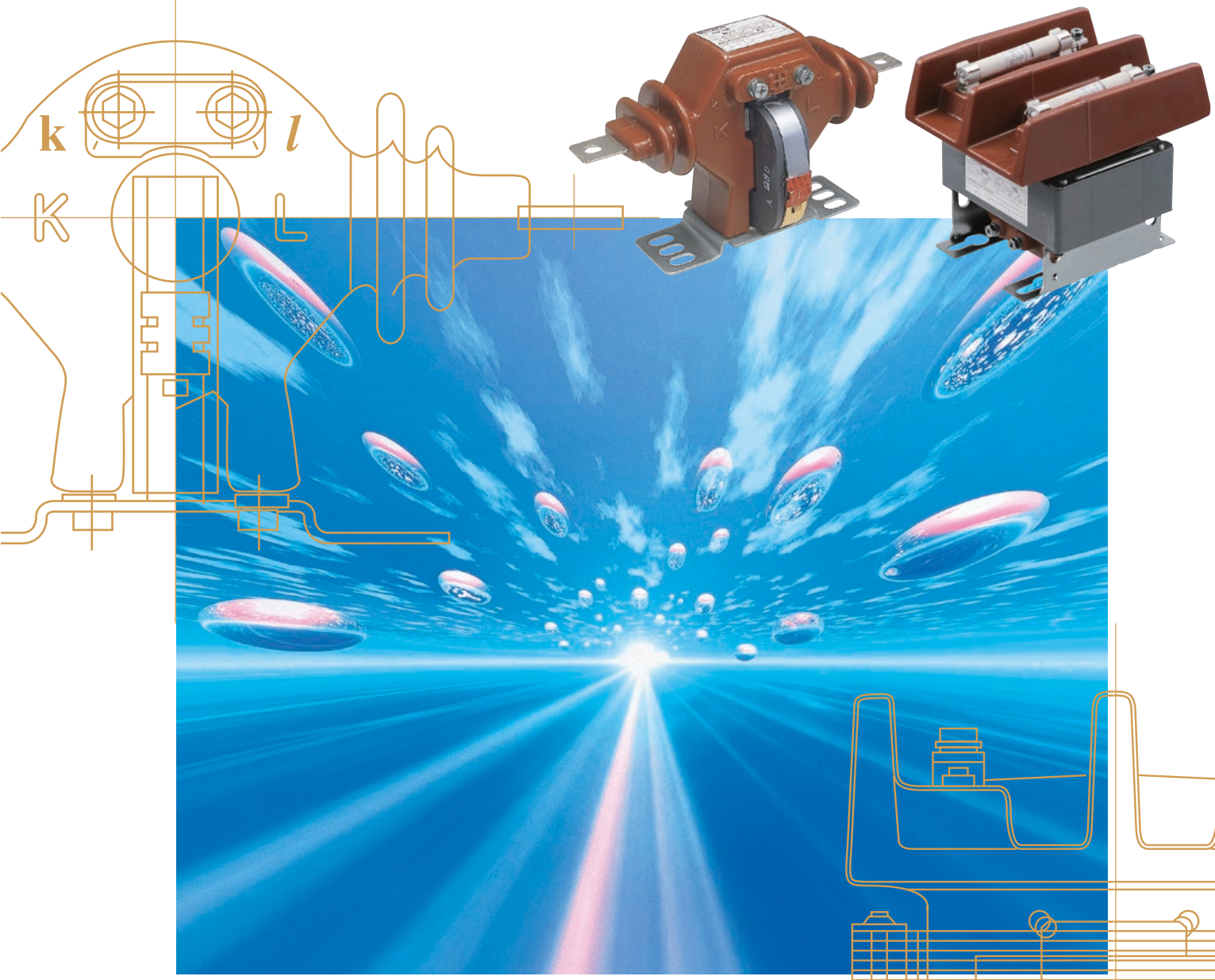
MITSUBISHI ELECTRIC

*Changes for the Better*

for a greener tomorrow eco Changes

MITSUBISHI ELECTRIC
Instrument Transformers




# High Reliability and Wide-ranging Variations to Meet Diversified Needs

ISO 14001 JACO EC97J1128

UKAS MANAGEMENT SYSTEMS 051

Mitsubishi Electric's Fukuyama Works, the factory that manufactures the products listed in this catalog, has received ISO14000:2004 Environmental Management System certification.

Linking Technology & Creation
THINK TOGETHER MITSUBISHI

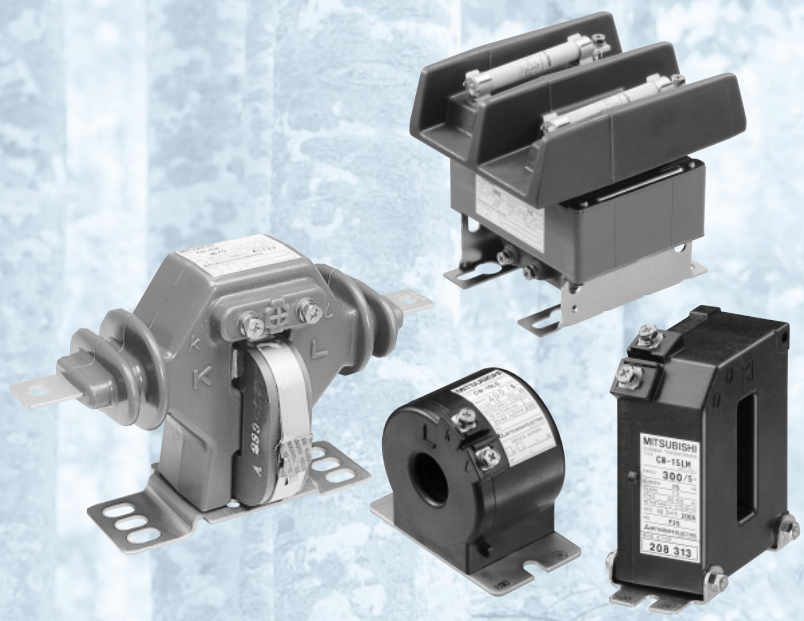
11A

# Insulation Performance — The deciding factor for voltage and current transformers.

An important role of instrument transformers, including transformers for the electric currents and voltages used by electric meters and measurement equipment, is to prevent major accidents involving the circuit sensors and power sources of electrical equipment, thereby ensuring the high reliability required of such equipment.

Utilizing advanced technologies accumulated over long years together with superior insulation materials, Mitsubishi Electric Instrument Transformers offer exceptional reliability and continually receive high evaluations from satisfied customers around the globe.

From low-voltage to 33kV, Mitsubishi Electric manufactures a complete line-up of instrument transformers that can be used safely in every application.



# ●Contents●

# 1 Overview and Features of Mitsubishi Electric Instrument Transformers

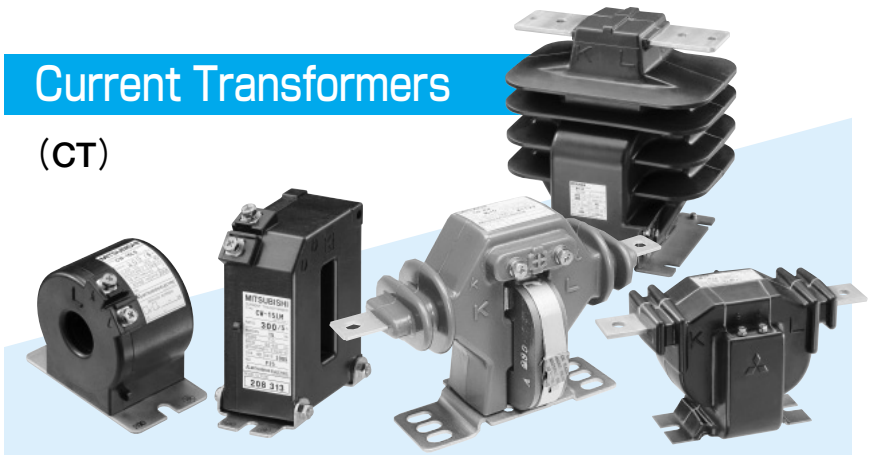
Mitsubishi Electric Instrument Transformers are highly reliable owing to the use of advanced technologies and superior insulating materials.
Choose from a wide range of models to best match your application needs.

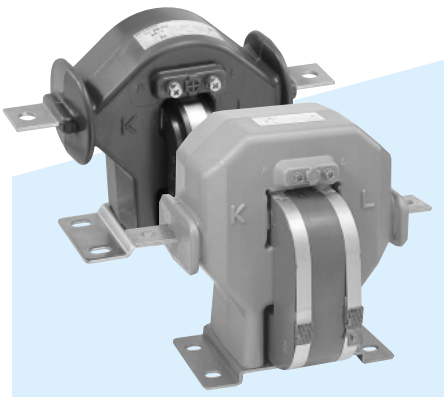
*Vast model line-up in answer to diversified application needs*

From low-voltage to 33kV

## Current Transformers

(CT)





**Low-voltage** — **22000V**

**For cubicle-type high-voltage power receiving equipment**

### CW Low-voltage Series

- Primary winding
- Round window through-type
- Rectangular window through type
- Emergency heat-resistant
- Class 2 verification
- Separated

### CD High-voltage Series

- Overcurrent intensity: 40x to 300x
- Class 2 verification, Class 1 verification

### BS Series

- Through-type

### EC・BN High-voltage, Extra-high-voltage Series

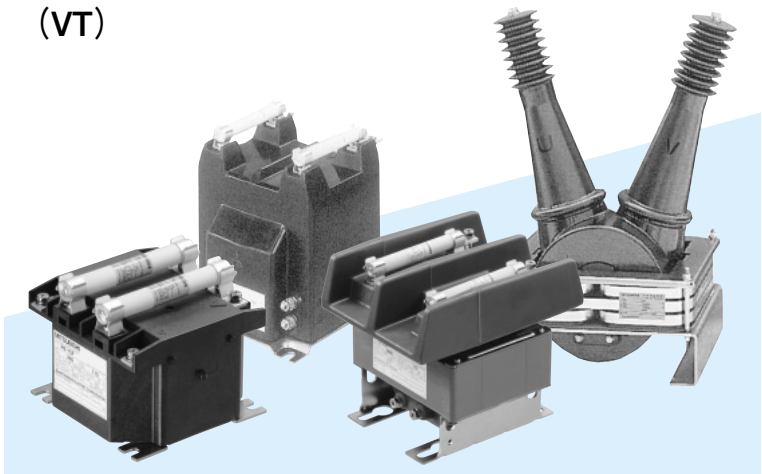
- Full-mold, high overcurrent intensity
- Class 2 verification, Class 1 verification

### AN・CN JIS C 4620 Appendix Series

- 12.5kA/0.125sec
- 12.5kA/0.25sec

## Voltage Transformers

(VT)



**Low-voltage** — **33000V**

### PE Low-voltage Series

- 15VA and 50VA
- Class 2 verification

### PD Low-voltage, High-voltage Series

- 50VA, 100VA and 200VA
- Class 2 verification, Class 1 verification

### EP High-voltage

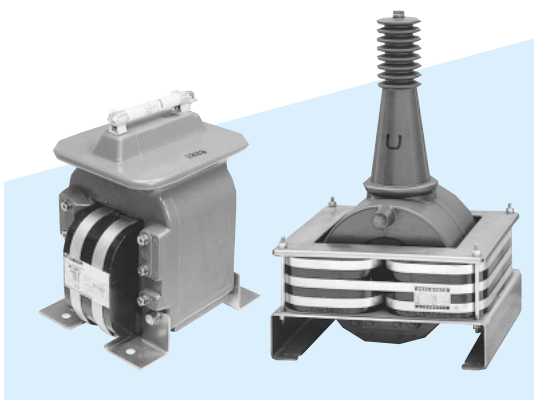
- 50VA and 100VA
- Full-mold

### EV Extra-high-voltage Series

- 100VA and 200VA

## Earthed Voltage Transformers

(EVT)



**Low-voltage** — **33000V**

### EF High-voltage Series

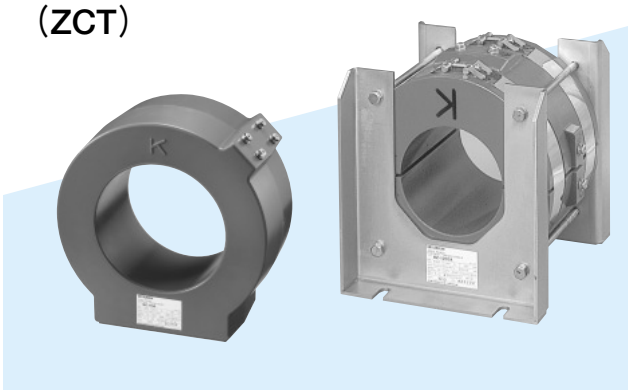
- 100VA and 200VA
- 3-phase models available

### EV Low-voltage to Extra-high-voltage Series

- 50VA, 100VA and 200VA

## Zero-phase Current Transformers

(ZCT)

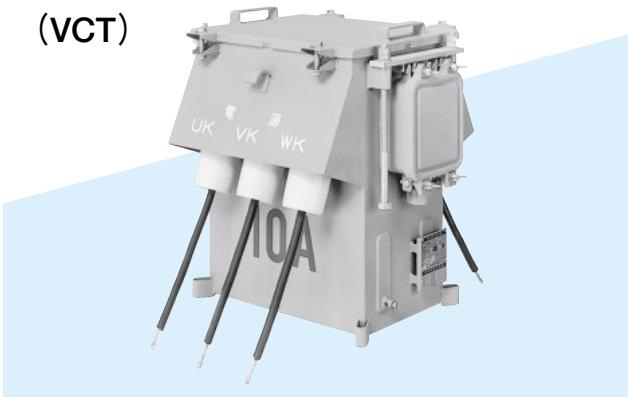


**BZ** Series

- ●Cable through-type
- ●Separated design also available

## Voltage&Current Transformers

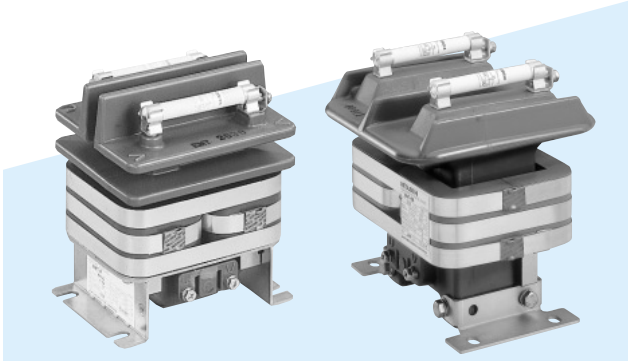
(VCT)




**PO** High-voltage

- ●Outdoor/for power supply and demand
- ●Class 2 verification, Class 1 verification

## Transformer for control circuits



**EMT**

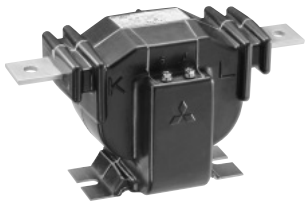
- ●For operating power supplies of high-voltage circuit breakers

## *Excellent Insulation Performance*

The use of superior insulation materials such as epoxy resins and Melquid rubber for these instrument transformers ensures excellent insulation performance.

- ●The heat-resistant resin of the CW Series uses a flame retardant material compliant with the UL 94 V-O (self-extinguishing) standard.
  However, CW-5LS3 and CW-5LMS3 cases use a flame retardant PBT resin material compliant with the UL 94 V-O (self-extinguishing) standard.

### ●Fully molded cases manufactured using Melquid rubber (EC/BN Series)



- ●Melquid rubber, which has excellent electric and mechanical characteristics, is used for these fully molded units.
- ●Small in size, lightweight and highly reliable.

## *Pursuing Compact Size and Operation Ease*

- ●The CW Series of low-voltage current transformers offers units that are compact in size and lightweight. Available in a wide range of models (e.g., cable or busbar wiring and small currents), wiring of this product is simple and easy. The direction of the mounting plate can be turned 90° .
- ●Because they are small in size and lightweight, general-use PD and CD units are suitable for simple cubicle equipment and other similar applications.
- ●For zero-phase current transformers, there is also a separated design that can be easily attached using existing cables.

# 2 Be Certain to Observe the Following Precautions to Ensure Safety

In order to get the best service life out of Mitsubishi Electric Instrument Transformers, be certain to observe the following items when using these products.

## 1 Usage Environment and Usage Conditions

(1) Do not use instrument transformers in the following places. It may lead to dielectric breakdown and shorter service life.

- ●Places where the ambient temperature is outside the range of -20～50℃
- ●Places where the daily mean temperature exceeds 35℃
- ●Places where the relative humidity is equal to or more than 85%, or places where condensation forms
- ●Places where the altitude exceeds 1000m
- ●Places where there is much dust, corrosive gas, salt-laddened wind (high salt content), or oily smoke
- ●Places where vibrations and/or jolting occurs frequently
- ●Places exposed to rain, water drops or sunlight (for indoor products)
- ●Near circuits with high harmonics
- ●Places where small animals such as mice and snakes may infiltrate

(2) If using a transformer in a location subject to high-temperature/humidity, corrosive gas, high altitude, pollution/humidity, high-temperature or cool-temperature environments, refer to Special Environments on page 74.

(3) Select the model carefully when using a transformer for the following purpose.

- ●If combining an small-load electronic meter with a voltage transformer, choose a transformer with a load rating of less than or equal to 50VA. If a transformer with a high load rating is chosen, there will be a large margin of error.

## 2 Installation

Be certain to observe the following regarding installation.
To ensure safety, the electrical works required when installing transformers should only be performed by an experienced electrician.

- ●Install the transformer so it is not exposed to rainwater, oil or other matter such as dust and coarse particulates (for indoor products).

## 3 Connections

Be certain to observe the following when connecting wiring.
To ensure safety, transformer connections should only be performed by an experienced electrician.

●Be certain to tighten terminal screws using the following torques.

| Model | Type | Primary terminal (N・m) | Screw size | Secondary terminal (Tertiary terminal) (N・m) | Screw size |
|---|---|---|---|---|---|
| CT | CW Series | M5 : 2.84～3.72<br>M6 : 4.71～6.37<br>M8 : 11.7～15.3<br>M10 : 23.5～30.2 | M5<br>M6<br>M8<br>M10 | 2.84～3.72 | M5 |
| | | | | 0.98～1.35 | M4 |
| | CD Series | M8 : 11.7～15.3<br>M10 : 23.5～30.2<br>M12 : 40.2～52.4<br>M16 : 99.0～130.3 | M8<br>M10<br>M12<br>M16 | 2.35～3.04 | M6 |
| | EC/BN Series | | | 2.35～3.04 | M6 |
| | AN/CN Series | | | 2.35～3.04 | M6 |
| | BS Series | — | — | 2.35～3.04 | M6 |
| VT | PE Series | 1.37～1.76 | M5 | 1.37～1.76 | M5 |
| | PD Series | 2.35～3.04 | M6 | 2.35～3.04 | M6 |
| | EP Series | 1.37～1.76 | M5 | 2.35～3.04 | M6 |
| | EV Series | 10.98～14.50 | M10 | 2.35～3.04 | M6 |
| EVT | EV/EF Series (except for the following models) | 2.35～3.04 | M6 | 2.35～3.04 | M6 |
| | EF-03XFC | 2.35～3.04 | M6 | 0.98～1.35 | M4 |
| | EV-1 | 10.98～14.50 | M10 | 2.35～3.04 | M6 |
| | EV-1X | Earth side 2.35～3.04 | M6 | | |
| | EV-2, EV-2X<br>EV-3, EV-3X | 10.98～14.50 | M10 | 2.35～3.04 | M6 |
| ZCT | BZ Series | — | — | (including test terminals, connection terminals) 2.35～3.04 | M6 |
| VCT | PO-2HB<br>PO-6HB | — | — | 0.98～1.35 | M4 |
| Transformer for control circuits | EMT-K<br>EMT-BB | 2.35～3.04 | M6 | 2.35～3.04 | M6 |

●Be certain to tighten screws provided with brackets directly mounted on busbars for square window through-type current transformers.
Target models: Brackets directly mounted on busbars for CW-15LM, CW-40LM and CW-15LMS.

| Applicable type/Rated primary current | Screw name | Tightening torque |
|---|---|---|
| CW-15LM 200～750A<br>CW-40LM 300～2000A<br>CW-15LMS 200～2000A | CT mounting screw (steel screw) | M5 screw：1.37～1.76N・m |
| | Busbar mounting screw (brass screw) | M6 screw：2.35～3.04N・m |
| CW-40LM 2500,3000A<br>CW-15LMS 2500,3000A | CT mounting screw (steel screw) | M6 screw：4.48～5.50N・m |
| | Busbar mounting screw (brass screw) | M8 screw：6.67～8.92N・m |

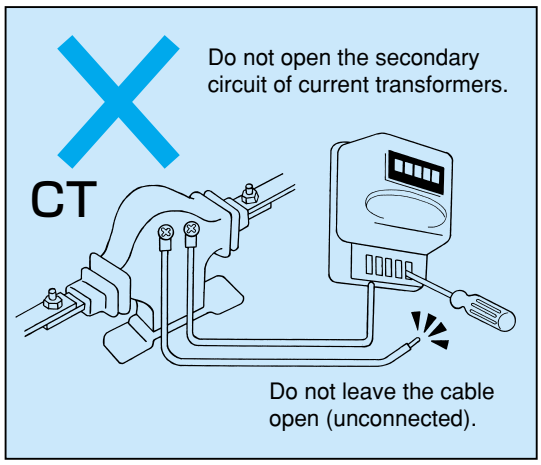
# ⚠ Caution

- ●Tightening screws too tight may damage the terminals.
- ●Tightening screws loosely may cause malfunction or the body to catch on fire.
- ●Do not perform connection work with live wires. This may cause electrical shock, equipment failure, burnout or a fire.
- ●Be certain to check the attachment diagram carefully and then connect wires correctly. Improperly connected wires may cause malfunction, burnout or a fire.
- ●Be certain to use electric cables made of materials and wire diameters suitable for the circuit voltage and rated current.
- ●Be certain to use crimp-type terminals suitable for the cable size. Using inappropriate crimp-type terminals may cause burnout or a fire.
- ●Be certain to connect cables to the primary and secondary terminals so that the terminal areas are not exposed to vibration or impact.

# ⚠ Caution

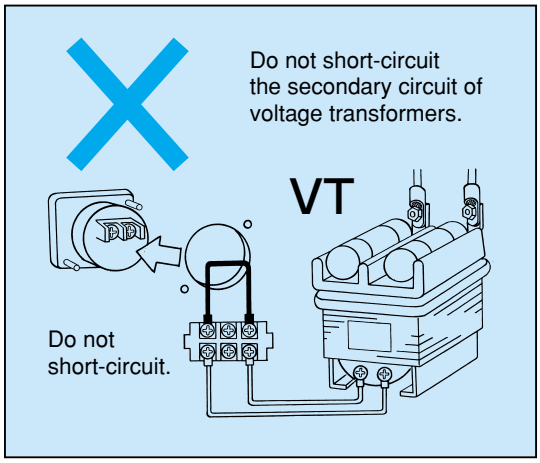
## (1) Do Not Open Circuit on Secondary Side of Current Transformer

Opening the circuit on the secondary side of a current transformer when the primary current is flowing is prohibited. If the circuit on the secondary side is open, the primary current flows but the secondary current does not. Therefore, this induces high voltage on the secondary side, causing the temperature to rise. For this reason, dielectric breakdown occurs in the secondary winding and it could result in burnout.



