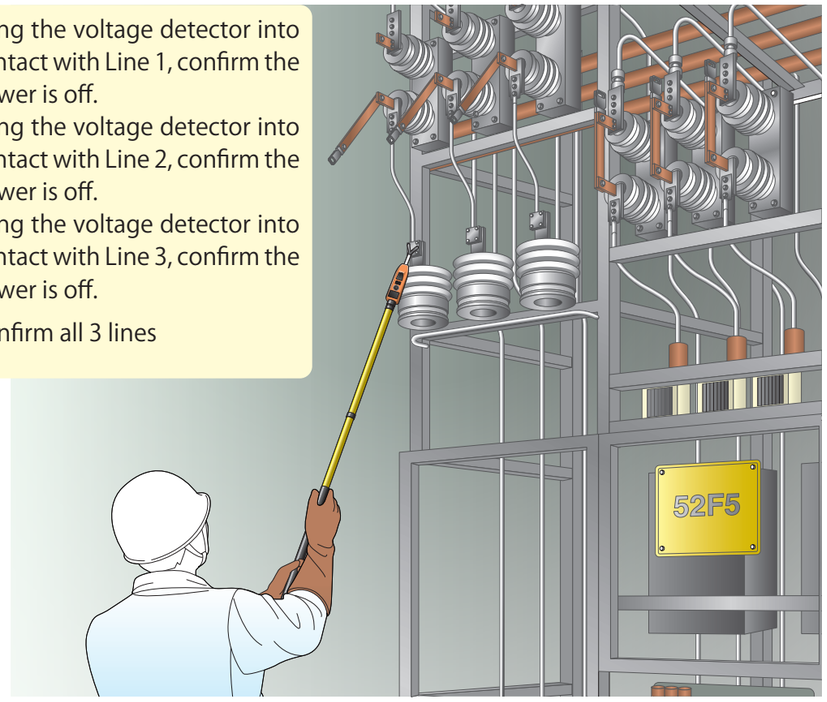


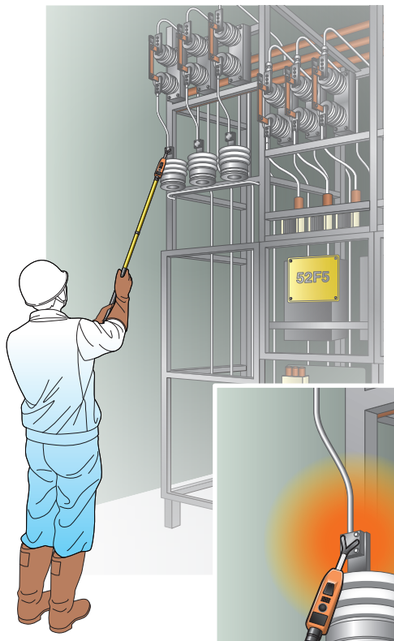


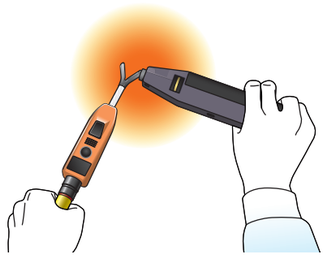
③Turn off the Circuit Breaker
Turn off the disconnector switch

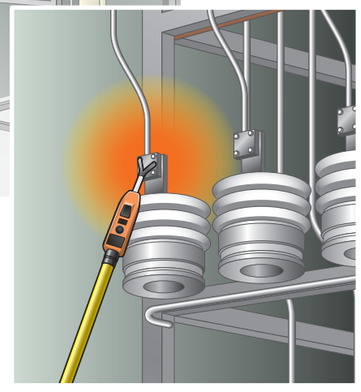
④Bring the voltage detector into contact with Line 1, confirm the power is off.
Bring the voltage detector into contact with Line 2, confirm the power is off.
Bring the voltage detector into contact with Line 3, confirm the power is off.

＊Confirm all 3 lines

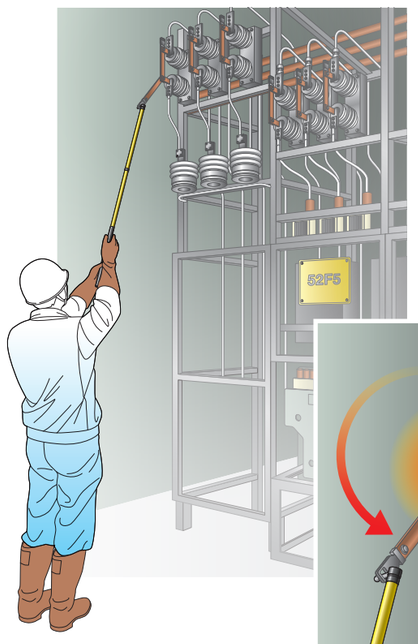


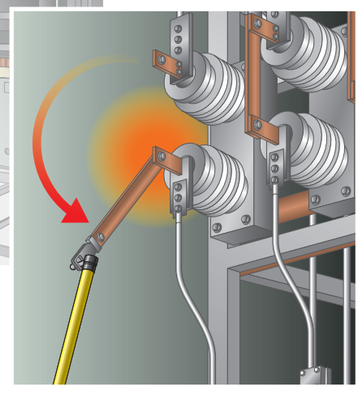




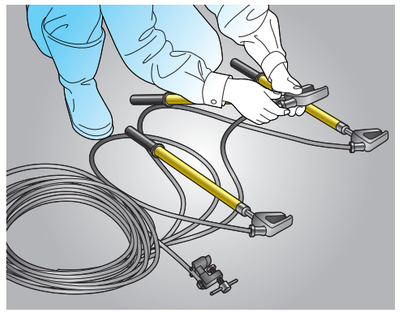


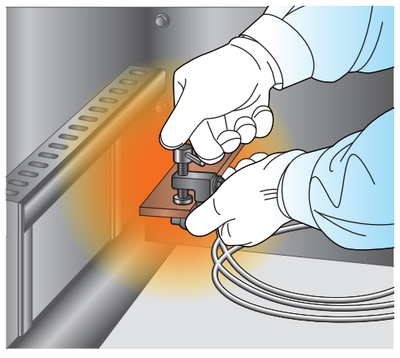
②Confirm normal operation of voltage detector contacting any charged conductor already known



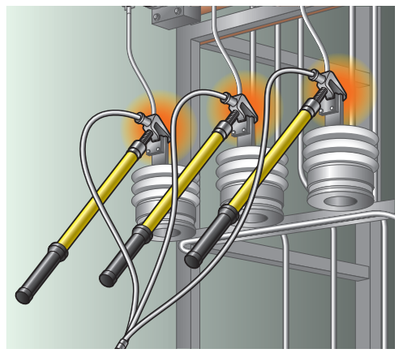


⑤Visual check of grounding hook set.
Appearance and construction check





⑥Connect the grounding device to earth terminal



⑦Connect the contact clamp to Line 1
Connect the contact clamp to Line 2
Connect the contact clamp to Line 3

＊Connect all 3 lines

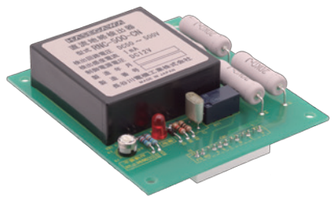
Introduction to the General Catalog of Relays

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

■Contents

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

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



■Plug-in type DC ground fault protection relay

■DC ground fault current transformer

■DC circuit breaker for wiring with direct current leakage alarm

■Plug-in type AC current leakage relay

■ωC measurement type digital ground fault protection relay