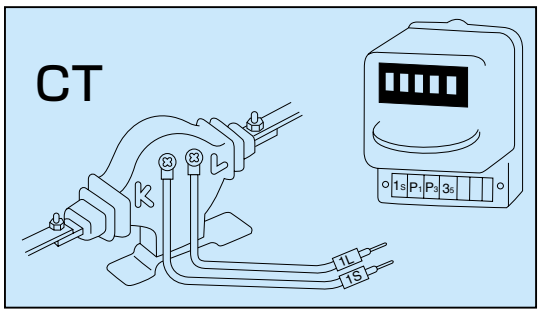

## (2) Do Not Short-circuit Voltage Transformers on the Secondary Side

Short-circuiting voltage transformers on the secondary side or short-circuiting them with low impedance is prohibited. If the secondary side of the transformer is short-circuited or short-circuiting occurs due to low impedance, excessive current flows to the secondary winding and the winding will be damaged. Additionally, secondary winding burnout may result in dielectric breakdown of the primary winding, and this could lead to phase-to-phase short-circuiting.



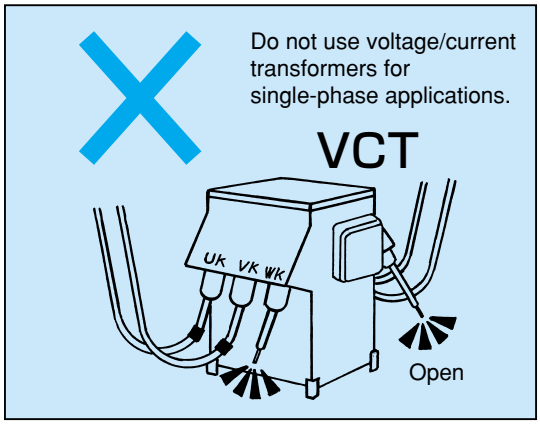

## (3) Prevent Improper Connections

Be careful to make sure wires are connected properly. Improperly connected wiring may lead to faulty measurements and dangerous conditions.
Be certain to carefully check terminal markings when making connections.
For meters associated with power factoring such as voltmeters and watt-hour meters, be certain to pay careful attention to polarity when making connections.




## (4) Do Not Use Voltage/Current Transformers for Single-phase Applications

Using voltage/current transformers (for 3-phase, 3-wire systems) for single-phase applications is prohibited. If you use a voltage/current transformer set to single-phase connected in a three-phase circuit, a wire in the unused phase is open. At this time, series resonance occurs in the voltage transformer caused by the grounding electrostatic capacity in the cable and voltage transformer winding reactance, and excess voltage may be generated. This excess voltage (approximately 1.3～2 times) could lead to burnout.



### (5) Do Not Use Voltage Transformers on the Secondary Side of Inverter Circuits

Since the voltage waveform on the secondary side of the inverter circuit is a square wave (rectangular wave), the secondary output waveform of the voltage transformer becomes pulse-shaped and normal voltage is not output. The magnetic saturation of the core may lead to burnout.

### (6) Do Not Use Voltage Transformers on the Secondary Side of Thyristor Circuits

Every time a thyristor circuit input operation occurs, an excitation current flows to the primary side of the voltage transformer. Heat generated from that current may lead to burnout.

### (7) Grounding

Be certain to ground the secondary sides, frames, and outer case (or core if there is no case) of voltage, current and voltage/current transformers (except for low-voltage units). It is instructed in the technical standards for electrical equipment to ensure grounding to prevent harm to humans caused by mistaken contact on the primary side and to safeguard meters.

●Grounding work for the secondary side wiring of meter transformers

| Type of meter transformer | Grounding work |
|---|---|
| Instrument transformers for extra-high-voltage measurement devices | Class A grounding |
| Instrument transformers for high-voltage measurement devices | Class D grounding |
| Instrument transformers for low-voltage measurement devices | No grounding (For details, refer to Article 13 of the Interpretation of Technical Standards for Electrical Equipment). |

●Grounding work of devices with iron racks or outer cases

(If the transformer or instrument transformers does not have an outer case, the core is applicable.)

| Equipment classification | Grounding work |
|---|---|
| For low-voltage use (less than or equal to 300V) | Class D grounding |
| For low-voltage use (over 300V) | Class C grounding |
| For high-voltage or extra-high-voltage | Class A grounding |

However, some equipment may not comply to the rules in the above table. For details, refer to Article 29 of the Interpretation of Technical Standards for Electrical Equipment.

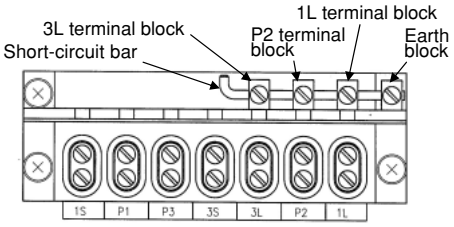
●Be certain to ground the earthed voltage transformer primary ground-side terminal before use.

### (8) Connecting Terminals

Pay careful attention to connect wires to terminals properly, without leaving any open-wire gaps. Otherwise, overheating, measurement error, equipment burnout or a fire may occur. Additionally, improperly attaching the neutral wire in a 1-phase, 3-wire circuit may cause the load side of a device to burnout when 200V is applied.

### (9) Confirm Grounding of the Voltage/Current Transformer Secondary Terminal Box

As the secondary terminals (1L, P2 and 3L) of voltage/current transformers must be grounded, check to confirm that the short-circuit bar described in the following figure is fastened to the 1L, P2 and 3L terminal blocks and the earth block. Otherwise, the 1L, P2 and 3L terminals will not be grounded.




Secondary terminal box

# ⚠ Danger

### ●Do Not Work with Live Wires

Performing connection work when wires are live (i.e., electricity is supplied to the unit) is absolutely prohibited. This could lead to not only electrical shock, electrical burn injury and equipment burnout or a fire, but also loss of human life.

## 4 Preparations before Use

Be certain to carefully review the following items before use. If an abnormality exists, refer to Section 6 Matters Regarding Repairs at Time of Malfunction and Handling Abnormalities.

### (1) Transportation

Carelessness at the time of transportation is a major cause of damage to transformers. Be certain to prevent subjecting the transformer to vibration and jolting as much as possible when moving it.

### (2) Checking transformer upon arrival

Be certain to do the following inspections immediately after arriving at the final destination, and check to ensure that there are no abnormalities.

●Check for cargo damage due to accidents or handling during transportation, including packaging.

●For molded models, check for changes in shape, damage, blemishes, etc.

### (3) Check ratings

Before using the transformer, be certain to check it ratings (e.g., voltage transformation ratio, current transformation ratio, rated load).

## 5 Usage Methods

Be certain to observe the following items when using a transformer.

# ⚠ Caution

### (1) Be certain to use products within the range of ratings specified.

Be certain to use a transformer within the range of ratings specified for that model.
Otherwise, not only measurement error, but also burnout or a fire caused by overheating may occur.
Refer to 4 Selection on page 11 for selecting models.

### (2) Precaution regarding usage period

Each transformer is subjected to a verification process for transactions and authorization during a period of validity, otherwise it is a violation of the Measurement Law (i.e., violation of Article 172 of the Measurement Law is punishable by up to six months in jail, a fine of up to 500,000 yen, or both). The period of validity is shown on the verification plate. Be certain to closely check the period of validity and use the transformer only within that period.
When updating verification due to expiration, special verification where only combination meters are submitted is possible if updating is conducted within 14 years from the first transformer verification test.

### (3) Recommended timing of renewal

Be certain to consider renewing molded transformers (including other dry versions) approximately 15 years after the purchase date. Using a transformer for more than 15 years may cause an accident due to dielectric breakdown.

### (4) Precaution regarding installing transformers as part of other equipment

Due to specification requirements, transformers are not to be installed in (i.e., built into) other equipment. Installing them for use in other equipment, may result in failure due to, for example, the generation of dielectric breakdown.

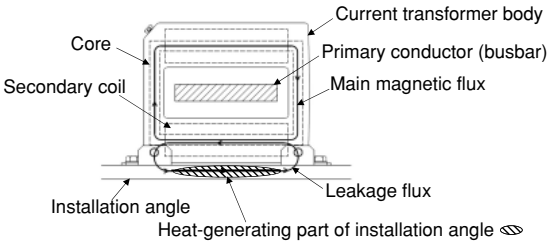
### (5) Using current transformers on the secondary side of inverter circuits

Because of errors due to higher harmonic components and an increase in the excitation current in the low-frequency range, the error becomes large. Therefore, select a rated load ten times larger than the usage load. Consider values in the low-frequency range that are less than or equal to 25Hz as reference values.

### (6) Heat generation when installing square window through-type current transformers horizontally

Target types : CW-40LM 2500/5A～6000/5A,
CW-15LMS 2500/5A～6000/5A

When a target current transformer is installed horizontally, it has been confirmed that the installation angle (if made of iron) generates abnormal heat due to the leakage of magnetic flux in the secondary coil of the transformer (temperature rise: approximately 30K (2500A rated) ～ 70K (6000A rated)). Due to the heat generated, the body temperature of the current transformer becomes approximately 30K, but this is not a problem. The section of the installation angle shown in the following figure generates heat. Be certain to prevent equipment affected by heat from coming in contact with the area surrounding the installation angle that generates heat. Additionally, if the heat generated has an impact on peripheral equipment (e.g., wiring), use an installation angle made of nonmagnetic material that does not permit the passage of magnetic flux. (If the rated primary current is less than or equal to 2000A, or if the current transformer is installed vertically, there is no problem of heat generation in the installation angle.)




### (7) Protecting the peripheral equipment of voltage transformers

If using a voltage transformer in combination with other equipment such as a protective relay, a voltage transformer-related accident due to an overload or lightning surge may cause a power outage.
If using a voltage transformer for equipment to which a power outage may inflict heavy damage, be certain to take measures to protect the system so that any transformer-related accident will not have a critical influence on peripheral meters/equipment.

## 6 Repairs at Time of Malfunction and Handling Abnormalities

If the transformer begins to operate abnormally, ask your electrical facilities manager to contact Mitsubishi Electric System & Service Co., Ltd. or the Mitsubishi Electric branch office in charge.

## 7 Maintenance & Inspections

Be certain to observe the following regarding maintenance and inspections. To ensure safety, maintenance and inspections should only be performed by an experienced electrician such as the chief electrical engineer. For details, refer to 4 Maintenance & Inspection on page 80.

## ⚠ Danger

### (1) Connecting earthing wires

To ensure safety, be certain that earthing wires are connected to the terminals.
If it is assumed that the power has been cut and forget to check whether or not the power supply is turned off, it may lead to electrical shock, electrical burn injury or death. If there is a need to touch the body of a transformer, make sure to check whether or not the transformer is disconnected from the circuit. To do this, use a circuit breaker or switch and then use a detector for the appropriate voltage to ensure that there is no voltage in the circuit.

### (2) Do not touch a transformer when there is a live current

If an electrical current exists when wanting to do maintenance or an inspection, do not touch the transformer body, terminal or other any other component. It could lead to not only electrical shock, electrical burn injury, equipment burnout or a fire, but also death.

## 8 Storage

If there is a need to a store a transformer for a long period of time, avoid the following places, as it may lead to degradation of insulation and shorten service life.

- ●Places where the ambient temperature is outside the range of -30～60℃
- ●Places where the daily mean temperature exceeds 35℃
- ●Places where the relative humidity is equal to or more than 90%, or places where condensation forms
- ●Places where there is much dust, corrosive gas, salt-laddened wind (high salt content), or oily smoke
- ●Places where vibrations and/or jolting occurs frequently
- ●Places exposed to rain, water drops or sunlight

## ⚠ Danger

### ●Cutting power supply for removal

When removing a transformer in preparation of storage, be certain that the power supply to the circuit to which the transformer is connected is turned off.
(Refer to 7 Section (1)). To ensure safety, removal should only be performed by an experienced electrician such as the chief electrical engineer.
If removal is attempted at the time wires are live, this could lead to not only electrical shock, electrical burn injury, equipment burnout or a fire, but also death.

## 9 Transformer Disposal

Be certain to dispose of transformers treating them as general industrial waste.
For removable installation racks, those that are iron can be recycled.

## 10 Warranty

(1) The duration of the warrantee is one year from the date of purchase or 18 months after manufacturing, whichever comes first. For equipment failures caused by carelessness or negligence of the user, repair services are charged at cost even within the warrantee period.

(2) Mitsubishi Electric shall not be liable for compensation of damage arising from reasons not attributable to Mitsubishi Electric, including loss in opportunities and/or lost profits incurred to users due to the failure of a Mitsubishi Electric product, as well as special damage and/or secondary damage, whether foreseeable or not, accidents, damage to products other than Mitsubishi Electric products, nor other business.

# 3 Model List

## 1. Current Transformers (CT)

| Circuit voltage | Location of use | Use | Overcurrent strength (Times) | Overcurrent constant | Type | | Rated burden (VA) | Current transformation ratio (A) | Accuracy class | Applicable standards | Remarks | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ≤1100V | Indoor | General-use meters | 40 | — | CW Series | CW-5L | 5 | 60～750/5 | 1.0 | JIS C 1731-1 | Cable wiring Round window through-type | 14 |
| | | | | | | | | 60～750/1 | | | | |
| | | | | | | CW-15L | 15 | 100～750/5 | | | | |
| | | | | | | | | 100～750/1 | | | | |
| | | | | | | CW-40L | 40 | 150～750/5 | | | | |
| | | | | | | | | 150～400/1 | | | | |
| | | | | | | CW-5LP | 5 | 1～50/5 | | | Small current Primary winding | 17 |
| | | | | | | | | 1～50/1 | | | | |
| | | | | | | CW-15LP | 15 | 1～50/5 | | | | |
| | | | | | | | | 1～50/1 | | | | |
| | | | | | | CW-40LP | 40 | 1～50/5 | | | | |
| | | | | | | | | 1～50/1 | | | | |
| | | | | | | CW-15LM | 15 | 150～750/5 | | | Busbar wiring Square window through-type | 18 |
| | | | | | | | | 150～750/1 | | | | |
| | | | | | | CW-40LM | 40 | 200～6000/5 | | | | |
| | | | | | | | | 200～2000/1 | | | | |
| | | Dedicated verification class | | | | CW-15LS | 15 | 5～750/5 | | | Cable wiring | 22 |
| | | | | | | CW-15LMS | 15 | 200～6000/5 | | | Busbar wiring | 23 |
| | | | | | | CW-5LS3 | 2×5 | 150～250/5 | | | Busbar/cable wiring | 27 |
| | | | | | | CW-5LMS3 | 2×5 | 250～400/5 | | | | |
| | | Class 1 heat-resistant | | | | CW-5T | 5 | 100～150/5 | | | Cable wiring | 30 |
| | | Class 2 heat-resistant | | | | CW-5L | 5 | 100～400/5 | | | | |
| | | | | | | CW-15LM | 15 | 200～400/5 | | | | |
| | | Relays | | n>10 | | CW-15LM | 15 | 1500～4000/5 | 1PS (JEC Standards) 10P10/1 (IEC Standards) | JEC-1201 -2007 IEC 60044-1 | Busbar wiring | 32 |
| ≤440V | Indoor | General-use meters Separated | 40 | — | | CW-5S | 5 | 300～500/5 | 1.0 | JIS C 1731-1 | Cable wiring Separated | 33 |
| | | | | | | | | 300～500/1 | | | | |
| | | | | | | CW-2SL | 2 | 150～250/1 | | | | |
| | | | | | | CW-5SL | 5 | 300～800/5 | | | | |
| | | | | | | | | 300～800/1 | | | | |
| ≤6600V | Indoor | General-use meters Relays | 40 | n>3 | CD Series | CD-40K | 40 | 5～750/5 | 1.0・1PS | JIS C 1731-1 JEC-1201 -2007 | — | 35 |
| | | | | n>10 | | CD-40NA | 40 | 5～500/5 | | | | 36 |
| | | | | n>10 | | CD-40H | 40 | 600～1000/5 | | | | 38 |
| | | | 40kA | n>10 | | | 40 | 1200～2000/5 | | | | |
| | | | 75 | | | CD-40ENA | 40 | 5～400/5 | | | | 39 |
| | | | 150 | | | CD-40GNA | 40 | 5～200/5 | | | | 40 |
| | | | 300 | | | CD-40LN | 40 | 5～100/5 | | | | 41 |
| | | Dedicated verification class | 40 | — | | CD-15BB | 15 | 5～400/5 | 0.5 | JIS C 1731-1 | | 42 |
| | | General-use meters | 40 | n>5 | EC/ BN Series | EC-0（LA） | 40 | 5～300/5 | 1.0・1PS | JIS C 1731-1 JEC-1201 -2007 | Fully molded | 43 |
| | | Relays | 40～300 | n>10 | | BN-0（LA） | 40 | 10～1500/5 | | | | 44 |
| | | Dedicated verification class | | | | | 15 | 10～1500/5 | 0.5 | JIS C 1731-1 | | |
| | | Cubicle-type high-voltage power receiving equipment | 12.5kA 0.125s. | n>10 | AN/ CN Series | CD-10ANA | 10 | 20～200/5 | 1PS | JIS C 4620 (Appendix) | — | 54 |
| | | | | | | CD-25ANA | 25 | 20～200/5 | | | | |
| | | | | | | CD-40ANA | 40 | 20～200/5 | | | | |
| | | | 12.5kA 0.25s. | | | CD-10CNA | 10 | 20～200/5 | | | | |
| | | | | | | CD-25CNA | 25 | 20～200/5 | | | | |
| | | | | | | CD-40CNA | 40 | 20～200/5 | | | | |
| | | General-use meters Relays | 40kA | n>10 | BS Series | BS-MD | 40 | 200～1500/5 | 1PS | JEC-1201 -1996 | — | 50 |
| | | | | | | | | 300-150～4000-2000/5 | | | | |
| | | | | | | BS-MC | 40 | 400～4000/5 | | | | |
| 11000V | Indoor | General-use meters Relays | 40～150 | n>10 | BN Series | BN-1（LA） | 40 | 10～1500/5 | 1.0・1PS | JIS C 1731-1 JEC-1201 -2007 | Fully molded | 46 |
| | | Dedicated verification class | 40 | | | | 15 | 10～1500/5 | 0.5W | JIS C 1736 | | |
| 22000V | | General-use meters Relays | 40～300 | n>10 | | BN-2A | 40 | 10～1200/5 | 1.0・1PS | JIS C 1731-1 JEC-1201 -2007 | Fully molded | 48 |
| — | Indoor | General-use meters Relays | 40 | n>10 n>20 | BS | BS-SA | 15～100 | 200～2000/5 | 1PS | JEC-1201 -1996 | — | 52 |

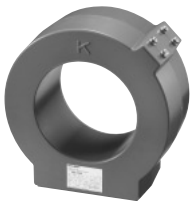
## 2. Voltage Transformers (VT)

| Circuit voltage | Location of use | Use | Type | | Rated burden (VA) | Voltage transformation ratio (V) | Accuracy class | Applicable standards | Remarks | Page |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤440V | Indoor | General-use meters Relays | PE Series | PE-15F (with fuse) | 15 | 220/110<br>440/110 | 1.0・1P | JIS C 1731-2<br>JEC-1201 -2007 | — | 58 |
| | | | | PE-15 | | | | | | |
| | | | | PE-50F (with fuse) | 50 | | 3.0・3P | | | |
| | | | | PE-50 | | | | | | |
| ≤6600V | Indoor | General-use meters Relays | PD Series | PD-50H | 50 | 220/110，440/110 | 1.0・1P | JIS C1731-2<br>JEC-1201 -2007 | — | 60 |
| | | | | PD-50HF (with fuse) | | 220/110，440/110<br>3300/110，6600/110 | | | | |
| | | | | PD-100H | 100 | 220/110，440/110 | | | | |
| | | | | PD-100HF (with fuse) | | 220/110，440/110<br>3300/110，6600/110 | | | | |
| | | | | PD-200K | 200 | 440/110 | | | | 62 |
| | | | | PD-200KFH (with fuse) | | 440/110<br>3300/110，6600/110 | | | | |
| | | | | PD-50KFH (with fuse) | 50 | 6600-3300/110 | | | | 63 |
| | | | | PD-100KFH (with fuse) | 100 | | 3.0・3P | | | |
| | | Dedicated verification class | | PD-15KFH (with fuse) | 15 | 3300/110<br>6600/110 | 0.5 | JIS C 1731-2 | | 64 |
| | | | | PD-25KFH (with fuse) | 25 | | | | | |
| | | | | PD-100KFH (with fuse) | 100 | | 1.0・1P | JIS C 1731-2<br>JEC-1201 -2007 | | |
| | | General-use meters Relays | EP | EP-0FH (with fuse) | 50 | 3300/110 | 1.0・1P | JIS C 1731-2<br>JEC-1201 -2007 | Fully molded | 65 |
| | | | | | 100 | 6600/110 | | | | |
| | | | | | 50 | 6600-3300/110 | | | | |
| 11000V | Indoor | General-use meters Relays | EV Series | EV-1 | 100 | 11000/110 | 1.0・1P | JIS C 1731-2<br>JEC-1201 -2007 | — | 66 |
| | | | | | 200 | | | | | |
| | | Dedicated verification class | | | 15 | | 0.5W | JIS C 1736 | | |
| | | | | | 25 | | | | | |
| 22000V | | General-use meters Relays | | EV-2 | 100 | 22000/110 | 1.0・1P | JIS C 1731-2<br>JEC-1201 -2007 | | |
| | | | | | 200 | | | | | |
| 33000V | | | | EV-3 | 100 | 33000/110 | | | | |
| | | | | | 200 | | | | | |

## 3. Earthed Voltage Transformers (EVT)

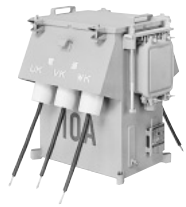
| Circuit voltage | Location of use | Use | Type | | Rated burden (VA) | Voltage transformation ratio (V) | Accuracy class | Applicable standards | Remarks | Page |
|---|---|---|---|---|---|---|---|---|---|---|
| ≤440V | Indoor | General-use meters Relays | EV EF Series | EV-L | 50 | $\frac{220}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ , $\frac{440}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ | 1P | JEC-1201 -2007 | — | 67 |
| | | | | | 100 | | | | | |
| | | | | EV-LX | 50/50 | $\frac{220}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{190}{3}\left(\frac{110}{3}\right)$ | 1P/3G | | | |
| | | | | | 100/100 | $\frac{440}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{190}{3}\left(\frac{110}{3}\right)$ | | | | |
| ≤6600V | Indoor | General-use meters Relays | | EF-0FC (with fuse) | 100 | $\frac{3300}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ , $\frac{6600}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ | 1P | JEC-1201 -2007 | — | 68 |
| | | | | | 200 | | | | | |
| | | | | EF-0XFC (with fuse) | 100/100 | $\frac{3300}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{190}{3}\left(\frac{110}{3}\right)$ | 1P/3G | | | |
| | | | | | 200/200 | $\frac{6600}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{190}{3}\left(\frac{110}{3}\right)$ | | | | |
| | | | | EF-03XFC (with fuse) For 3-phase | 3×100/ 3×100 | $3300/110/\frac{190}{3}\left(\frac{110}{3}\right)$ | | | | |
| | | | | | 3×200/ 3×200 | $6600/110/\frac{190}{3}\left(\frac{110}{3}\right)$ | | | | |
| 11000V | Indoor | General-use meters Relays | | EV-1 | 100 | $\frac{11000}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ | 1P | JEC-1201 -2007 | — | 69 |
| | | | | | 200 | | | | | |
| | | | | EV-1X | 100/100 | $\frac{11000}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{110}{3}\left(\frac{190}{3}\right)$ | 1P/3G | | | |
| | | | | | 200/200 | | | | | |
| 22000V | | | | EV-2 | 100 | $\frac{22000}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ | 1P | | | |
| | | | | | 200 | | | | | |
| | | | | EV-2X | 100/100 | $\frac{22000}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{110}{3}\left(\frac{190}{3}\right)$ | 1P/3G | | | |
| | | | | | 200/200 | | | | | |
| 33000V | | | | EV-3 | 100 | $\frac{33000}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ | 1P | | | |
| | | | | | 200 | | | | | |
| | | | | EV-3X | 100/100 | $\frac{33000}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{110}{3}\left(\frac{190}{3}\right)$ | 1P/3G | | | |
| | | | | | 200/200 | | | | | |

## 4. Zero-phase Current Transformers (ZCT)



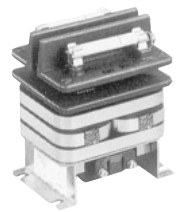
| Circuit voltage | Location of use | Use | | Type | | Window diameter (mm) | Rated primary current (A) | Applicable standards | Page |
|---|---|---|---|---|---|---|---|---|---|
| ≤22000V | Indoor | Ground relays | Through-type | BZ Series | BZ-60A | 60 | 300 | JEC-1201-2007 | 70 |
| | | | | | BZ-90A | 90 | 600 | | |
| | | | | | BZ-110A | 110 | 1000 | | |
| | | | | | BZ-170A | 170 | 1200 | | |
| | | | Separated | | BZ-120SA | 120 | 1000 | | 71 |

## 5. Voltage/Current Transformers (VCT)



| Circuit voltage | Location of use | Use | Overcurrent strength (Times) | Type | Rating | | | | Page |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Voltage Transformer | | Current Transformer | | |
| | | | | | Voltage transformation ratio (V) | Load (VA) | Current transformation ratio (A) | Load (VA) | |
| ≤6600V | Outdoor | Electric power supply and demand | 40 | PO-2HB | 3300/110<br>6600/110 | 2×15 | 10～400/5 | 2×15 | 72 |
| | | | 150 | PO-6HB | 6600/110 | 2×15 | 20、50/5 | 2×15 | |

## 6. Transformer for control circuits



| Circuit voltage | Location of use | Use | Type | Capacity (VA) | Voltage transformation ratio (V) | Applicable standards | Page |
|---|---|---|---|---|---|---|---|
| ≤6600V | Indoor | Operation of high-voltage circuit breakers | EMT-K (with fuse) | 300 | 3300/110 | JEC-2200 | 73 |
| | | | EMT-BB (with fuse) | 600 | 6600/110 | | |

## ■Type Composition

### Current Transformer

CW - 40 LM

- Type symbol (Series)
  - CW……Low-voltage current transformer
  - CD……High-voltage current transformer
  - EC……High-voltage current transformer
  - BN……High-voltage and extra-high-voltage current transformers
  - BS……Through-type current transformer
- Rated burden (CW and CD type)
  - 5……5VA 25……25VA
  - 10……10VA 40……40VA
  - 15……15VA 100……100VA
- Circuit voltage (EC and BN type)
  - 0……≤6600V
  - 1……11000V
  - 2……22000V
- Use/Structure

| Series | Symbol | Use/Structure |
|---|---|---|
| CW Series | L | Round window through-type |
| | LP | Primary winding |
| | LM | Square window through-type |
| | LS,LMS | Dedicated verification class |
| | T | Class 1 heat-resistant |
| | S, SL | Separated |
| CD Series | ANA | Cubicle-type high-voltage power receiving equipment |
| | CNA | |
| | K,NA | Overcurrent strength 40Times |
| | H | Overcurrent intensity 600～1000A: 40x 1200～2000A: 40kA |
| | ENA | Overcurrent strength 75Times |
| | GNA | Overcurrent strength 150Times |
| | LN | Overcurrent strength 300Times |
| | BB | Dedicated verification |
| BS Series | MD,MC | Round window through-type |
| | SA | Separated |

### Voltage Transformers/Earthed Voltage Transformers

PD - 50 HF

- Type symbol (Series)
  - PE……Low-voltage transformer
  - PD……Medium voltage transformer
  - EP……High-voltage transformer
  - EF……Earthed high-voltage transformer
  - EV……Extra-high-voltage transformer Earthed voltage transformer
- Rated burden (PE and PD type)
  - 15……15VA 100……100VA
  - 25……25VA 200……200VA
  - 50……50VA
- Circuit voltage (EP, EF and EV type)
  - L……Low-voltage 2……22000V
  - 0……High-voltage 3……33000V
  - 1……11000V
- Use

| Series | Symbol | Use/Structure |
|---|---|---|
| PE, PD and EF Series | F | with current-limiting fuse |
| | HF,KFH | |
| | X | Including tertiary winding |

### Zero-phase Current Transformers

BZ - 110 A

- Type symbol BZ…Zero-phase current transformer
- Window diameter 60…60mm 90…90mm 110…110mm 120…120mm 170…170mm
- Use/Structure A…Through-type SA…Separated

### Voltage/Current Transformers

PO - 2HB

- Type symbol PO…Voltage/Current transformer (outdoor)
- Overcurrent intensity 2HB…Overcurrent strength 40Times 6HB…Overcurrent strength 150Times

# 4 Selection

In order to configure an economic and reliable measurement/protection system, when selecting a model, be certain to thoroughly review the items listed below while considering the circuit conditions that apply, type of use and ambient conditions.

## 1. Guidelines for Selecting Current Transformers

<table>
<tr><th colspan="2">Item</th><th>Selection guidelines</th></tr>
<tr><td>1</td><td>Use</td><td>General meters, relays, verification devices, and cubicle-type high-voltage power receiving equipment.</td></tr>
<tr><td>2</td><td>Rated primary current</td><td>Generally, approximately 1.5-times the load current selected from values specified in JIS or JEC standards.</td></tr>
<tr><td>3</td><td>Rated secondary current</td><td>The standard value is 5A. For remote measurements, using 1A leads to the mitigation of CT load and lower wiring costs. However, 1A applies only to the low-voltage CW Series current transformers.</td></tr>
<tr><td>4</td><td>Highest voltage/ withstand voltage</td><td>Select a value for the insulation coordination of circuit voltage and system circuitry.<br>Mitsubishi Electric regards the contents of the table at the right as standard.<br>In-house standard withstand voltage values<br><table><tr><td>Highest voltage (kV)</td><td>0.46</td><td>1.15</td><td>3.45</td><td>6.9</td><td>11.5</td><td>23</td></tr><tr><td>Withstand voltage</td><td>3/—</td><td>4/—</td><td colspan="2">22/60</td><td>28/90</td><td>50/125</td></tr></table>* Withstand voltage indicates commercial frequency withstand voltage/lightning impulse withstand voltage.</td></tr>
<tr><td>5</td><td>Accuracy class</td><td>Select a class according to the accuracy required for usage and meter and relay connected.<br><table><tr><td rowspan="2">Use</td><td colspan="2">Accuracy (Class)</td></tr><tr><td>JIS C 1731-1</td><td>JEC-1201-2007</td></tr><tr><td>Precision meters</td><td>0.5</td><td>—</td></tr><tr><td>General-use meters/relays</td><td>1.0(*1P, 1PS)</td><td>1P, 1PS</td></tr><tr><td>Distribution boards/relays</td><td>3.0</td><td>3P, 3PS</td></tr></table>* Standard specified in JIS C 4620 Appendix - Current Transformers Used for Cubicle-type High-voltage Power Receiving Equipment.</td></tr>
<tr><td>6</td><td>Verification (Y/N)</td><td>If a current transformer is used for electricity transactions, verification is required.<br>Select a type dedicated to verification or a model that is listed as "Verification enabled" in the specifications list.<br>For voltage transformer combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.</td></tr>
<tr><td>7</td><td>Rated burden</td><td>*1 Rated load must be more than the total combined load VA of the meter, relay and wires that are connected to the current transformer.</td></tr>
<tr><td>8</td><td>Overcurrent strength (rated overcurrent)</td><td>Select a current transformer with a short-circuit current in the distribution system.<br>Be certain to use the AN or CN series for cubicle-type high-voltage power receiving equipment.<br>For the withstand current of each model, refer to 8.1 Current Transformer Characteristics on pages 77-79.</td></tr>
<tr><td>9</td><td>Overcurrent constant</td><td>If using a current transformer for general-use meters, the constant is not required.<br>The constant is required if you use a current transformer for relays. Select a current transformer that has an overcurrent constant that can be coordinated with a relay.<br>Calculate the overcurrent constant (n') at the usage load using the following formula. When the usage load is reduced, the overcurrent constant at the usage load becomes larger than the rated overcurrent constant.<br>$n' = \text{Overcurrent constant n (Rated value or Performance value)} \times \frac{\text{Rated load of current transformer + Secondary leakage VA}}{\text{Usage load + Secondary leakage VA}}$<br>For secondary VA, refer to 8.1 Current Transformer Characteristics on pages 77-79.</td></tr>
<tr><td>10</td><td>Use environment</td><td>For special environments of high-temperature/humidity (anti-fungus/moisture-proof treatment), corrosive gas (corrosion-resistant), high altitudes, pollution/humidity, high temperatures or cool temperatures, refer to 6.1 Special Environments on page 74.</td></tr>
</table>

Note: *1 For load VA values of connection wires, refer to the following values.

### Connection wire load (VA)

| Lead-wire nominal cross-sectional area ($mm^2$) | Wire length (m) | | |
|---|---|---|---|
| | 5 | 10 | 15 |
| 2.0 | 1.16 | 2.31 | 3.47 |
| 3.5 | 0.65 | 1.30 | 1.95 |
| 5.5 | 0.42 | 0.83 | 1.25 |

### Conductor resistance of connection wires

| Wire nominal cross-sectional area ($mm^2$) | Conductor resistance (Ω/km) |
|---|---|
| 2.0 | 9.24 |
| 3.5 | 5.20 |
| 5.5 | 3.33 |
| 8.0 | 2.31 |

Remarks

1) Wiring is 600V vinyl-insulated wire (IV wire).

2) Load value of each wire is the value at an ambient temperature of 20℃ and rated current of 5A.

3) The wire length is the total length of the secondary circuit, and the load value is the value for the total length.

4) If the wire length is longer than 15m, calculate the value using the following formula.

Example: If the wire length round-trip is 100m ($2.0mm^2$):

$$VA = I^2R \cdots\cdots 5A^2 \times \text{Conductor resistance per 1km (upper-right table)} \times \frac{100m}{1000m} = 23.1VA$$

## 2. Guidelines for Selecting Voltage Transformers

<table>
<tr><th colspan="2">Item</th><th>Selection guidelines</th></tr>
<tr><td>1</td><td>Use</td><td>General-use meters, relays and verification devices.</td></tr>
<tr><td>2</td><td>Rated voltage</td><td>Determine the voltage according to the circuit voltage.<br>For grounded circuits, select from Earthed Voltage Transformers (EVT).</td></tr>
<tr><td>3</td><td>Withstand voltage</td><td>Select a value for the insulation coordination of circuit voltage and system circuit.<br>Select a value according to Mitsubishi Electric's standard withstand voltage values.<br>Mitsubishi Electric regards the contents of the table to the right as standard.<br>Notes:<br>*1 The withstand voltage of the voltage transformer indicates commercial frequency withstand voltage value/lightning impulse withstand voltage value.<br>The withstand voltage of earthed voltage transformers indicates commercial frequency<br>withstand voltage value/lightning impulse withstand voltage value.<br>*2 EP/0FH VTs have the value of 22/60kV, even though these are for 3.3kV.<br><br>Mitsubishi Electric's standard withstand voltage values<br><table><tr><th colspan="2">Circuit voltage (kV)</th><th>0.44</th><th>3.3</th><th>6.6</th><th>11</th><th>22</th><th>33</th></tr><tr><td rowspan="2">Withstand voltage (kV)</td><td>Voltage transformer</td><td>3/—</td><td>16/45</td><td>22/60</td><td>28/90</td><td>50/125</td><td>70/170</td></tr><tr><td>Earthed voltage transformer</td><td>0.88/—</td><td>6.6/45</td><td>13.2/60</td><td>22/90</td><td>44/125</td><td>66/170</td></tr></table><br>Withstand voltage value for special transformation ratios<br><table><tr><th>Primary voltage (V)</th><th>Withstand voltage (kV)</th></tr><tr><td>≤220</td><td>2／—</td></tr><tr><td>221～440</td><td>3／—</td></tr><tr><td>441～1100</td><td>4／—</td></tr><tr><td>1101～2999</td><td>16／—</td></tr><tr><td>3000～3999</td><td>16／45</td></tr><tr><td>4000～5999</td><td>22／45</td></tr><tr><td>6000～6600</td><td>22／60</td></tr></table></td></tr>
<tr><td>4</td><td>Accuracy class</td><td>Select the class according to the accuracy required for usage, and meter and relay connected.<br><table><tr><th rowspan="2">Use</th><th colspan="2">Accuracy class</th></tr><tr><th>JIS C 1731-2</th><th>JEC-1201-2007</th></tr><tr><td>Precision meters</td><td>0.5</td><td>—</td></tr><tr><td>General-use meters/relays</td><td>1.0</td><td>1P</td></tr><tr><td>Distribution board/relays</td><td>3.0</td><td>3P</td></tr><tr><td>Earthed voltage transformers (EVT)</td><td>—</td><td>3G</td></tr></table></td></tr>
<tr><td>5</td><td>Verification (Yes/No)</td><td>If a current transformer is used for electricity transactions, verification is required.<br>Select a type dedicated to verification or a model that is listed as "Verification enabled" in the specifications list.<br>For voltage transformer combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.</td></tr>
<tr><td>6</td><td>Rated burden</td><td>The rated load must be more than the total combined load VA of the meter, relay and wires that are connected to the current transformer.<br>However, when combining a voltage transformer and electronic meter that has a lower load, use a voltage transformer with a rated load of less than or equal to 50VA.<br>The rated load is out of range of the guaranteed voltage transformer loads, but there is no problem with error characteristics.</td></tr>
<tr><td>7</td><td>Limit output</td><td>If using a voltage transformer for testing or as a control source, rising temperature becomes more problematic than the error characteristics.<br>Limiting load means the load where the rise in temperature reaches the full limit specified in the standard.<br>For the limiting load of each voltage transformer and its error, see 8.2 Voltage Transformer Characteristics on page 79.</td></tr>
<tr><td>8</td><td>Selection of primary side fuse-equipped voltage transformers</td><td>The primary-side fuse of voltage transformers cuts off the voltage transformer circuit at the time of an accident before dielectric breakdown of the transformer occurs, leading to short-circuiting of the main circuit and minimizing the accident instead of protecting the transformer itself. Select a voltage transformer model equipped with a fuse on the primary side.<br>Mitsubishi Electric voltage transformers for measuring equipment use the following fuses.<br><table><tr><th>Circuit voltage</th><th>Type</th><th>Rating</th><th>Size</th></tr><tr><td>≤440V</td><td>PL-G</td><td>0.6kV T2A 100kA</td><td>φ15×107ℓ</td></tr><tr><td>3300V</td><td rowspan="2">PL-G</td><td rowspan="2">7.2/3.6kV T1A 40kA</td><td rowspan="2">φ15×107ℓ</td></tr><tr><td>6600V</td></tr></table><br>Voltage transformers for 11-33kV measuring equipment are not equipped with fuses; therefore, the following fuses can be used by mounting separately.<br><table><tr><th>Circuit voltage</th><th>Type</th><th>Rating</th><th>Size</th></tr><tr><td>11000V</td><td>PL-J</td><td>12kV T1A 40kA</td><td>φ50×260ℓ</td></tr><tr><td>22000V</td><td>PL-J</td><td>24kV T1A 40kA</td><td>φ50×325ℓ</td></tr><tr><td>33000V</td><td>PL-J</td><td>36kV T1A 25kA</td><td>φ50×445ℓ</td></tr></table></td></tr>
<tr><td>9</td><td>Use environment</td><td>For special environments of high-temperature/humidity (anti-fungus/moisture-proof treatment), corrosive gas (corrosion-resistant), high altitudes, pollution/humidity, high temperatures or cool temperatures, refer to 6.1 Special Environments on page 74.</td></tr>
</table>

Remark: Additionally, select an earthed voltage transformer model according to the same guidelines as the above table.

## 3. Watt-hour Meters Combined with Verification

When using voltage transformers in combination with watt-hour meters for electricity transactions, since the Measurements Law specifies the characteristics of voltage transformers and current transformers for watt-hour meters, verification must be performed. For verification transformers, select a type that is dedicated to verification or a model that is listed as “Verification enabled” in the specifications list. Be certain to refer to the following items when select the appropriate model.

### (1)Accuracy class of transformer

Select the accuracy class of the transformer according to the contract maximum electricity demand and type of watt-hour meters described in the following table.

Accuracy class of transformer to be combined

| Contract maximum electricity demand (based on criterion of the Ministry of International Trade and Industry) | Watt-hour meter | Accuracy class | |
|---|---|---|---|
| | | JIS C 1731-1(CT) JIS C 1731-2(VT) | JIS C 1736 |
| Electric light household demand or less than 500kW | Class 2 Watt-hour meter | 1.0 | 1.0W |
| ≥500kW | Class 1 Watt-hour meter, var-hour meter | 0.5 | 0.5W |
| ≥10000kW | Class 0.5 S meter | — | 0.3W |

Remark: The use of Class W power supply meters for meter transformers is stipulated in the JIS Standards of 1969, but verification can be performed even if meters are a class other than Class W (e.g., Class 1.0) under the current Measurements Law, independent of JIS.

### (2)Models Capable of Combining Watt-hour Meters and Verification

●This table lists the voltage transformers and current transformers that can be verified in combination with watt-hour meters.

●The use load of each voltage transformer and current transformer (total load VA for watt-hour meters and other devices connected to the transformer) must be within a use load VA range capable of being verified, as listed in the following table.

| Watt-hour meter class | Circuit voltage | VT / CT Type | | Current transformation ratio (A) | Verifiable use load (VA) Current transformers only | PE-15 PE-15F | | PD-50H PD-50HF | PD-50HF | EP-0FH (Rated load 50 VA only) | PD-100KFH Dedicated verification class | PD-15KFH | PD-25KFH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Voltage transformation ratio (V) | 220/110 440/110 | | 220/110 440/110 | 3300/110 6600/110 | 3300/110 6600/110 | 3300/110 6600/110 | 3300/110 6600/110 | 3300/110 6600/110 |
| | | | | | | 1～5 | 6～12 | 3～30 | 1～30 | | * 20-80 | 3～12 | 10～20 |
| Class 2 meter | ≤1100V | CW-5LS3 | 150/5, 200/5, 250/5 | 1～5 | ◎ | ◎ | ○ | — | — | — | — | — | — |
| | | CW-5LMS3 | 250/5, 300/5, 400/5 | 1～5 | ◎ | ◎ | ○ | — | — | — | — | — | — |
| | | CW-15LS | 5/5～750/5 | 2～10 | ◎ | ◎ | | ◎ | — | — | — | — | — |
| | | CW-15LMS | 200/5～4000/5 | 2～10 | ◎ | ◎ | | ◎ | — | — | — | — | — |
| | | CW-15LMS | 5000/5～6000/5 | 2～10 | ○ | ○ | | ○ | — | — | — | — | — |
| | ≤6600V | CD-40K | 5/5～750/5 | 2～30 | — | — | | — | ◎ | — | ○ | — | — |
| | | | 250/5,500/5 | 2～30 | — | — | | — | ○ | — | ○ | — | — |
| | | CD-40NA | 5/5～500/5 | 2～30 | — | — | | — | ◎ | — | ○ | — | — |
| | | CD-40H | 600/5～2000/5 | 2～30 | — | — | | — | ◎ | — | ○ | — | — |
| | | CD-40ENA | 5/5～400/5 | 2～30 | — | — | | — | ◎ | — | ○ | — | — |
| | | CD-40GNA | 5/5～200/5 | 4～30 | — | — | | — | ◎ | — | ○ | — | — |
| | | CD-40LN | 5/5～100/5 | 4～30 | — | — | | — | ○ | — | ○ | — | — |
| | | EC-0（LA） | 5/5～300/5 | 2～30 | — | — | | — | ○ | ◎ | ○ | — | — |
| | | BN-0（LA） | 10/5～1500/5 | 4～30 | — | — | | — | ○ | ○ | ○ | — | — |
| Class 1 meter | ≤6600V | CD-15BB | 5/5～400/5 | 4～10 | — | — | | — | — | — | — | ○ | ○ |
| | | BN-0（LA） | 10/5～1500/5 | 4～10 | — | — | | — | — | — | — | ○ | ○ |

Note: * For PD-100KFH, product specifications are determined according to the meter load and power factor, as well as the characteristics of the current transformer and watt-hour meters combined. Be certain to notify Mitsubishi Electric of the specifications for combined CTs and the use loads of voltage transformers and current transformers.

Symbol legend

◎ : Standard product: Standard-specification products can be used without change.

○ : Semi-standard product: Voltage transformers and current transformers must be manufactured for verification. Be certain to specify “For verification” or “With verification”.

# 5-1 Current transformers

## CW Series Low-voltage Current Transformers (less than or equal to 1100V)

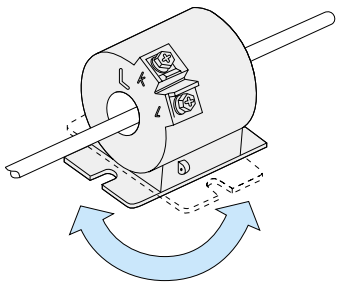
### CW-5L/CW-15L/CW-40L

**Cable wiring/Round window through-type**

## ■Use

●General-use meters

## ■Features



●The direction of the mounting plate can be turned 90° .

●600V vinyl wiring can be used for the primary conductor.

●Secondary terminal insulation cap (page 34) is available as an option.

## ■Specifications

Applicable standard: JIS C 1731-1

| Type | Rated primary current (A) Secondary current 5A | Rated primary current (A) Secondary current 1A | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Delivery /5A | Delivery /1A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-5L | 60 | 60 | 5 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 5 | 1.9 | ◎ | △ |
| | 75 | 75 | | | | | | | | | |
| | 100 | 100 | | | | | | Fig. 1 | 0.6 | ◎ | ◎ |
| | 120 | 120 | | | | | | | | | |
| | 150 | 150 | | | | | | | | | |
| | 160 | 160 | | | | | | | | ○ | ○ |
| | 180 | 180 | | | | | | | | | |
| | 200 | 200 | | | | | | | | ◎ | ◎ |
| | 240 | 240 | | | | | | Fig. 2 | 0.5 | ○ | ○ |
| | 250 | 250 | | | | | | | | ◎ | ◎ |
| | 300 | 300 | | | | | | | | | |
| | 400 | 400 | | | | | | | | | ○ |
| | 500 | 500 | | | | | | Fig. 3 | 0.5 | | △ |
| | 600 | 600 | | | | | | | | | |
| | 750 | 750 | | | | | | | 0.6 | | |
| CW-15L | 100 | 100 | 15 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 5 | 2.0 | ◎ | △ |
| | 120 | 120 | | | | | | | | | |
| | 150 | 150 | | | | | | Fig. 4 | 1.0 | ◎ | ◎ |
| | 160 | 160 | | | | | | | | ○ | ○ |
| | 180 | 180 | | | | | | | | | |
| | 200 | 200 | | | | | | | | | ◎ |
| | 240 | 240 | | | | | | Fig. 2 | 0.6 | | ○ |
| | 250 | 250 | | | | | | | | ◎ | ◎ |
| | 300 | 300 | | | | | | | | | |
| | 400 | 400 | | | | | | | | | ○ |
| | 500 | 500 | | | | | | Fig. 3 | 0.8 | | △ |
| | 600 | 600 | | | | | | | | | |
| | 750 | 750 | | | | | | | 0.6 | | |
| CW-40L | 150 | 150 | 40 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 5 | 2.0 | ◎ | ◎ |
| | 160 | 160 | | | | | | | | ○ | ○ |
| | 180 | 180 | | | | | | | | | |
| | 200 | 200 | | | | | | | | | ◎ |
| | 240 | 240 | | | | | | Fig. 6 | 1.2 | | ○ |
| | 250 | 250 | | | | | | | | ◎ | ◎ |
| | 300 | 300 | | | | | | | | | |
| | 400 | 400 | | | | | | | | | ○ |
| | 500 | — | | | | | | Fig. 3 | 0.8 | | — |
| | 600 | — | | | | | | | | | |
| | 750 | — | | | | | | | | | |

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

Notes

*1 If the current transformer is to be used where there is much oily smoke, be certain to specify "oil-resistant product." Mitsubishi Electric manufactures custom-built units.

*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

*3 Product weight may vary due to changes in core characteristics.

## ■Regarding Rated Primary Current (current transformation ratio)

Through-type current transformers can be used for several rated primary currents by changing the through number of the primary conductor, and are therefore flexible and economical. (When ordering, be certain to specify the current transformation ratio □□□/□A, which is the primary conductor through number per one turn).

Example: If the current transformation ratio is 200/5A:

Through number 1 turn …Rated primary current 200A
Through number 2 turns…Rated primary current 100A
Through number 4 turns…Rated primary current 50A

} These circuits can be used with this current transformer.

Refer to page 16 for proper use of through number in the primary conductor, rated primary current (current transformation ratio) and through-type enabled primary conductor size.

## ■External Dimensions

**Fig. 1**

| CW-5L | 100, 120, 150, 160, 180, 200A |
|---|---|

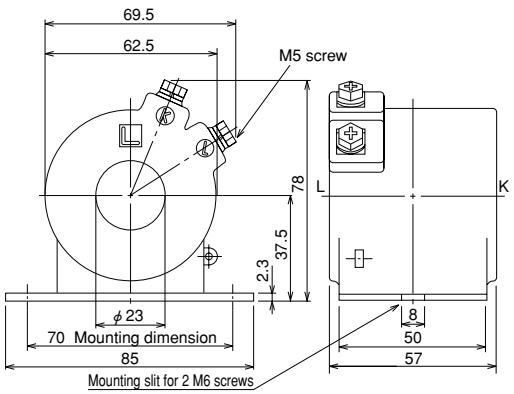



**Fig. 2**

| CW-5L | 240, 250, 300, 400A |
|---|---|
| CW-15L | 240, 250, 300, 400A |

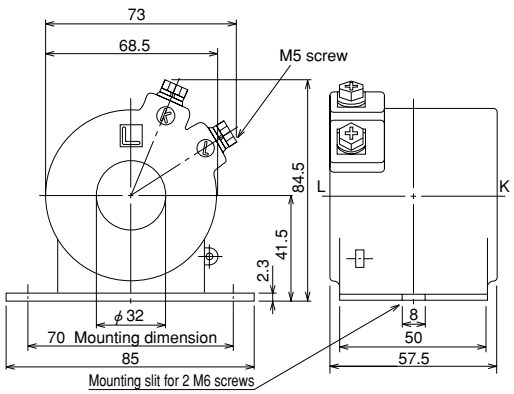



**Fig. 3**

| CW-5L | 500, 600, 750A |
|---|---|
| CW-15L | 500, 600, 750A |
| CW-40L | 500, 600, 750A |

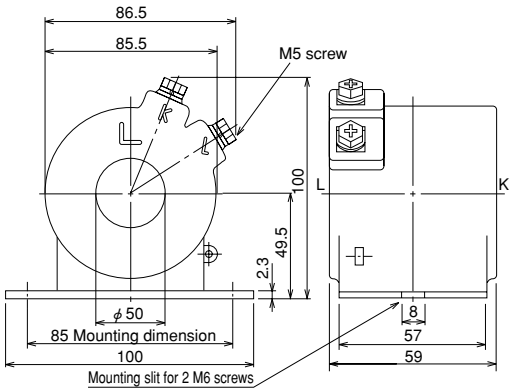



**Fig. 4**

| CW-15L | 150, 160, 180, 200A |
|---|---|

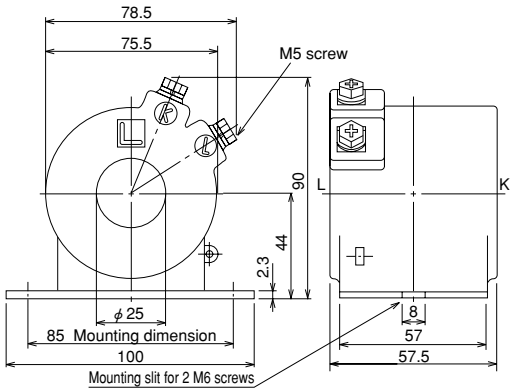



**Fig. 5**

| CW-5L | 60, 75A |
|---|---|
| CW-15L | 100, 120A |
| CW-40L | 150, 160, 180, 200A |

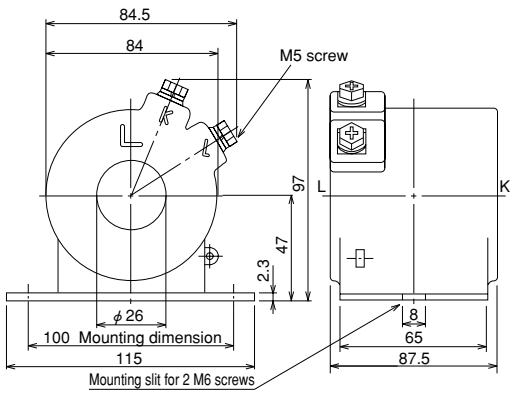
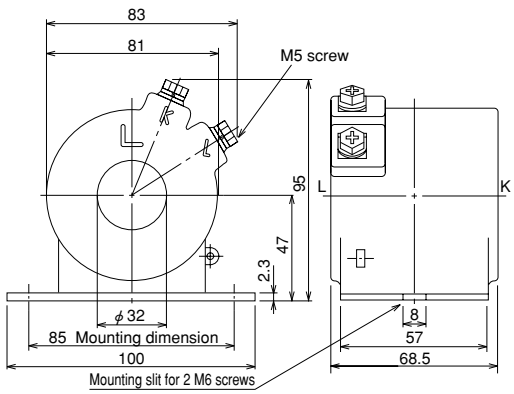



**Fig. 6**

| CW-40L | 240, 250, 300, 400A |
|---|---|



## ■Using Primary Conductor Through Number and Rated Primary Current (current transformation ratio)

The following table specifies rated primary currents, through number in the conductor, and nominal cross-sectional areas of through-enabled 600V vinyl wiring (600V IV wiring) ( $\phi$ indicates a single-wire diameter).
The following table covers the allowable current of 600V vinyl wiring at the ambient temperature of 40℃.

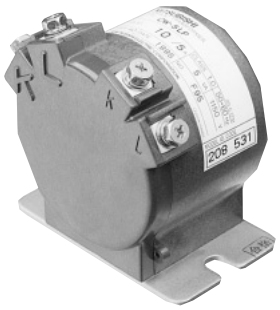
| 5VA CW-5L | | | | 15VA CW-15L | | | | 40VA CW-40L | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated primary current (A) | Primary current (A) | Through No. (turns) | Primary conductor size (mm²) | Rated primary current (A) | Primary current (A) | Through No. (turns) | Primary conductor size (mm²) | Rated primary current (A) | Primary current (A) | Through No. (turns) | Primary conductor size (mm²) |
| 60 | 10 | 6 | 5.5 | 100 | 10 | 10 | 5.5 | 150 | 10 | 15 | 3.5 |
| | 15 | 4 | 14 | | 20 | 5 | 14 | | 15 | 10 | 5.5 |
| | 20 | 3 | 22 | | 25 | 4 | 22 | | 25 | 6 | 14 |
| | 30 | 2 | 22 | | 50 | 2 | 38 | | 30 | 5 | 14 |
| | 60 | 1 | 150 | | 100 | 1 | 200 | | 50 | 3 | 22 |
| 75 | 15 | 5 | 8 | 120 | 15 | 8 | 8 | | 75 | 2 | 38 |
| | 25 | 3 | 22 | | 20 | 6 | 14 | | 150 | 1 | 200 |
| | 75 | 1 | 150 | | 30 | 4 | 22 | 160 | 20 | 8 | 8 |
| 100 | 10 | 10 | $\phi$2 | | 40 | 3 | 22 | | 40 | 4 | 22 |
| | 20 | 5 | 8 | | 60 | 2 | 38 | | 80 | 2 | 38 |
| | 25 | 4 | 14 | | 120 | 1 | 200 | | 160 | 1 | 200 |
| | 50 | 2 | 22 | 150 | 10 | 15 | 3.5 | 180 | 20 | 9 | 5.5 |
| | 100 | 1 | 150 | | 15 | 10 | 5.5 | | 30 | 6 | 14 |
| 120 | 15 | 8 | 5.5 | | 25 | 6 | 8 | | 60 | 3 | 22 |
| | 20 | 6 | 8 | | 30 | 5 | 14 | | 90 | 2 | 38 |
| | 30 | 4 | 14 | | 50 | 3 | 22 | | 180 | 1 | 200 |
| | 40 | 3 | 22 | | 75 | 2 | 38 | 200 | 25 | 8 | 8 |
| | 60 | 2 | 22 | | 150 | 1 | 200 | | 40 | 5 | 14 |
| | 120 | 1 | 150 | 160 | 20 | 8 | 8 | | 50 | 4 | 22 |
| 150 | 15 | 10 | $\phi$2 | | 40 | 4 | 22 | | 100 | 2 | 38 |
| | 25 | 6 | 8 | | 80 | 2 | 38 | | 200 | 1 | 200 |
| | 30 | 5 | 8 | | 160 | 1 | 200 | 240 | 40 | 6 | 14 |
| | 50 | 3 | 22 | 180 | 20 | 9 | 5.5 | | 60 | 4 | 22 |
| | 75 | 2 | 22 | | 30 | 6 | 8 | | 80 | 3 | 38 |
| | 150 | 1 | 150 | | 60 | 3 | 22 | | 120 | 2 | 60 |
| 160 | 20 | 8 | 5.5 | | 90 | 2 | 38 | | 240 | 1 | 325 |
| | 40 | 4 | 14 | | 180 | 1 | 200 | 250 | 25 | 10 | 8 |
| | 80 | 2 | 22 | 200 | 20 | 10 | 5.5 | | 50 | 5 | 22 |
| | 160 | 1 | 150 | | 25 | 8 | 8 | | 125 | 2 | 60 |
| 180 | 20 | 9 | $\phi$2 | | 40 | 5 | 14 | | 250 | 1 | 325 |
| | 30 | 6 | 8 | | 50 | 4 | 22 | 300 | 30 | 10 | 8 |
| | 60 | 3 | 22 | | 100 | 2 | 38 | | 50 | 6 | 14 |
| | 180 | 1 | 150 | | 200 | 1 | 200 | | 60 | 5 | 22 |
| 200 | 20 | 10 | $\phi$2 | 240 | 30 | 8 | 8 | | 75 | 4 | 38 |
| | 25 | 8 | 5.5 | | 40 | 6 | 14 | | 100 | 3 | 60 |
| | 40 | 5 | 8 | | 60 | 4 | 38 | | 150 | 2 | 60 |
| | 50 | 4 | 14 | | 80 | 3 | 60 | | 300 | 1 | 325 |
| | 200 | 1 | 150 | | 120 | 2 | 60 | 400 | 40 | 10 | 8 |
| 240 | 40 | 6 | 14 | | 240 | 1 | 325 | | 50 | 8 | 14 |
| | 60 | 4 | 38 | 250 | 25 | 10 | 8 | | 100 | 4 | 38 |
| | 80 | 3 | 60 | | 50 | 5 | 22 | | 400 | 1 | 325 |
| | 120 | 2 | 60 | | 125 | 2 | 60 | 500 | 50 | 10 | 22 |
| | 240 | 1 | 325 | | 250 | 1 | 325 | | 100 | 5 | 60 |
| 250 | 25 | 10 | 8 | 300 | 30 | 10 | 8 | | 125 | 4 | 100 |
| | 50 | 5 | 22 | | 50 | 6 | 14 | | 250 | 2 | 200 |
| | 125 | 2 | 60 | | 60 | 5 | 22 | | 500 | 1 | 500 |
| | 250 | 1 | 325 | | 75 | 4 | 38 | 600 | 60 | 10 | 22 |
| 300 | 30 | 10 | 8 | | 100 | 3 | 60 | | 75 | 8 | 38 |
| | 50 | 6 | 14 | | 150 | 2 | 60 | | 100 | 6 | 60 |
| | 60 | 5 | 22 | | 300 | 1 | 325 | | 150 | 4 | 100 |
| | 75 | 4 | 38 | 400 | 40 | 10 | 8 | | 200 | 3 | 150 |
| | 100 | 3 | 60 | | 50 | 8 | 14 | | 300 | 2 | 200 |
| | 150 | 2 | 60 | | 100 | 4 | 38 | | 600 | 1 | 500 |
| | 300 | 1 | 325 | | 400 | 1 | 325 | 750 | 75 | 10 | 22 |
| 400 | 40 | 10 | 8 | 500 | 50 | 10 | 22 | | 150 | 5 | 60 |
| | 50 | 8 | 14 | | 100 | 5 | 60 | | 750 | 1 | 200 x 2 conductors |
| | 100 | 4 | 38 | | 125 | 4 | 100 | | | | |
| | 400 | 1 | 325 | | 250 | 2 | 200 | | | | |
| 500 | 50 | 10 | 22 | | 500 | 1 | 500 | | | | |
| | 100 | 5 | 60 | 600 | 60 | 10 | 22 | | | | |
| | 125 | 4 | 100 | | 75 | 8 | 38 | | | | |
| | 250 | 2 | 200 | | 100 | 6 | 60 | | | | |
| | 500 | 1 | 500 | | 150 | 4 | 100 | | | | |
| 600 | 60 | 10 | 22 | | 200 | 3 | 150 | | | | |
| | 75 | 8 | 38 | | 300 | 2 | 200 | | | | |
| | 100 | 6 | 60 | | 600 | 1 | 500 | | | | |
| | 150 | 4 | 100 | 750 | 75 | 10 | 22 | | | | |
| | 200 | 3 | 150 | | 150 | 5 | 60 | | | | |
| | 300 | 2 | 200 | | 750 | 1 | 200 x 2 conductors | | | | |
| | 600 | 1 | 500 | | | | | | | | |
| 750 | 75 | 10 | 22 | | | | | | | | |
| | 150 | 5 | 60 | | | | | | | | |
| | 750 | 1 | 200 x 2 conductors | | | | | | | | |

Note: Rated primary current is expressed as primary conductor through numbers per turn.

# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-5LP/CW-15LP/CW40LP

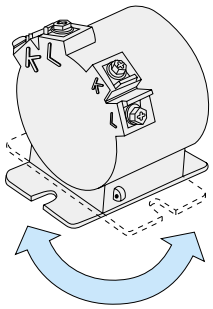
**Small current/Primary winding**



## ■Use

●General-use meters

## ■Features



●The direction of the mounting plate can be turned 90° .

●Secondary terminal insulation cap (page 34) is available as an option.

## ●Self-burden (VA)

| | CW-5LP | CW-15LP | CW-40LP |
|---|---|---|---|
| Self-burden (VA) | 3.5(≤30A)<br>5.0(40,50A) | 5.0 | 6.5 |

## ■Specifications

Applicable standard: J1SC1731-1

| Type | Rated primary current (A) Secondary current 5A | Rated primary current (A) Secondary current 1A | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV) | Frequency (Hz) | Extenal dimensions | Mass (kg) | Delivery /5A | Delivery /1A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-5LP | 1 | 1 | 5 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 1 | 0.7 | ○ | ○ |
| | 2 | 2 | | | | | | | | | |
| | 3 | 3 | | | | | | | | ◎ | ◎ |
| | 5 | 5 | | | | | | | | ◎ | |
| | 7.5 | 7.5 | | | | | | | | ○ | ○ |
| | 10 | 10 | | | | | | | | ◎ | ◎ |
| | 15 | 15 | | | | | | | | | |
| | 20 | 20 | | | | | | | | | |
| | 25 | 25 | | | | | | | | ○ | ○ |
| | 30 | 30 | | | | | | | | ◎ | ◎ |
| | 40 | 40 | | | | | | Fig. 2 | 1.1 | ◎ | ○ |
| | 50 | 50 | | | | | | | | | |
| CW-15LP | 1 | 1 | 15 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 2 | 1.1 | ○ | ○ |
| | 2 | 2 | | | | | | | | | |
| | 3 | 3 | | | | | | | | ◎ | ◎ |
| | 5 | 5 | | | | | | | | ◎ | |
| | 7.5 | 7.5 | | | | | | | | ○ | ○ |
| | 10 | 10 | | | | | | | | ◎ | ◎ |
| | 15 | 15 | | | | | | | | | |
| | 20 | 20 | | | | | | | | | |
| | 25 | 25 | | | | | | | | ○ | ○ |
| | 30 | 30 | | | | | | | | ◎ | ◎ |
| | 40 | 40 | | | | | | | | ◎ | ○ |
| | 50 | 50 | | | | | | | | | |
| CW-40LP | 1 | 1 | 40 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 2 | 1.1 | ○ | ○ |
| | 2 | 2 | | | | | | | | | |
| | 3 | 3 | | | | | | | | ◎ | ◎ |
| | 5 | 5 | | | | | | | | ◎ | |
| | 7.5 | 7.5 | | | | | | | | ○ | ○ |
| | 10 | 10 | | | | | | | | ◎ | ◎ |
| | 15 | 15 | | | | | | | | | |
| | 20 | 20 | | | | | | | | | |
| | 25 | 25 | | | | | | | | ○ | ○ |
| | 30 | 30 | | | | | | | | ◎ | ◎ |
| | 40 | 40 | | | | | | | 1.2 | ◎ | ○ |
| | 50 | 50 | | | | | | | | | |

Notes

*1 If the current transformer is to be used where there is much oily smoke, be certain to specify "oil-resistant product." We manufacture custom-built units.

*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

*3 Product weight may vary due to changes in core characteristics.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 CW-5LP (1～30A)**

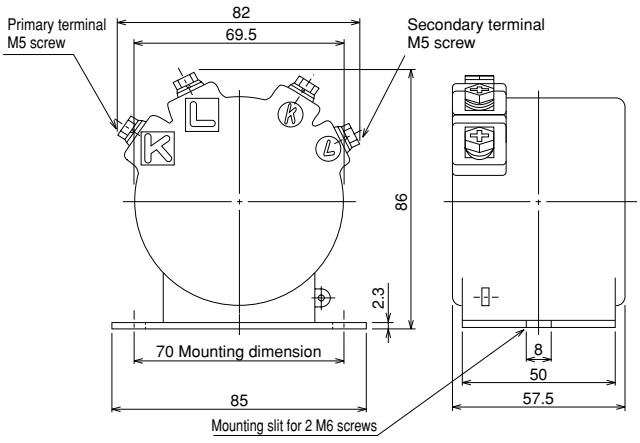
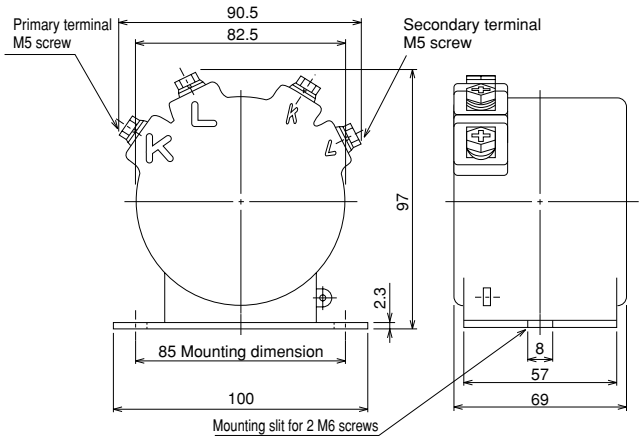



**Fig. 2 CW-5LP (40, 50A), CW-15LP and CW-40LP**



# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-15LM/CW-40LM

**Busbar wiring/Rectangular window through type**


5000/5A
6000/5A

## ■Use

●General-use meters

## ■Features

●These current transformers allow the selection of various installation configurations such as vertical or horizontal mounting, or direct mounting on the busbar.

●Secondary terminal insulation cap (page 34) is available as an option. (less than or equal to 4000/5A)

## ■Specifications

Applicable standard: JISC 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV) | Frequency (Hz) | External dimensions/Mounting dimensions *1 Vertical mount | Horizontal mount | Direct mounting on busbar *2 1 busbar | Direct mounting on busbar *2 2 busbars | Square window dimensions (mm) | Mass (kg) | Delivery /5A | Delivery /1A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-15LM | 150 | 5 or 1 | 15 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 5 | Fig. 6 | — | — | 14×55 | 2.1 | ◎ | △ |
| | 200 | | | | | | | Fig. 1 | Fig. 2 | Fig. 15-1 | — | | 1.1 | | |
| | 250 | | | | | | | | | | | | | | |
| | 300 | | | | | | | | | | | | | | |
| | 400 | | | | | | | Fig. 3 | Fig. 4 | Fig. 15-2 | — | | 0.6 | | |
| | 500 | | | | | | | | | | | | | | |
| | 600 | | | | | | | | | | | | 0.5 | | |
| | 750 | | | | | | | | | | | | | | |
| CW-40LM | 200 | 5 or 1 | 40 | 1.0 | 40 | 1.15/ 4/— | Both 50/60 | Fig. 5 | Fig. 6 | — | — | 14×55 | 2.3 | ◎ | △ |
| | 250 | | | | | | | Fig. 1 | Fig. 2 | Fig. 15-3 | — | | 1.1 | | |
| | 300 | | | | | | | | | | | | | | |
| | 400 | | | | | | | | | | | | | | |
| | 500 | | | | | | | | | | | | | | |
| | 600 | | 40 (double as 15VA) *7 | | | | | Fig. 7 | Fig. 8 | Fig. 15-4 | — | 14×80 | 1.1 | | |
| | 750 | | | | | | | | | | | | | | |
| | 800 | | | | | | | | | | | | 0.9 | | |
| | 1000 | | | | | | | Fig. 9 | Fig. 10 | Fig. 15-5 | Fig. 16 | 28×105 | 1.2 | | |
| | 1200 | | | | | | | | | | | | | | |
| | 1500 | | | | | | | | | | | | 1.1 | | |
| | 2000 | | | | | | | | | | | | 1.2 | | |
| | 2500 | 5 | | | | | | Fig. 11 | Fig. 12 | — | | 48×160 | 4.8 | | — |
| | 3000 | | | | | | | | | | | | | | |
| | 4000 | | | | | | | | | | — | | 6.3 | | |
| | *3 5000 | | | | | | | Fig. 13 | Fig. 14 | — | — | 88×217 | 14 | | |
| | *3 6000 | | | | | | | | | | | | | | |

Notes
*1 Standard products must be mounted vertically.
*2 Busbar direct mounting brackets are sold separately.
When ordering, specify the desired body type and rated primary current.
For rated primary currents of 1000～2000A, also specify the number of busbars.
*3 An epoxy resin mold is used to insulate rated primary currents of 5000A and 6000A.
*4 If the current transformer is to be used where there is much oily smoke, be certain to specify "oil-resistant product." Mitsubishi Electric manufactures custom-built units.
*5 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*6 Product weight may vary due to changes in core characteristics.
*7 Mitsubishi Electric also guarantees the performance for rated loads of 15A.

**Delivery time**

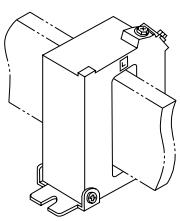
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Mounting Method

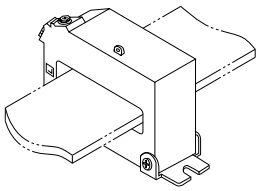
●Vertical or horizontal mounting
These current transformers can be mounted vertically or horizontally, easily changing the direction to fit the board space.

●Direct mounting on busbar
Angles are not necessary, and making holes in busbars is not required. Freely change the mounting position as required.

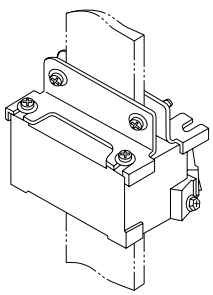
**Vertical mount**



**Horizontal mount**



**Direct mounting on busbar**



# ■External Dimensions

| Vertical mount | Horizontal mount |
|---|---|

## CW-15LM　200～300A・CW-40LM　300～500A

**Fig. 1**

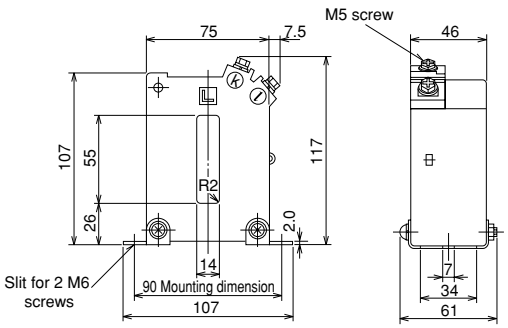
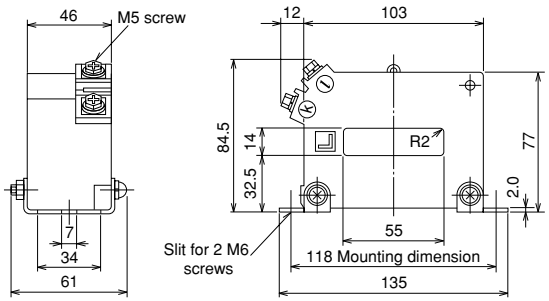



**Fig. 2**




## CW-15LM　400～750A

**Fig. 3**

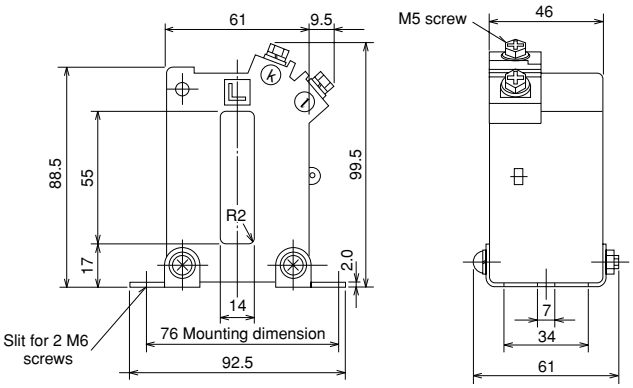
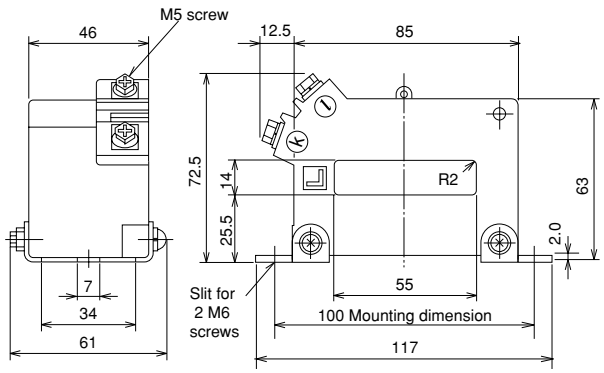



**Fig. 4**




## CW-15LM　150A・CW-40LM　200・250A

**Fig. 5**

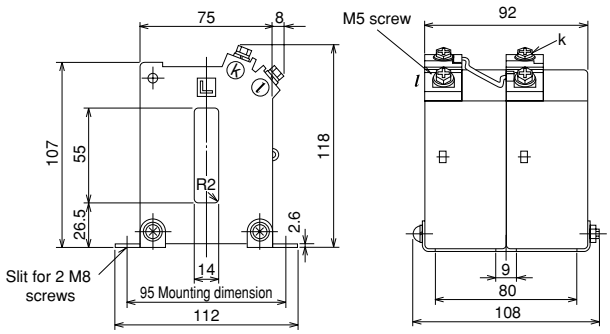
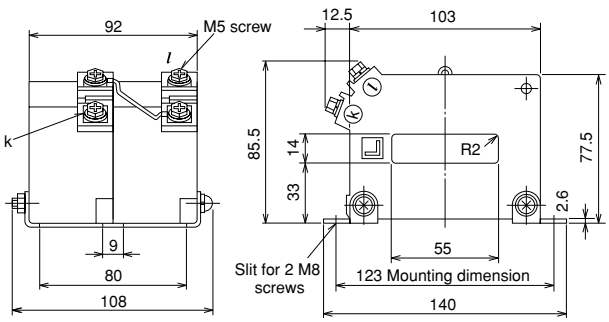



**Fig. 6**



| Vertical mount | Horizontal mount |
|---|---|

## CW-40LM 600～800A

Fig. 7

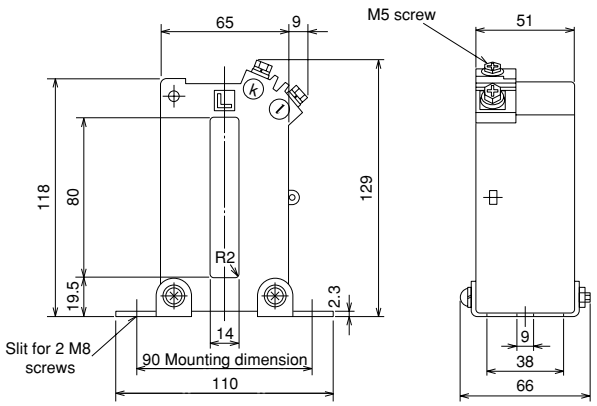
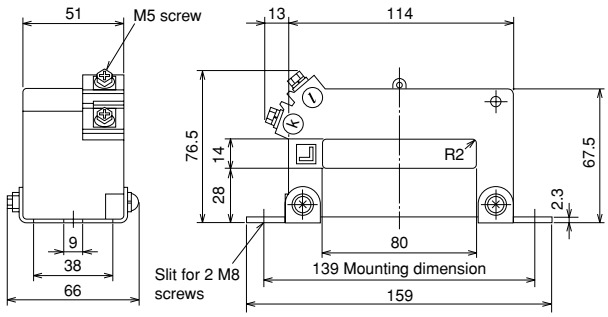



Fig. 8




## CW-40LM 1000～2000A

Fig. 9

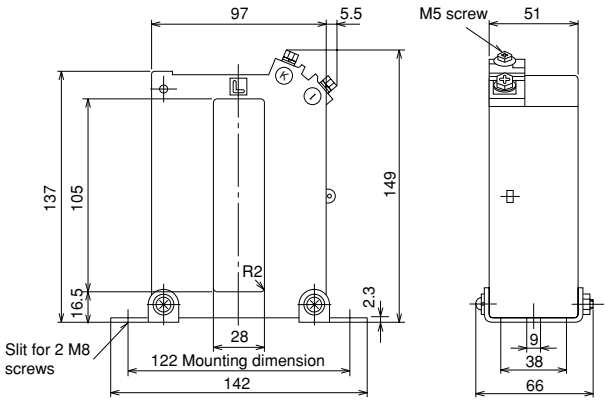
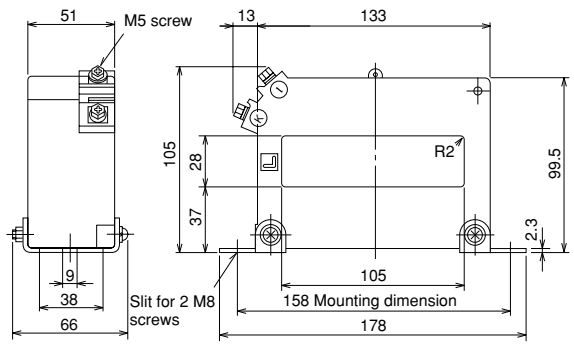



Fig. 10




## CW-40LM 2500～4000A

Fig. 11

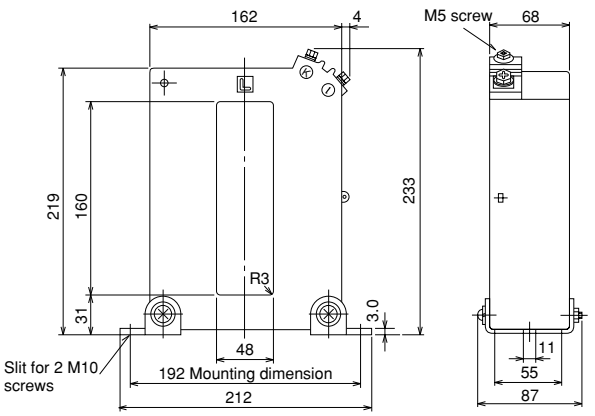
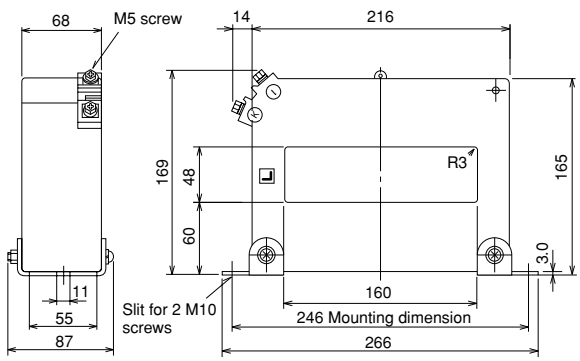



Fig. 12



| Vertical mount | Horizontal mount |
|---|---|
| CW-40LM 5000・6000A | |

Fig. 13

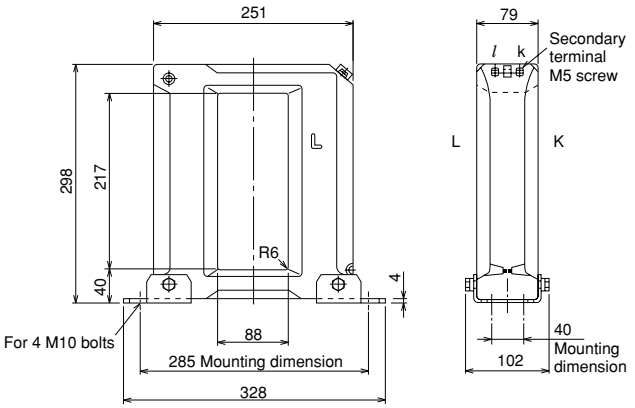
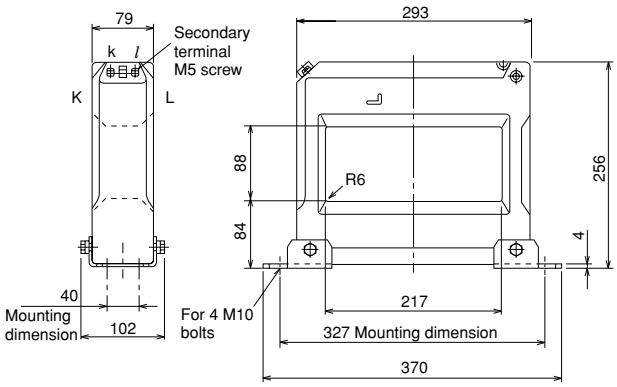



Fig. 14



# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-15LS Dedicated verification Cable wiring

With primary conductor　　Without primary conductor

## ■Use

- ●General-use meters
- ●Dedicated verification current transformers that can be verified in combination with Class 2 watt-hour meters. For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.
- ●Secondary terminal insulation cap (page 34) is available as an option.

## ■Specifications

Applicable standard: JIS C 1731-1

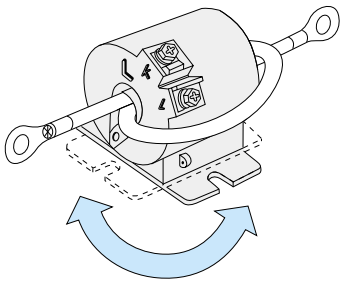
| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Structure | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-15LS | 5 | 5 | 15 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | Fig. 1 | 1.1 | Primary winding | ◎ |
| | 10 | | | | | | | | | | |
| | 15 | | | | | | | | | | |
| | 20 | | | | | | | | | | |
| | 30 | | | | | | | | | | |
| | 40 | 5 | 15 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | Fig. 2-1 | 1.2 | With primary conductor | |
| | 50 | | | | | | | Fig. 2-2 | | | |
| | 60 | | | | | | | Fig. 2-3 | | | |
| | 75 | | | | | | | Fig. 2-4 | | | |
| | 100 | | | | | | | | | | |
| | 120 | | | | | | | Fig. 2-5 | 0.9 | | |
| | 150 | 5 | 15 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | Fig. 3-1 | 1.0 | Without primary conductor | |
| | 200 | | | | | | | | | | |
| | 250 | | | | | | | Fig. 3-2 | 0.6 | | |
| | 300 | | | | | | | | | | |
| | 400 | | | | | | | | | | |
| | 500 | | | | | | | Fig. 3-3 | 0.8 | | |
| | 600 | | | | | | | | | | |
| | 750 | | | | | | | | | | |

Note: Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Features



- ●The direction of the mounting plate can be turned 90° , even after the verification seal has been affixed.

## ■External Dimensions

**Fig. 1 5～30A**

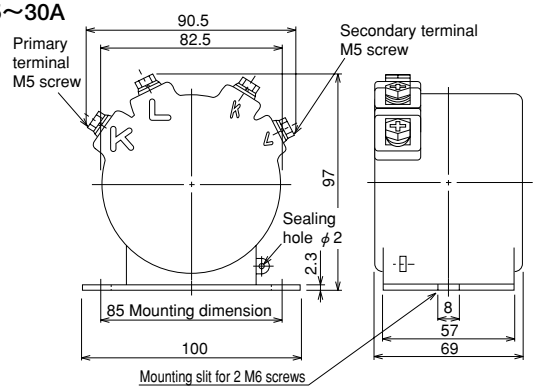
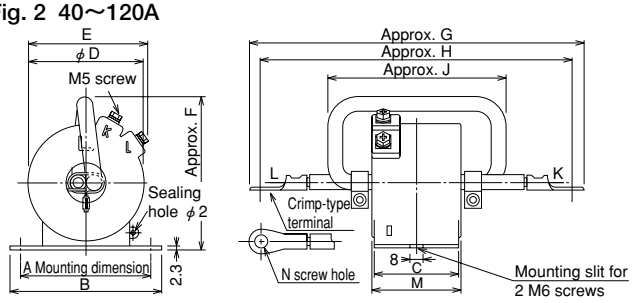
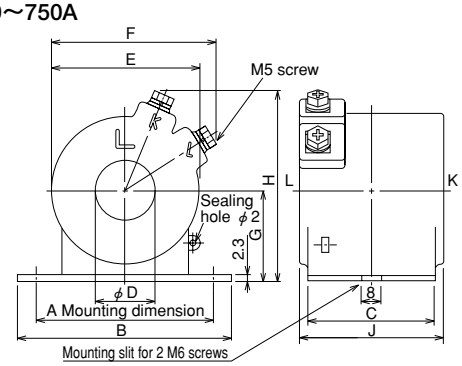



**Fig. 2 40～120A**




| Item | Rated primary current (A) | Primary winding (T) | Primary wire cross-sectional area (mm²) | Dimensions A | B | C | D | E | F | G | H | J | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40 | 4 | 14 | 85 | 100 | 57 | 75.5 | 78.5 | 105 | 215 | 203 | 105 | 57.5 | M6 |
| 2 | 50 | 3 | 22 | 85 | 100 | 57 | 75.5 | 78.5 | 105 | 220 | 203 | 105 | 57.5 | M6 |
| | 60 | 3 | 22 | | | | | | | | | | | |
| 3 | 75 | 2 | 38 | 85 | 100 | 57 | 75.5 | 78.5 | 105 | 230 | 208 | 105 | 57.5 | M8 |
| 4 | 100 | 2 | 38 | 85 | 100 | 57 | 75.5 | 78.5 | 105 | 240 | 218 | 105 | 57.5 | M10 |
| 5 | 120 | 2 | 60 | 70 | 85 | 50 | 68.5 | 73 | 105 | 255 | 233 | 105 | 57.5 | M10 |

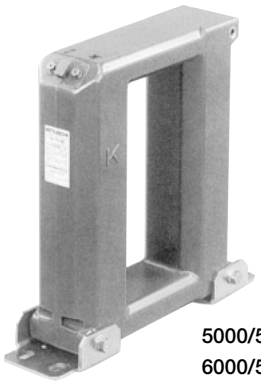
**Fig. 3 150～750A**




| Item | Rated primary current | Dimensions A | B | C | D | E | F | G | H | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 150,200 | 85 | 100 | 57 | 25 | 75.5 | 78.5 | 44 | 90 | 57.5 |
| 2 | 250,300,400 | 70 | 85 | 50 | 32 | 68.5 | 73 | 41.5 | 84.5 | 57.5 |
| 3 | 500,600,750 | 85 | 100 | 57 | 50 | 85.5 | 86.5 | 49.5 | 100 | 59 |

# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-15LMS Dedicated verification Busbar wiring/Rectangular window through type

5000/5A
6000/5A

## ■Use

- ●General-use meters
- ●Dedicated verification current transformers that can be verified in combination with Class 2 watt-hour meters. For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Features

- ●Even after the verification seal is affixed, these current transformers allow the selection of various installation configurations such as vertical or horizontal mounting, or direct mounting on the busbar.
- ●Secondary terminal insulation cap (page 34) is available as an option. (less than or equal to 4000/5A)

## ■Specifications

Applicable standard: JISC 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV) | Frequency (Hz) | External dimensions/Mounting dimensions *1 | | | | Square window dimensions (mm) | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Vertical mount | Horizontal mount | Direct mounting on busbar *2 | | | | |
| | | | | | | | | | | 1 busbar | 2 busbars | | | |
| CW-15LMS | 200 | 5 | 15 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | Fig. 1 | Fig. 2 | Fig. 13-1 | — | 14×55 | 1.1 | ◎ |
| | 250 | | | | | | | | | | | | | |
| | 300 | | | | | | | | | | | | | |
| | 400 | | | | | | | Fig. 3 | Fig. 4 | Fig. 13-2 | — | | 0.6 | |
| | 500 | | | | | | | | | | | | | |
| | 600 | | | | | | | Fig. 5 | Fig. 6 | Fig. 13-3 | — | 14×80 | 1.1 | |
| | 750 | | | | | | | | | | | | | |
| | 800 | | | | | | | | | | | | 0.9 | |
| | 1000 | | | | | | | Fig. 7 | Fig. 8 | Fig. 13-4 | Fig. 14-5 | 28×105 | 1.2 | |
| | 1200 | | | | | | | | | | | | | |
| | 1500 | | | | | | | | | | | | 1.1 | |
| | 2000 | | | | | | | | | | | | 1.2 | |
| | 2500 | | | | | | | Fig. 9 | Fig. 10 | — | Fig. 14-6 | 48×160 | 4.8 | |
| | 3000 | | | | | | | | | | | | | |
| | 4000 | | | | | | | | | | — | | 6.3 | |
| | *3 5000 | | | | | | | Fig. 11 | Fig. 12 | — | — | 88×217 | 14 | △ |
| | *3 6000 | | | | | | | | | | | | | |

Notes
*1 Standard products must be mounted vertically.
*2 Busbar direct mounting brackets are sold separately.
When ordering, specify the desired body type and rated primary current.
For rated primary currents of 1000～2000A, also specify the number of busbars.
*3 An epoxy resin mold is used to insulate rated primary currents of 5000A and 6000A.
*4 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*5 Product weight may vary due to changes in core characteristics.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

| Vertical mount | Horizontal mount |
|---|---|

### CW-15LMS 200～300A

**Fig. 1**

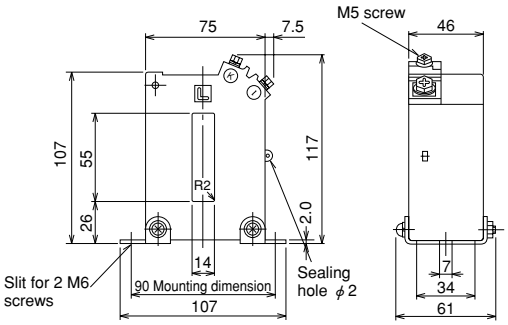
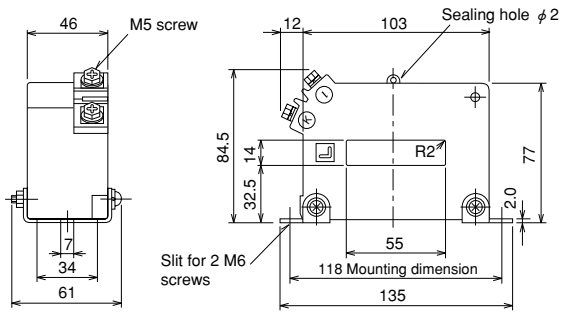



**Fig. 2**




### CW-15LMS 400・500A

**Fig. 3**

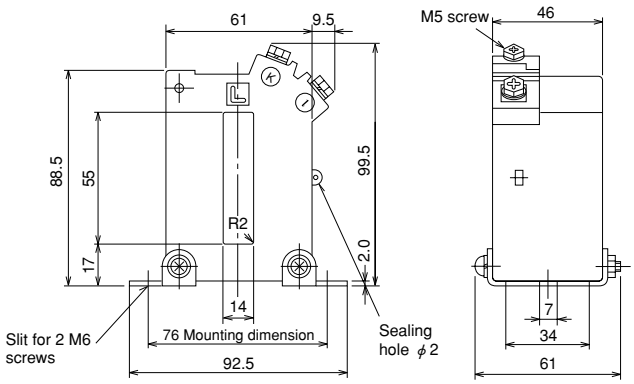
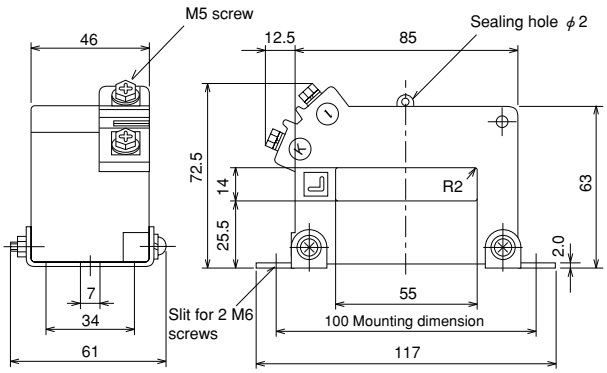



**Fig. 4**




### CW-15LMS 600～800A

**Fig. 5**

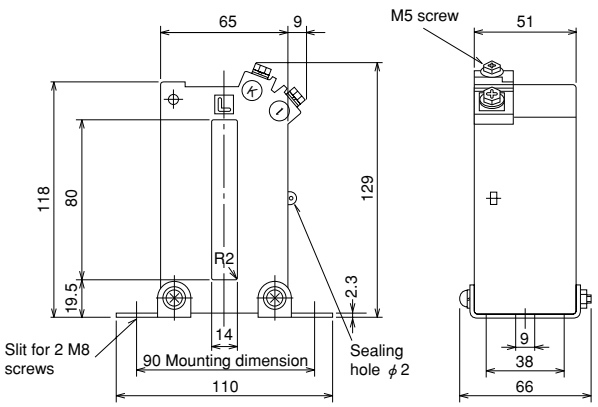
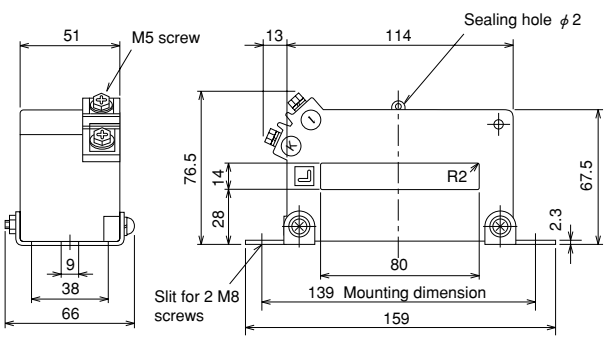



**Fig. 6**



| Vertical mount | Horizontal mount |
|---|---|

## CW-15LMS 1000～2000A

**Fig. 7**

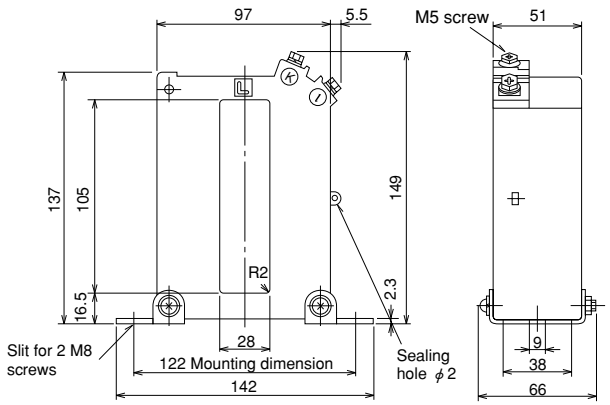
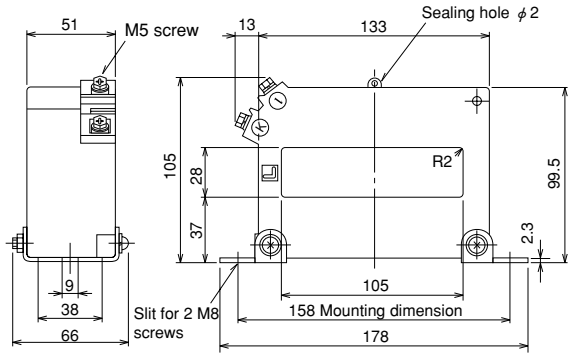



**Fig. 8**




## CW-15LMS 2500～4000A

**Fig. 9**

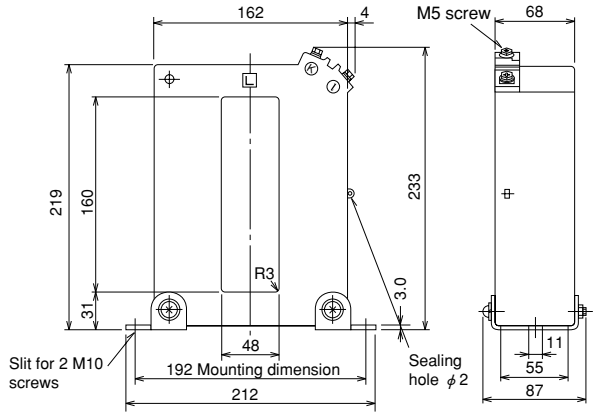
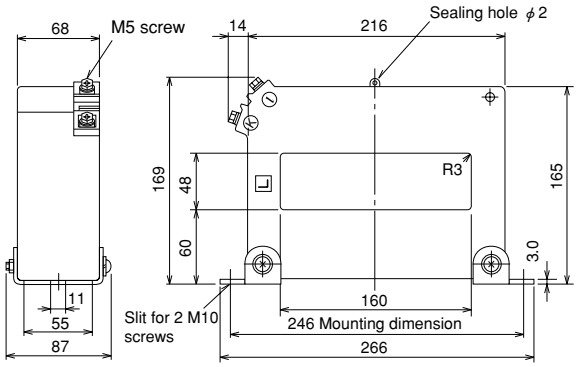



**Fig. 10**




## CW-15LMS 5000・6000A

**Fig. 11**

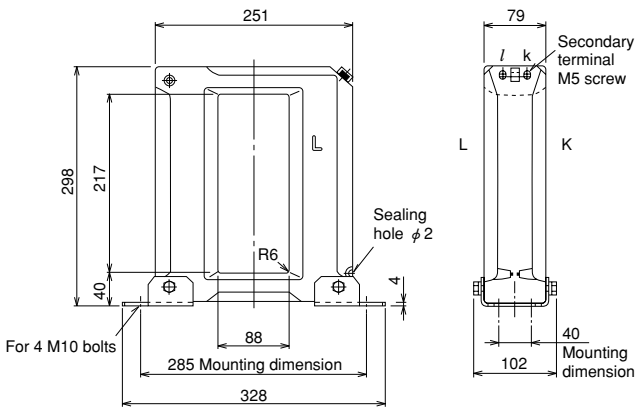
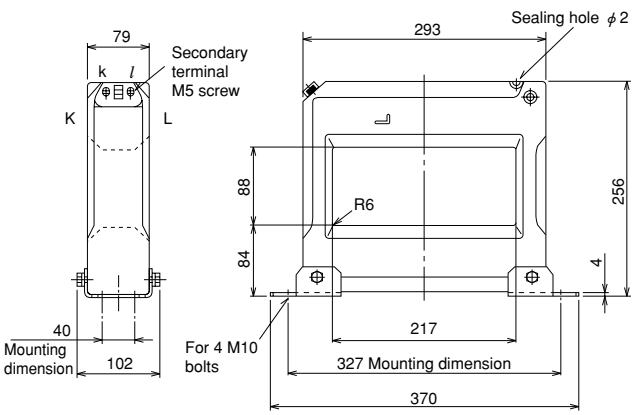



**Fig. 12**

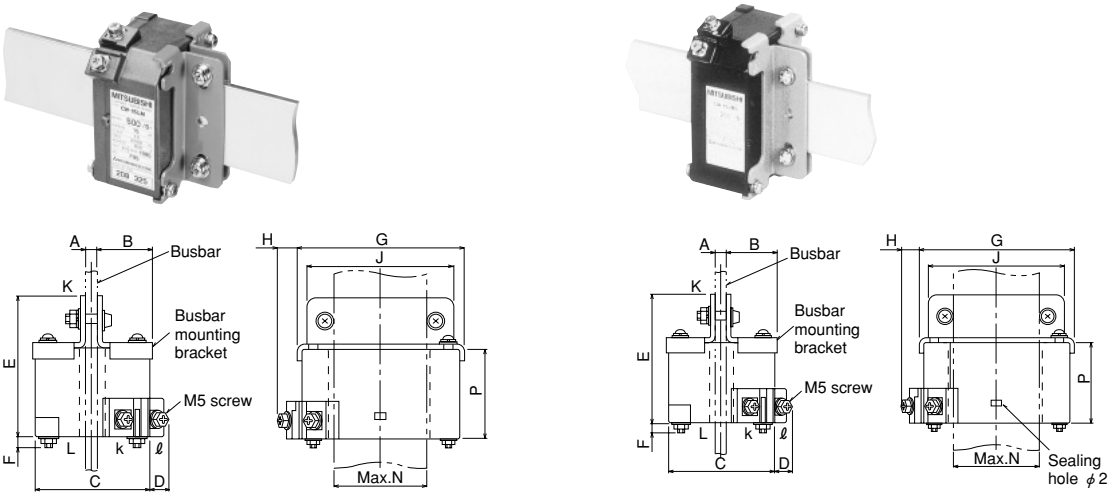


# Busbar Direct-mount Brackets for CW-15LM, CW-40LM and CW-15LMS

Notes:
*1 For CW-15LM (150A), CW-40LM (200A, 250A and 4000～6000A) and CW-15LMS (4000～6000A), direct mounting on the busbar is not possible as the respective CTs are too heavy for the busbar cross-sectional dimensions.
*2 Be certain to mount busbars at the center of the through hole so that these is no contact with the inner surface of the hole.

## busbar mounting

**Fig. 1**



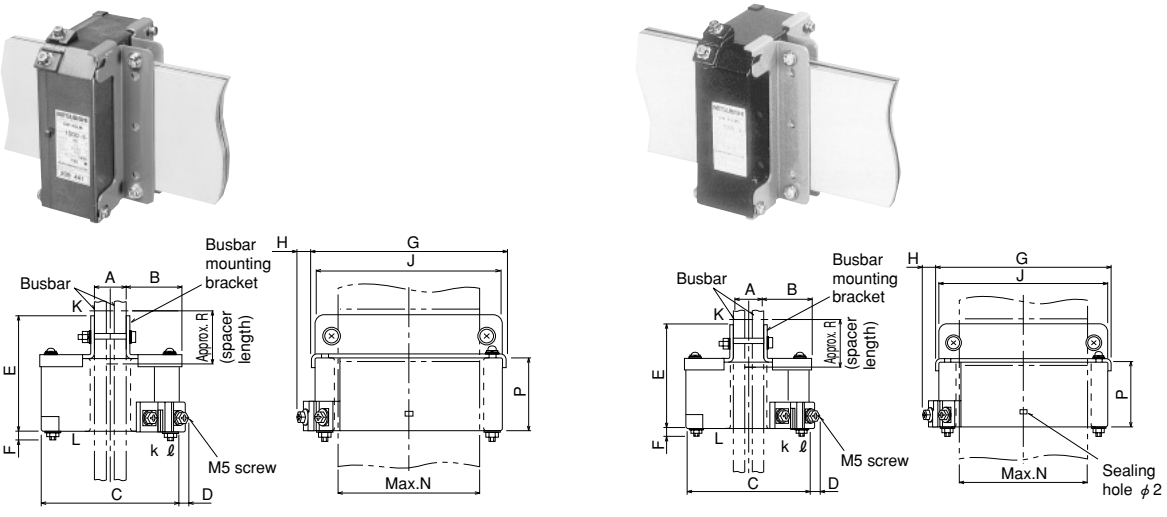

CW-15LM, CW-40LM　　CW-15LMS

| Model name | Rating | A | B | C | D | E | F | G | H | J | N | P | R | External dimensions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-15LM<br>CW-40LM<br>CW-15LMS | 200～300A<br>300～500A<br>200～300A | 5～10 | 33.5 | 75 | 7.5 | 74 | 10 | 110 | 8.5 | 90 | 50 | 46 | — | Fig. 1 |
| CW-15LM<br>CW-15LMS | 400～750A<br>400・500A | 5～10 | 26.5 | 61 | 9.5 | 73.5 | 9 | 90.5 | 9.5 | 81 | 50 | 46 | — | |
| CW-40LM<br>CW-15LMS | 600～800A<br>600～800A | 5～10 | 27.5 | 65 | 9 | 79 | 9 | 121 | 9 | 107 | 75 | 51 | — | |
| CW-40LM<br>CW-15LMS | 1000～2000A<br>1000～2000A | 6～12 | 43.5 | 97 | 5.5 | 80.5 | 10 | 139 | 10 | 129 | 100 | 51 | — | |

Note: *1 Busbar mounting bracket are made of nonmagnetic material for CM-40LM and CW-15LMS (1000～2000A) current transformers.

## 2-busbar mounting

**Fig. 2**




CW-40LM　　CW-15LMS

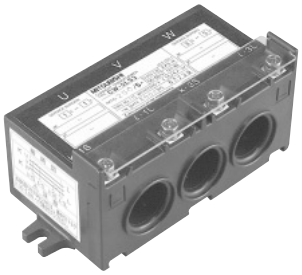
| Model name | Rating | A | B | C | D | E | F | G | H | J | N | P | R | External dimensions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-40LM<br>CW-15LMS | 1000～2000A<br>1000～2000A | 15～24 | 39 | 97 | 5.5 | 80.5 | 10 | 139 | 10 | 129 | 100 | 51 | 40 | Fig. 2 |
| CW-40LM<br>CW-15LMS | 2500～3000A<br>2500～3000A | 15～45 | 72 | 162 | 4 | 102 | 10 | 223 | 11 | 210 | 150 | 68 | 60 | |

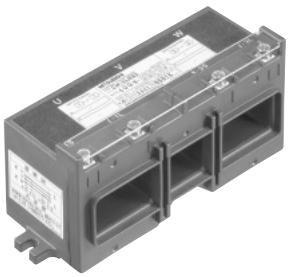
Note: *1 Busbar brackets are made of nonmagnetic material for two-busbar mounting configurations.

# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-5LS3/CW-5LMS3

**Dedicated verification  Distribution boards  Busbar/Cable wiring**





## ■Use

●General-use meters and distribution boards

●Dedicated verification current transformers that can be verified in combination with Class 2 watt-hour meters. For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Features

●As the result of an integrated three-wire current transformer structure and direct pass through enables the busbar to be connected directly to the main breaker "250A (225A)～400A frame" terminal, space savings and simplified wiring work are realized.
If mounting the current transformer on the power supply-side of the breaker, be certain to secure appropriate arc space.

● As the rated load is 5VA, verification in combination with an electronic watt-hour meter or induction watt-hour meter can be performed.

● A primary conductor and mounting adapter are available as an option (for CW-5LS3).

## ■Specifications

Applicable standard: JISC 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/ withstand voltage (kV)*1 | Frequency (Hz) | Applicable circuit | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|
| CW-5LS3 | 150 | 5 | 2×5 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | 1-phase, 3-wire | 1.0 | ◎*2 |
| | 200 | | | | | | | | | |
| | 250 | | | | | | | | | |
| CW-5LMS3 | 250 | 5 | 2×5 | 1.0 | 40 | 1.15/ 4/— | 50 or 60 | 3-phase, 3-wire | 1.6 | ◎*2 |
| | 300 | | | | | | | | | |
| | 400 | | | | | | | | | |

Notes
*1 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*2 If verification in combination with a voltage transformer is required, select a semi-standard product (Symbol ○) depending on the usage load value of the voltage transformer.
For details, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.
*3 Product weight may vary due to changes in core characteristics.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

# ■Exterior Dimensions

**Fig. 1　CW-5LS3　150～250A**

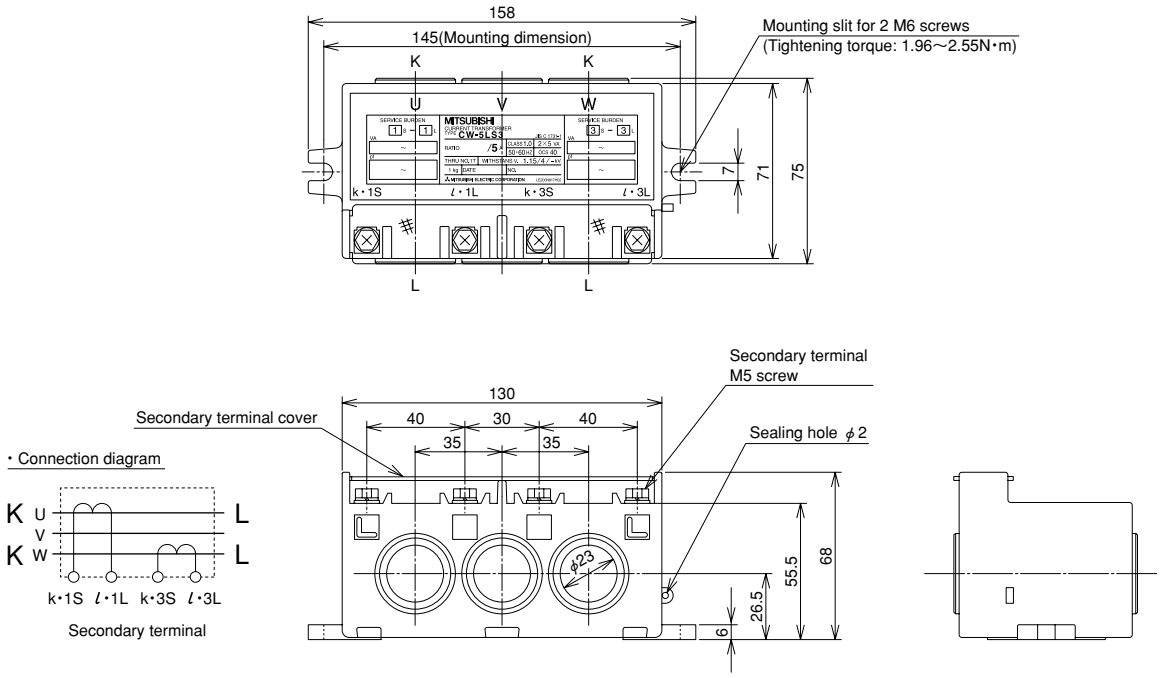
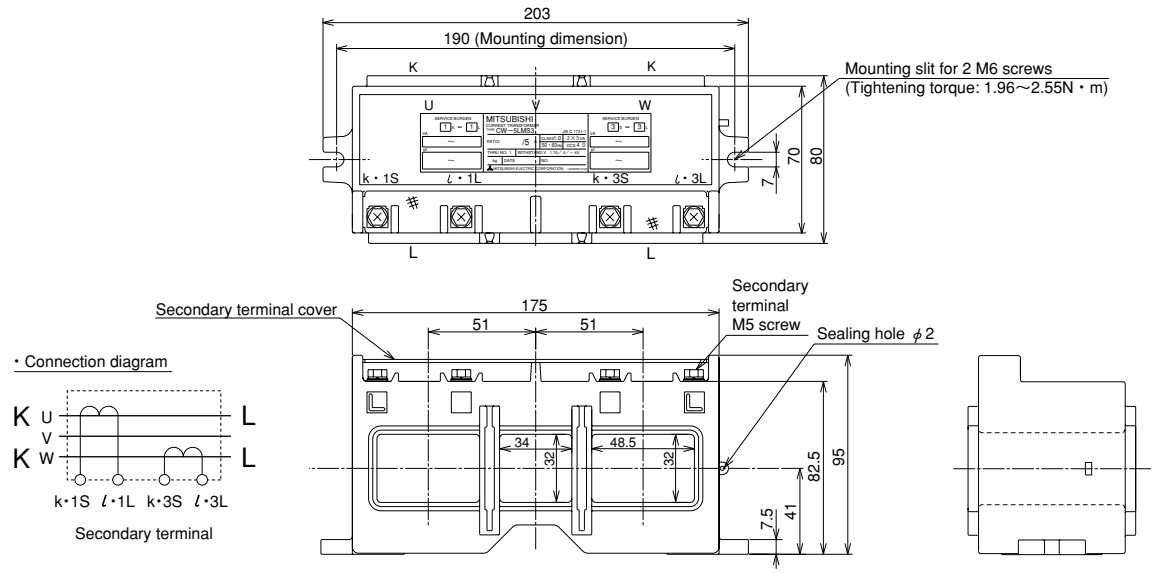


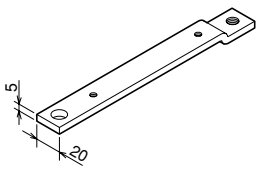
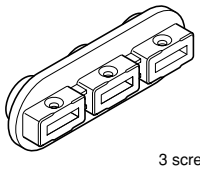

**Fig. 2　CW-5LMS3　250～400A**



# ■Optional Parts

## Primary conductor and primary conductor mounting adapter for CW-5LS3

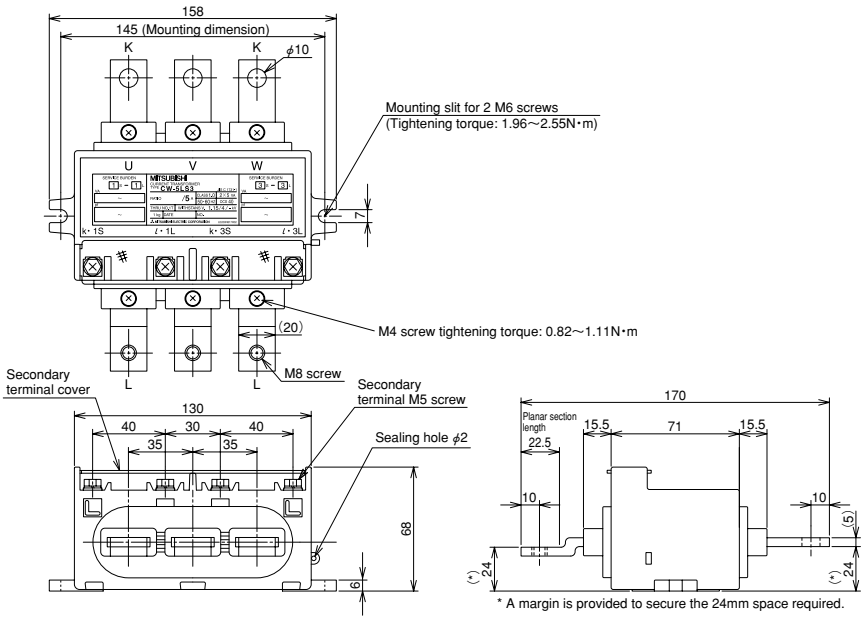
●The primary conductor and primary conductor mounting adapter are provided.

| Product name | Primary conductor | Primary conductor mounting adapter |
|---|---|---|
| Model name | **CW-B205** | **CW-AD205** |
| Appearance |  |  3 screws included |
| No. in package | **30 pieces** | **20 pieces** |

●Example of primary conductor and mounting adapter assembled

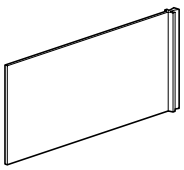
Note: * The primary conductor and primary conductor mounting adapter are used for low-voltage circuits.

# ■External Dimensions (example of with primary conductor and mounting adapter assembled)

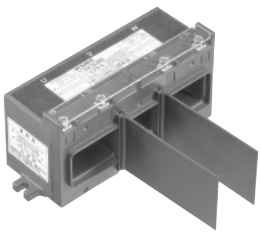



## Insulation barrier for CW-5LMS3

●The CW-5LMS3 is built to allow mounting of the Mitsubishi Electric NF250-CW insulation barrier.

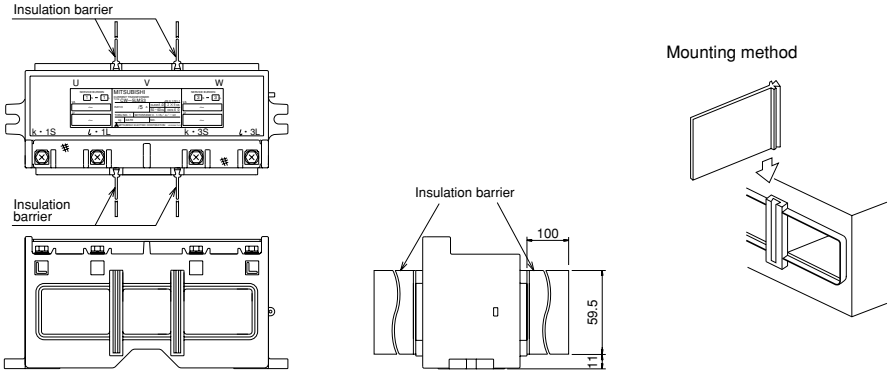
| Product name | Insulation barrier |
|---|---|
| Model name | **BAF-2SW** |
| Appearance |  |
| No. in package | **1 piece** |

●Example of insulation barrier attached



* Possible to mount on both the power supply-side and load side.

# ■External Dimensions (example with insulation barrier attached)

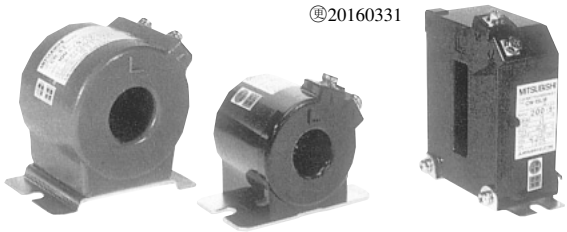


# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-5T/CW-5L/CW-15LM Class 1 and 2 heat-resistant models for emergency power sources

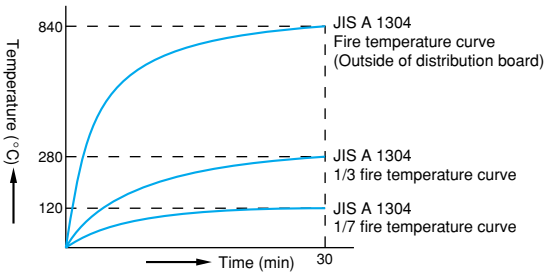
To comply with Notice 10, "Standards for Switchboards and Distribution Boards of Power Receiving Equipment for Emergency Power Sources that Receive Low-voltage Electricity," of Japan's Fire and Disaster Management Agency, devices installed in switchboards and distribution boards must have sufficiently high heat-resistance to ensure that the power source is able to continue operating and provide electricity to fire-extinguishing systems even if a fire breaks out. Mitsubishi Electric's heat-resistance current transformers are certified Class 1 and Class 2 equipment compliant with the above-mentioned standards, and have obtained the approval of the "Committee for the Certification of Distribution Boards, etc. for Emergency Use."

㊙20160331



CW-5T (Class 1 heat-resistant) CW-5L CW-15LM (Class 2 heat-resistant)

## ■Heat-resistant Power Distribution Performance




Allowable temperature curve

### Class 1 heat-resistance

When a current transformer is heated for 30min according to the 1/3 fire temperature curve, heat-resistant rated current passes without trouble. Be certain to use heat-resistant wiring for the primary conductor.

### Class 2 heat-resistance

When a current transformer is heated for 30min according to the 1/7 fire temperature curve, heat-resistant rated current passes through without trouble. Be certain to use 600V Class 2 wiring that is heat-resistant and insulated by vinyl (HIV) for the primary conductor of the CW-5L.

### Regarding heat-resistant rated current

Be certain to use the load current within the heat-resistant rated current (70% of the primary current). Additionally, select a wire gauge based on the primary current.

## ■Specifications

Applicable standard: JISC 1731-1

| Class | Type | Rated primary current (A) | Primary current (A) | Through No. (turns) | Primary conductor size (mm²) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage/withstand voltage (kV) | Frequency (Hz) | Insulation method | External dimensions | Mass (kg) | Verification | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Class 1 heat-resistant | CW-5T | 100 | 20 | 5 | 5.5 | 5 | 5 | 1.0 | 40 | 1.15/4/— | Both 50/60 | Epoxy resin mold | Fig. 1 | 1.0 | No | △ |
| | | | 25 | 4 | 8 | | | | | | | | | | | |
| | | | 50 | 2 | 22 | | | | | | | | | | | |
| | | | 100 | 1 | 150 | | | | | | | | | | | |
| | | 120 | 30 | 4 | 8 | | | | | | | | | | | |
| | | | 40 | 3 | 14 | | | | | | | | | | | |
| | | | 60 | 2 | 22 | | | | | | | | | | | |
| | | | 120 | 1 | 150 | | | | | | | | | | | |
| | | 150 | 75 | 2 | 22 | | | | | | | | | | | |
| | | | 150 | 1 | 150 | | | | | | | | | | | |
| Class 2 heat-resistant | CW-5L | 100 | 10 | 10 | φ2 | 5 | 5 | 1.0 | 40 | 1.15/4/— | Both 50/60 | Double mold | Fig. 2 | 0.6 | No | △ |
| | | | 20 | 5 | 8 | | | | | | | | | | | |
| | | | 25 | 4 | 14 | | | | | | | | | | | |
| | | | 50 | 2 | 22 | | | | | | | | | | | |
| | | | 100 | 1 | 150 | | | | | | | | | | | |
| | | 120 | 15 | 8 | 5.5 | | | | | | | | | | | |
| | | | 30 | 4 | 14 | | | | | | | | | | | |
| | | | 40 | 3 | 22 | | | | | | | | | | | |
| | | | 60 | 2 | 22 | | | | | | | | | | | |
| | | | 120 | 1 | 150 | | | | | | | | | | | |
| | | 150 | 75 | 2 | 22 | | | | | | | | | | | |
| | | | 150 | 1 | 150 | | | | | | | | | | | |
| | | 200 | 200 | 1 | 150 | | | | | | | | | | | |
| | | 250 | 250 | 1 | 325 | | | | | | | | Fig. 3 | 0.5 | | |
| | | 300 | 300 | 1 | 325 | | | | | | | | | | | |
| | | 400 | 400 | 1 | 325 | | | | | | | | | | | |
| | CW-15LM | — | 200 | — | *14×55 | 5 | 15 | 1.0 | 40 | 1.15/4/— | Both 50/60 | Double mold | Fig. 4 | 1.1 | No | △ |
| | | | 250 | | | | | | | | | | | | | |
| | | | 300 | | | | | | | | | | Fig. 5 | 0.6 | | |
| | | | 400 | | | | | | | | | | | | | |

Notes
*1 Square window dimensions are listed because it is for busbar wiring.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

Remarks:
1) For primary conductor sizes, nominal cross-sectional areas of through-type enabled wiring are listed. ( φ indicates single-wire diameter)
2) Primary conductor sizes of Class 1 heat-resistant CTs are described as smaller than the maximum conductor size, because heat-resistant wiring is hard and is not easy to wind.

### Heat-resistant current transformer indicator

Heat-resistance classes are indicated by the following labels:

| Class 1 heat-resistant | Class 2 heat-resistant |
|---|---|
| 一種 耐熱 登録機器 | 二種 耐熱 登録機器 |
| Red label | Blue label |

# ■External Dimensions

**Fig. 1** | CW-5T | 100, 120, 150A

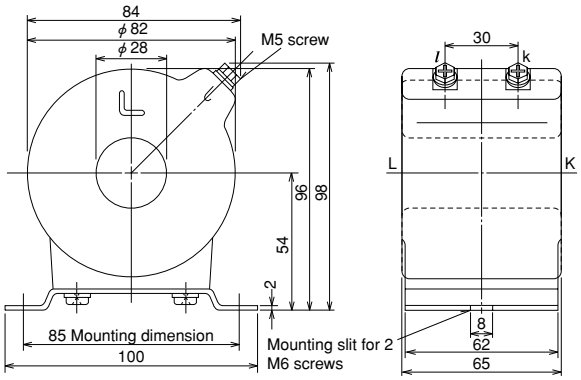



**Fig. 2** | CW-5L | 100, 120, 150, 200A

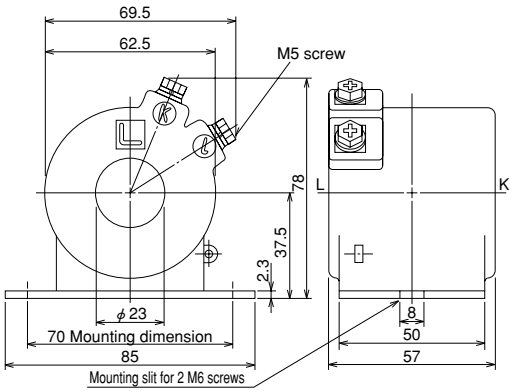



**Fig. 3** | CW-5L | 250, 300, 400A

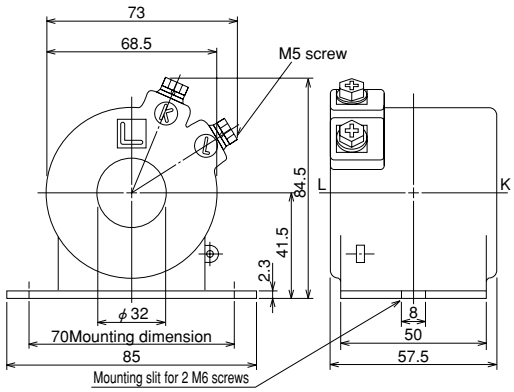



**Fig. 4** | CW-15LM | 200, 250, 300A

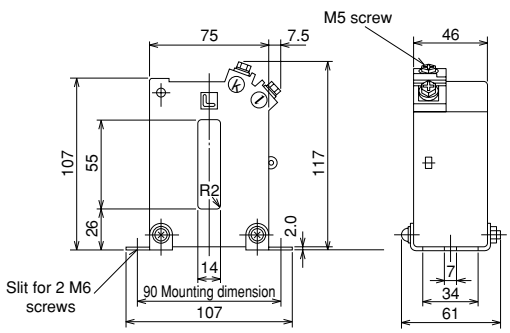
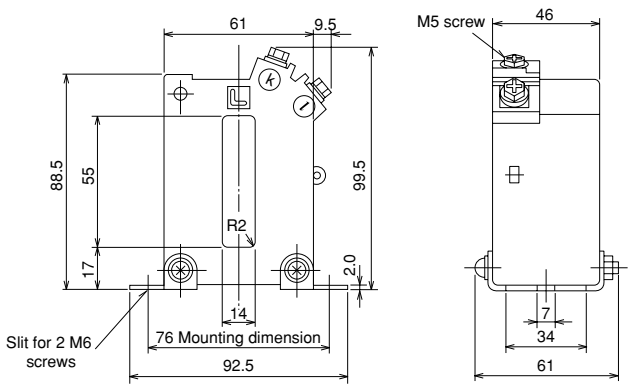



**Fig. 5** | CW-15LM | 400A



# CW Series Low-voltage Current Transformers (less than or equal to 1100V)

## CW-15LM Low-voltage current transformer for protective relays

## ■Use

●This current transformer is mainly used in combination with overcurrent protective relays of low-voltage switchboards used in international markets.

●This current transformer can also be used to protect transformers used for extra-high-voltage (22kV)/low-voltage distribution.

## ■Features

●Can be used for protective relay compliant with IEC/JEC standards.

●Can be used for measurement at Class 1 accuracy (IEC)/1PS (JEC).

●Compact and lightweight, enabling mounting vertically, horizontally and even directly on the busbar.

Note: Ratings for direct mounting on busbar are 1500～3000A.
To mount directly on a busbar, select the brackets used for CW-40LM 2500～3000A.

●Main body case is made of heat-resistant ABS resin with a superior UL94 flame resistance rating of V-0.

●Simplified wiring work
The square window through-type design enables easy connection of the primary conductor by passing the wiring through the window.

●Secondary terminal insulation cap (page 34) is available as an option.

## ■Specifications

Applicable standards: IEC 60044-1 or JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | | Rated overcurrent (kA) | Insulation level (withstand voltage) (kV) | | Overcurrent constant | Frequency (Hz) | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | IEC Standard | JEC Standard | | IEC Standard | JEC Standard | | | | |
| CW-15LM | 1500 | 5 | 15 | 10P10/1 | 1PS | 60 | 0.72/3/– | 1.15/4/– | n＞10 | 50 or 60 | 4.7 | △ |
| | 2000 | | | | | 80 | | | | | 4.8 | |
| | 2500 | | | | | 100 | | | | | 4.6 | |
| | 3000 | | | | | 120 | | | | | 4.9 | |
| | 3500 | | | | | 140 | | | | | 5.3 | |
| | 4000 | | | | | 160 | | | | | 6.3 | |

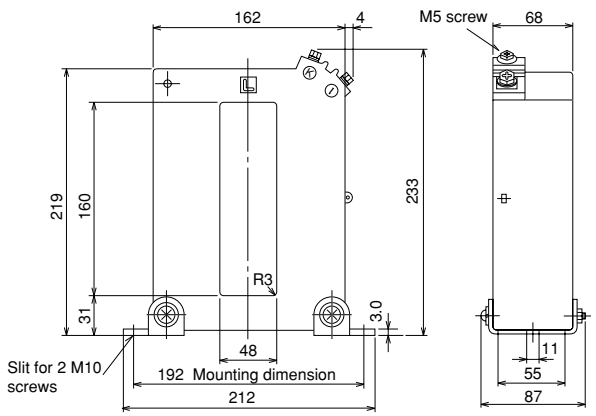
Note: * Insulation level (withstand voltage) indicates values for peak voltage/short-time commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

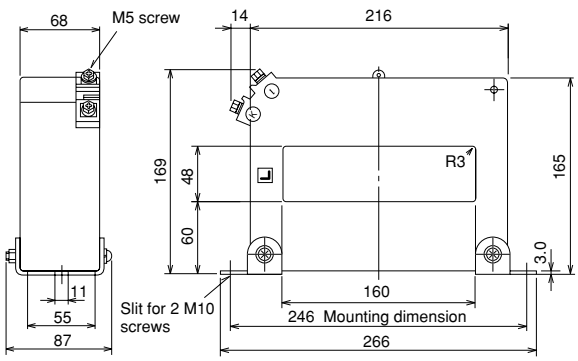
| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

### Vertical mount



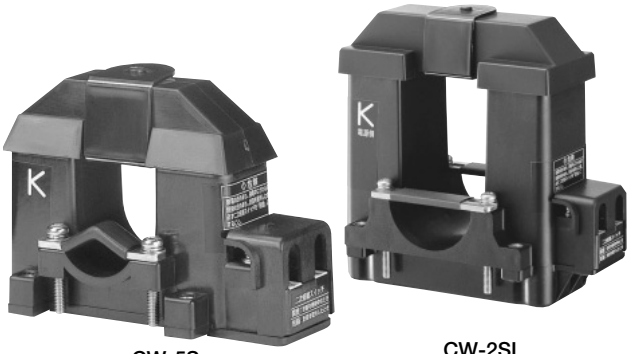

### Horizontal mount




Note: * For IEC standard products, in terms of terminal symbols, the primary side is labeled P1, P2 and the secondary side is labeled S1, S2.

# CW-5S/CW-2SL/CW-5SL

**Separated/Cable wiring**



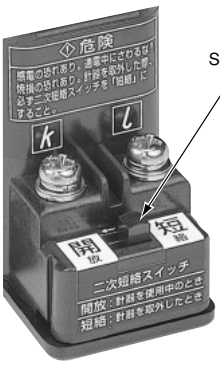
CW-5S　　CW-2SL CW-5SL

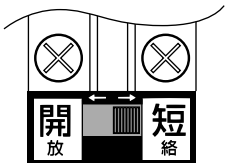
### Secondary Terminal Cover Included as Standard Equipment

A secondary terminal cover is included as standard equipment.

### Equipped with Secondary Side Short-circuit Switch

These transformers are equipped with a short-circuit switch to prevent the terminals on the secondary side from opening.
If the transformer is not connected, short-circuiting between the terminals is possible.




・When using meter :
Set to「開放」"Open"
・When not using meter :
Set to「短絡」"Short circuit"

## ■Features

### Removal of existing cables is not required.

These transformers can be mounted without removing existing cables, simplifyingmounting work.

## ■Specifications

Applicable standard: JIS C 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Highest voltage/ withstand voltage (kV) | Overcurrent strength (times) | Frequency (Hz) | Mass (kg) | Mountable wire size (be certain to use a wire size compatible with the load current) | Delivery /5A | Delivery /1A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CW-5S | 300 | 5 or 1 | 5 | 1.0 | 0.46/ 3/— | 40 | Both 50/60 | 0.4 | $\phi$11 - $\phi$28<br>600V IV wire 38～250mm$^2$<br>CV wire 38～200mm$^2$ | ◎ | △ |
| | 400 | | | | | | | | | | |
| | 500 | | | | | | | | | | |
| CW-2SL | 150 | 1 | 2 | 1.0 | 0.46/ 3/— | 40 | Both 50/60 | 1.0 | 600V IV wire and CV wire<br>38mm$^2$～500mm$^2$<br>(if cables are too small to attach, use the rubber spacers supplied) | — | △ |
| | 200 | | | | | | | | | | |
| | 250 | | | | | | | | | | |
| CW-5SL | 300 | 5 or 1 | 5 | 1.0 | 0.46/ 3/— | 40 | Both 50/60 | 1.0 | 600V IV wire and CV wire<br>250mm$^2$～500mm$^2$×1 piece<br>200mm$^2$～325mm$^2$×2 pieces | ◎ | △ |
| | 400 | | | | | | | | | | |
| | 500 | | | | | | | | | | |
| | 600 | | | | | | | | | ◎ | △ |
| | 800 | | | | | | | | | | |

Notes
*1 If dust collects on the separated surface of the core or rust begins to form, current transformer performance will drop and measurement errors may occur.
Be certain to clean the separated surfaces before use.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1　CW-5S**

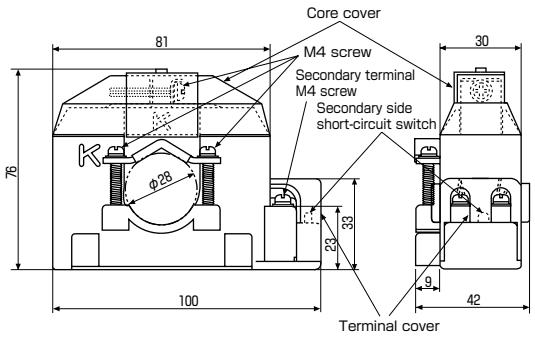
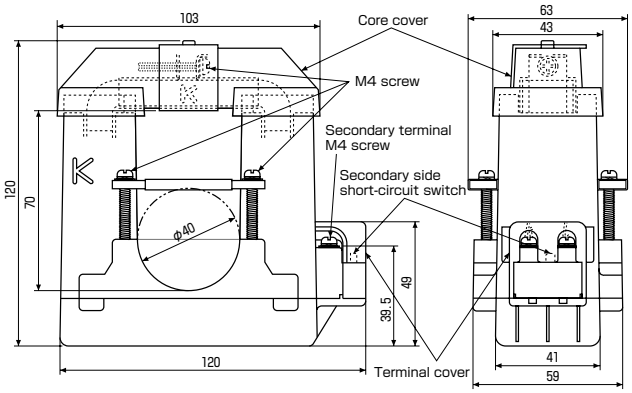
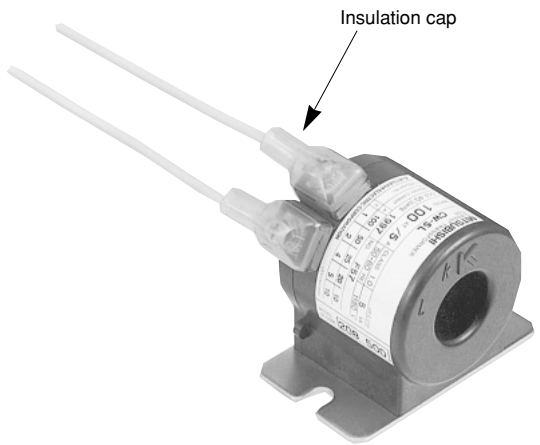



**Fig. 2　CW-2SL and CW-5SL**



# Insulation Cap for CW Low-voltage Current Transformers

## CW-M1/CW-M2/CW-M3




## ■Features

- ●Cap can be installed without removing the crimp-type terminal.
- ●Cap covers the entire terminal, preventing any live part from being exposed.
- ●Insulation cap is specially designed to fit, so product height is virtually unchanged even after mounting.
- ●Cap is half transparent, allowing terminal tightness can be checked without removing it.

## ■Type

| Type | Applicable model | Order Qty. |
|---|---|---|
| CW-M1 | Secondary terminals of CW-L, LP, LM, LS and LMS CTs (less than or equal to 2000A) | 100 pieces |
| CW-M2 | Primary terminals of CW-LP and LS CTs | 100 pieces |
| CW-M3 | Secondary terminals of CW-40LM and 15LMS (2500～4000A) | 100 pieces |

## ■How to Order

| Type | Quantity |
|---|---|
| CW-M1 | 500 |

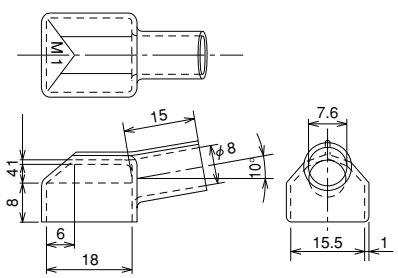
Orders must be in units of 100 pieces.

## ■List of Applicable Models

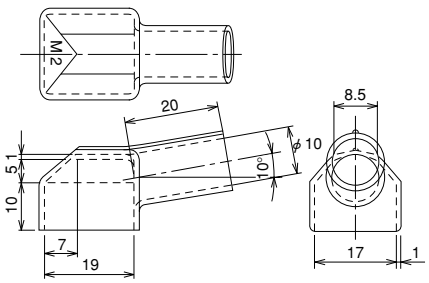
| Current transformer name | Rating | Insulation cap | | | Remarks |
|---|---|---|---|---|---|
| | | CW-M1 | CW-M2 | CW-M3 | |
| CW-5L | 60～750A | 2 pieces | — | — | For secondary terminal |
| CW-15L | 100～750A | 2 pieces | — | — | For secondary terminal |
| CW-40L | 150～750A | 2 pieces | — | — | For secondary terminal |
| CW-5LP | 1～50A | 2 pieces | 2 pieces | — | For primary and secondary terminals |
| CW-15LP | 1～50A | 2 pieces | 2 pieces | — | For primary and secondary terminals |
| CW-40LP | 1～50A | 2 pieces | 2 pieces | — | For primary and secondary terminals |
| CW-15LM | 150～750A | 2 pieces | — | — | For secondary terminal |
| CW-40LM, 15LMS | 200～2000A | 2 pieces | — | — | For secondary terminal |
| CW-40LM, 15LMS | 2500～4000A | — | — | 2 pieces | For secondary terminal |
| CW-15LM | 1500～4000A | — | — | 2 pieces | For secondary terminal |
| CW-15LS | 5～30A | 2 pieces | 2 pieces | — | For primary and secondary terminals |
| CW-15LS | 40～750A | 2 pieces | — | — | For secondary terminal |

## ■External Dimensions

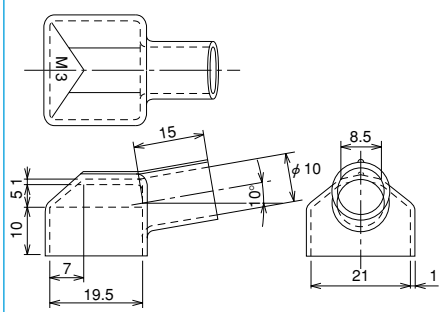
**CW-M1**




**CW-M2**




**CW-M3**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40K 40VA / 40times

**Epoxy resin mold**

## ■Use

- ●General-use meters/Relays
- ●Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.
- ●The direction of the mounting plate can be turned 90° , even after the verification seal has been affixed.

## ■Specifications

Applicable standards: JIS C1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40K | 5 | 5 | 40 | 1.0・1PS | 40 | n>3 (for 30VA, n>5) *3 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 3.0 | Yes | ◎ |
| | 10 | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 75 | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | |
| | 120 | | | | | | | | | | | | |
| | 150 | | | | | | | | | Fig. 2 | 3.0 | | |
| | 200 | | | | | | | | | | | | |
| | 250 | | | | | | | | | Fig. 3 | 3.0 | | |
| | 300 | | | | | | | | | | | | |
| | 400 | | | | | | | | | | | | |
| | 500 | | | | | | | | | | | | |
| | 600 | | | | | | | | | | | | |
| | 750 | | | | | | | | | | | | |

Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*3 n>5 is applied for transformer with rated primary currents of 250A or 500A, for 25VA.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 5～120A**

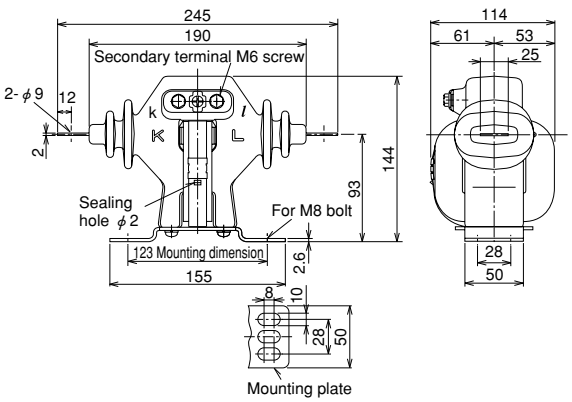



**Fig. 2 150 and 200A**

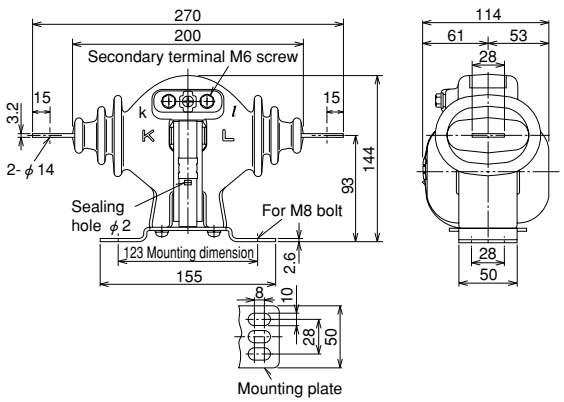
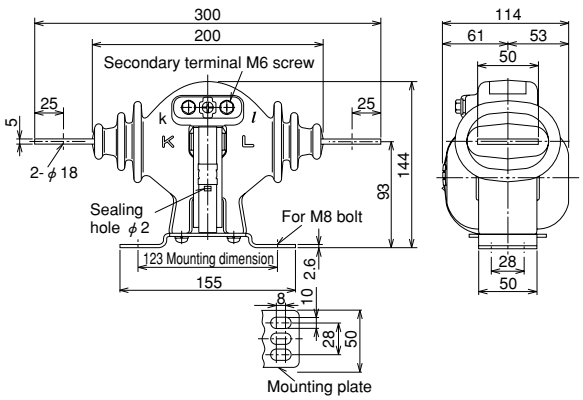


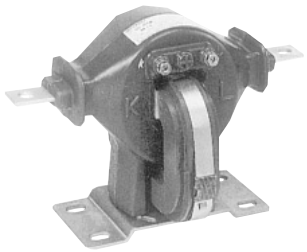

**Fig. 3 250～750A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40NA 40VA / 40times / n>10

Epoxy resin mold



## ■Use

●General-use meters/Relays

●Verification in combination with Class 2 meters can be done.
For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40NA | 5 | 5 | 40 | 1.0・1PS | 40 | n＞10 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 6.5 | Yes | ○ |
| | 10 | | | | | | | | | | | | ◎ |
| | 15 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 25 | | | | | | | | | | | | ○ |
| | 30 | | | | | | | | | | | | ◎ |
| | 40 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 75 | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | ○ |
| | 100 | | | | | | | | | | | | ◎ |
| | 120 | | | | | | | | | | | | ○ |
| | 150 | | | | | | | | | | | | ◎ |
| | 200 | | | | | | | | | | | | |
| | 250 | | | | | | | | | Fig. 2 | 9.5 | | |
| | 300 | | | | | | | | | | | | |
| | 400 | | | | | | | | | | | | |
| | 500 | | | | | | | | | | | | |

Notes
*1 If ordering a product for verification, be certain to specify “For verification” as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 5～200A**

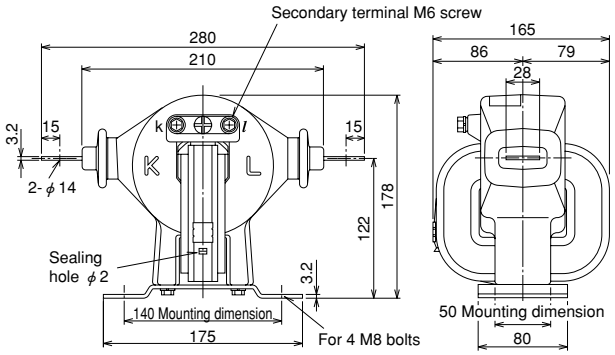
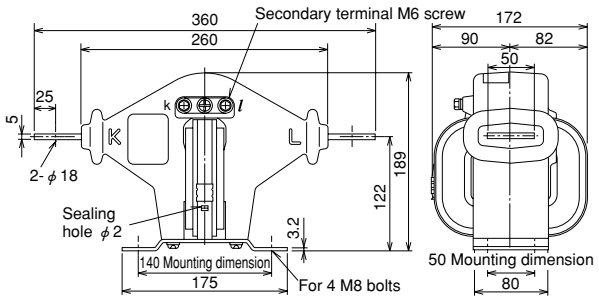


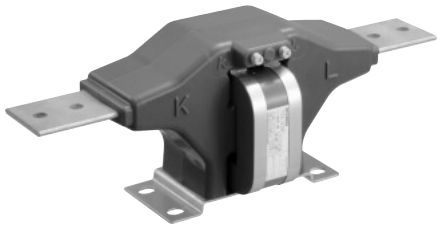

**Fig. 2 250～500A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40H 40VA / $\frac{40\text{times}}{40\text{kA}}$ / n>10

**Epoxy resin mold**



## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength/ Rated overcurrent | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40H | 600 | 5 | 40 | 1.0・1PS | 40 times | n>10 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 14 | Yes | ◎ |
| | 750 | | | | | | | | | | | | |
| | 800 | | | | | | | | | | | | |
| | 1000 | | | | | | | | | | 15 | | △ |
| | 1200 | | | | 40kA | | | | | Fig. 2 | | | |
| | 1500 | | | | | | | | | | | | |
| | 2000 | | | | | | | | | | 17 | | |

Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Use

- ●General-use meters/Relays
- ●Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■External Dimensions

**Fig. 1 600～1000A**

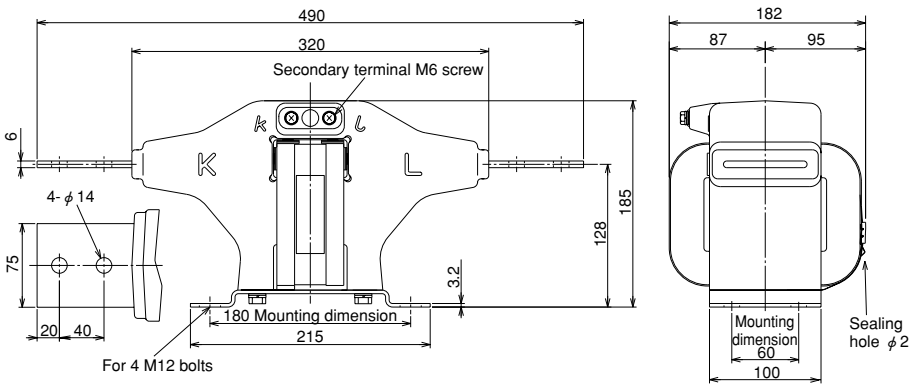
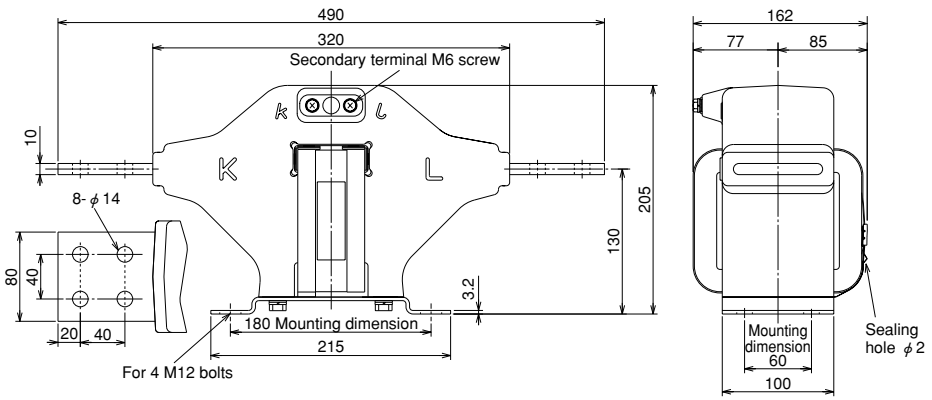



**Fig. 2 1200～2000A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40ENA　40VA / 75times / n>10

**Epoxy resin mold**

## ■Use

- ●General-use/Relays
- ●Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40ENA | 5 | 5 | 40 | 1.0・1PS | 75 | n＞10 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 8.5 | Yes | ○ |
| | 10 | | | | | | | | | | | | ○ |
| | 15 | | | | | | | | | | | | ○ |
| | 20 | | | | | | | | | | | | ◎ |
| | 25 | | | | | | | | | | | | ○ |
| | 30 | | | | | | | | | | | | ◎ |
| | 40 | | | | | | | | | | | | ◎ |
| | 50 | | | | | | | | | | | | ◎ |
| | 60 | | | | | | | | | | | | ◎ |
| | 75 | | | | | | | | | | | | ◎ |
| | 80 | | | | | | | | | | | | ○ |
| | 100 | | | | | | | | | | | | ◎ |
| | 120 | | | | | | | | | | | | ○ |
| | 150 | | | | | | | | | | | | ◎ |
| | 200 | | | | | | | | | | | | ◎ |
| | 250 | | | | | | | | | Fig. 2 | 9.5 | | ◎ |
| | 300 | | | | | | | | | | | | ◎ |
| | 400 | | | | | | | | | | | | ◎ |

Notes
*1 If ordering a product for verification, be certain to specify “For verification” as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1　5～200A**

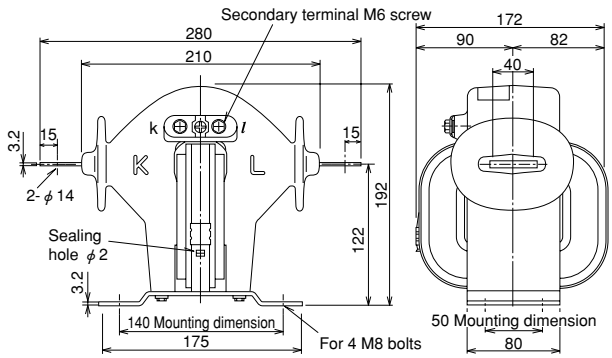
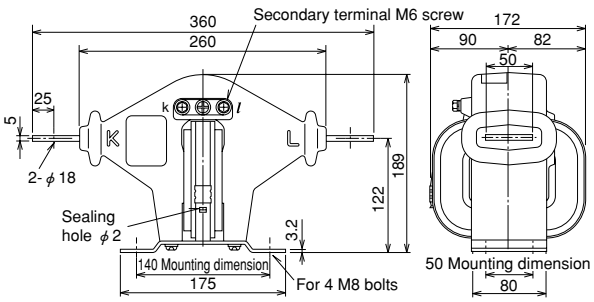


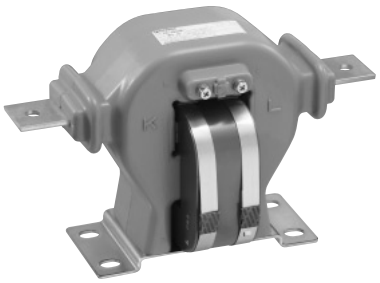

**Fig. 2　250～400A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40GNA　40VA / 150times / n>10

**Epoxy resin mold**



## ■Use

- ●General-use meters/Relays
- ●Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40GNA | 5 | 5 | 40 | 1.0・1PS | 150 | n＞10 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 16 | Yes | △ |
| | 10 | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | ◎ |
| | 25 | | | | | | | | | | | | △ |
| | 30 | | | | | | | | | | | | ◎ |
| | 40 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 75 | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | △ |
| | 100 | | | | | | | | | | | | ◎ |
| | 150 | | | | | | | | | | | | |
| | 200 | | | | | | | | | | | | |

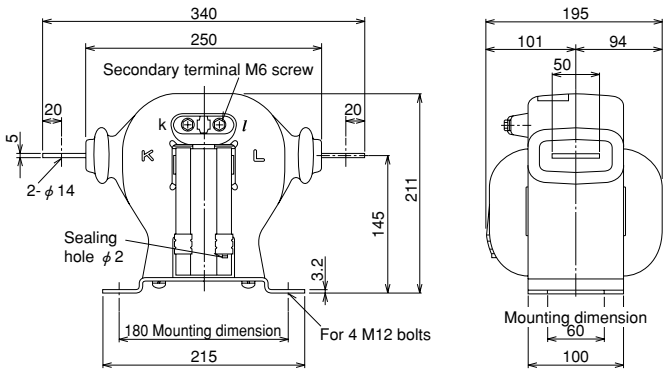
Notes
*1 If ordering a product for verification, be certain to specify “For verification” as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*3 The overcurrent intensity is the guaranteed figure if 25% of the rated load is connected to the secondary side.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

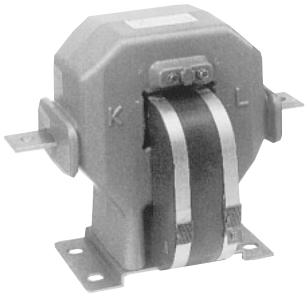
**Fig. 1　5～200A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-40LN　40VA / 300times, / n>10

**Epoxy resin mold**



## ■Use

- ●General-use meters/Relays
- ●Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-40LN | 5 | 5 | 40 | 1.0・1PS | 300 | n＞10 | 6900 | 22/60 | Both 50/60 | Fig. 1 | 25 | Yes | △ |
| | 10 | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 75 | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | |

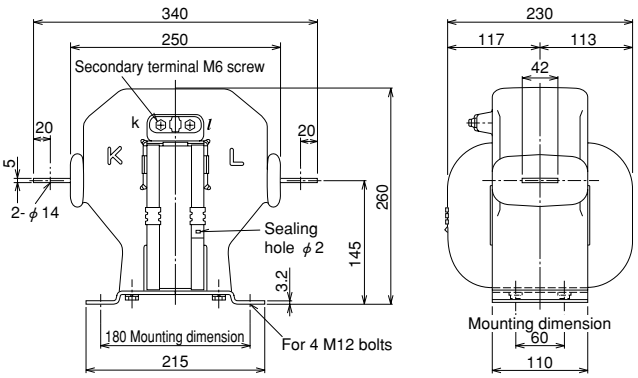
Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
*3 The overcurrent intensity is the guaranteed figure if 25% of the rated load is connected to the secondary side.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

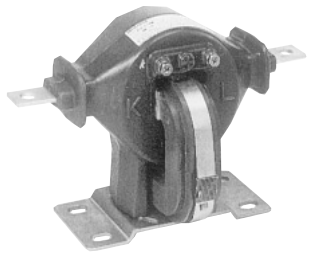
## ■External Dimensions

**Fig. 1　5～100A**



# CD Series High-voltage Current Transformers (less than or equal to 6600V)

## CD-15BB Dedicated Class 1 verification 15VA / 40times / Class 0.5 Epoxy resin mold



## ■Use

- ●General-use meters
- ●Verification in combination with Class 1 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-15BB | 5 | 5 | 15 | 0.5 | 40 | 6900 | 22/60 | 50 or 60 | Fig.1 | 6.5 | Yes | △ |
| | 10 | | | | | | | | | | | |
| | 15 | | | | | | | | | | | |
| | 20 | | | | | | | | | | | |
| | 25 | | | | | | | | | | | |
| | 30 | | | | | | | | | | | |
| | 40 | | | | | | | | | | | |
| | 50 | | | | | | | | | | | |
| | 60 | | | | | | | | | | | |
| | 75 | | | | | | | | | | | |
| | 80 | | | | | | | | | | | |
| | 100 | | | | | | | | | | | |
| | 120 | | | | | | | | | | | |
| | 150 | | | | | | | | | | | |
| | 200 | | | | | | | | | | | |
| | 250 | | | | | | | | Fig.2 | 9.5 | | |
| | 300 | | | | | | | | | | | |
| | 400 | | | | | | | | | | | |

Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 5～200A**

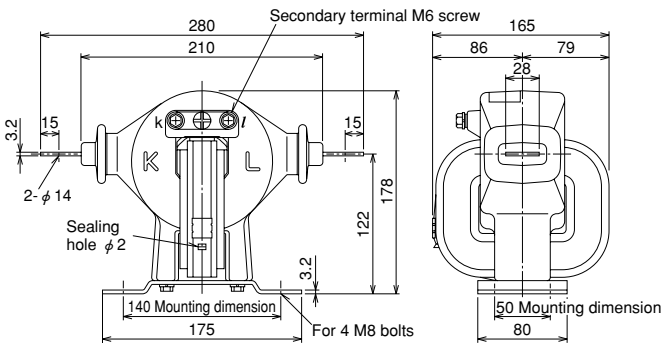
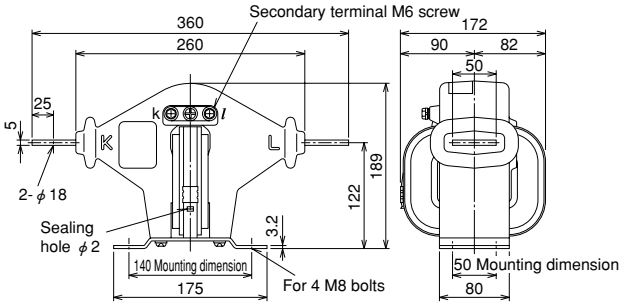


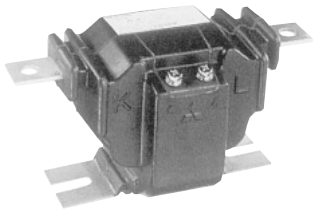

**Fig. 2 250～400A**



# EC Series High-voltage Current Transformers (less than or equal to 6600V)

## EC-0 (Style LA)　40VA / 40times / n>5

Melquid rubber mold



## ■Use

- General-use meters/Relays
- Verification in combination with Class 2 meters can be done.
  For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-1/JEC-1201-2007

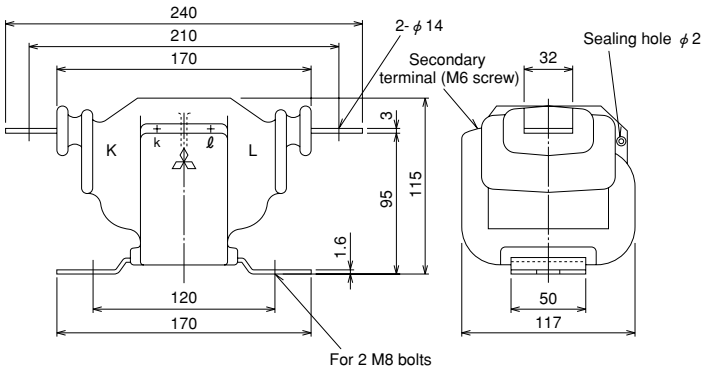
| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EC-0 (Style LA) | 5 | 5 | 40 | 1.0・1PS | 40 | n>5 | 6900 | 22/60 | Both 50/60 | 3.8 | Yes | △ |
| | 10 | | | | | | | | | | | |
| | 15 | | | | | | | | | | | |
| | 20 | | | | | | | | | | | |
| | 30 | | | | | | | | | | | |
| | 40 | | | | | | | | | | | |
| | 50 | | | | | | | | | | | |
| | 60 | | | | | | | | | | | |
| | 75 | | | | | | | | | | | |
| | 100 | | | | | | | | | | | |
| | 120 | | | | | | | | | | | |
| | 150 | | | | | | | | | | | |
| | 200 | | | | | | | | | | | |
| | 300 | | | | | | | | | | | |

Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

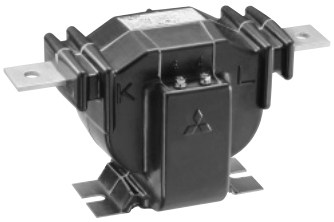


# BN Series High-voltage Current Transformers (less than or equal to 6600V)

## BN-0 (Style LA)

40VA / 40～300times / n>10
15VA / 40～75times / Class 0.5

Melquid rubber mold



## ■Use

- ●General-use meters/Relays
- ●Class 1.0/IPS and Class 0.5 devices can each be verified in combination with Class 1 meters. For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

### (Single ratio)

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | | | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | External dimensions (Fig. 1) | External dimensions (Fig. 2) | External dimensions (Fig. 3) | | | | | | | |
| BN-0 (Style LA) | 10 | 5 | 40 | 1.0・1PS | 40,75,150 | | | n＞10 | 6900 | 22/60 | Both 50/60 | Fig. 1 10<br>Fig. 2 15<br>Fig. 3 30 | Yes | △ |
| | 15 | | | | 40,75,150 | 300 | | | | | | | | |
| | 20 | | | | 40,75,150 | 300 | | | | | | | | |
| | 25 | | | | 40,75,150 | | | | | | | | | |
| | 30 | | | | 40,75,150 | 300 | | | | | | | | |
| | 40 | | | | 40,75,150 | 300 | | | | | | | | |
| | 50 | | | | 40,75,150 | 300 | | | | | | | | |
| | 60 | | | | 40,75,150 | 300 | | | | | | | | |
| | 75 | | | | 40,75,150 | 300 | | | | | | | | |
| | 80 | | | | | 40,75,150 | | | | | | | | |
| | 100 | | | | 40,75,150 | 300 | | | | | | | | |
| | 120 | | | | 40,75,150 | 300 | | | | | | | | |
| | 150 | | | | 40,75,150 | 40kA | | | | | | | | |
| | 200 | | | | 40,75,150 | 40kA | | | | | | | | |
| | 250 | | | | | 40,75,150 | | | | | | | | |
| | 300 | | | | 40,75 | 40kA | | | | | | | | |
| | 400 | | | | 40,75 | 40kA | | | | | | | | |
| | 500 | | | | | 40kA | | | | | | | | |
| | 600 | | | | | 40kA | | | | | | | | |
| | 750 | | | | | 40kA | | | | | | | | |
| | 800 | | | | | 40kA | | | | | | | | |
| | 1000 | | | | | 40kA | | | | | | | | |
| | 1200 | | | | | 40kA | | | | | | | | |
| | 1500 | | | | | | 40kA | | | | | | | |

Notes

*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.

*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

*3 An overcurrent intensity value of more than 150 times is guaranteed if 25% of the rated load is connected to the secondary side.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## <Dedicated Class 1 Verification Devices>

Applicable standard: JISC 1731-1

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) External dimensions (Fig. 2) | Overcurrent strength (times) External dimensions (Fig. 3) | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BN-0 (Style LA) | 10 | 5 | 15 | 0.5 | 40, 75 | | 6900 | 22/60 | 50 or 60 | Fig. 2 15<br>Fig. 3 30 | Yes | △ |
| | 15 | | | | 40 | | | | | | | |
| | 20 | | | | 40, 75 | | | | | | | |
| | 25 | | | | 40, 75 | | | | | | | |
| | 30 | | | | 40 | | | | | | | |
| | 40 | | | | 40, 75 | | | | | | | |
| | 50 | | | | 40, 75 | | | | | | | |
| | 60 | | | | 40, 75 | | | | | | | |
| | 75 | | | | 40, 75 | | | | | | | |
| | 100 | | | | 40, 75 | | | | | | | |
| | 120 | | | | 40, 75 | | | | | | | |
| | 150 | | | | 40, 75 | | | | | | | |
| | 200 | | | | 40, 75 | | | | | | | |
| | 250 | | | | 40, 75 | | | | | | | |
| | 300 | | | | 40, 75 | | | | | | | |
| | 400 | | | | 40, 75 | | | | | | | |
| | 500 | | | | 40kA | | | | | | | |
| | 600 | | | | 40kA | | | | | | | |
| | 750 | | | | 40kA | | | | | | | |
| | 800 | | | | 40kA | | | | | | | |
| | 1000 | | | | 40kA | | | | | | | |
| | 1200 | | | | 40kA | | | | | | | |
| | 1500 | | | | | 40kA | | | | | | |

Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1**

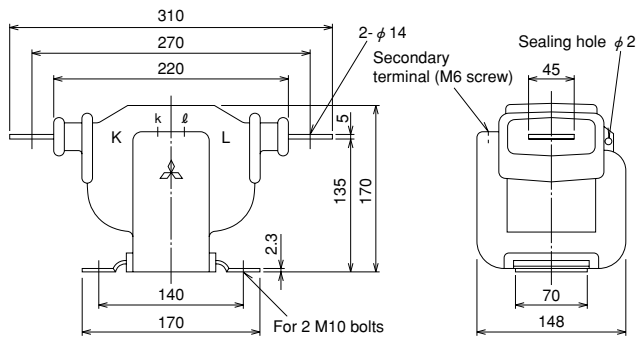



**Fig. 2**

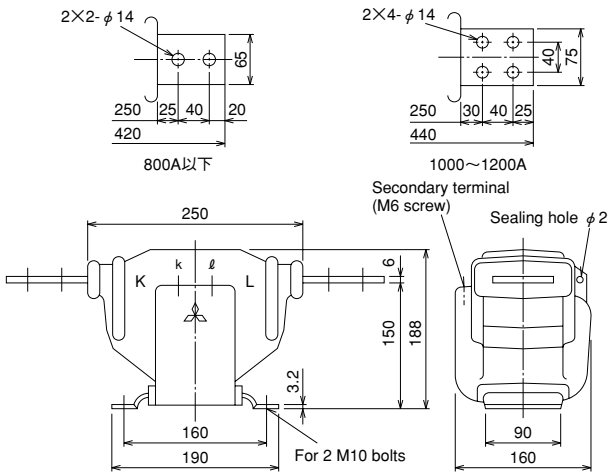
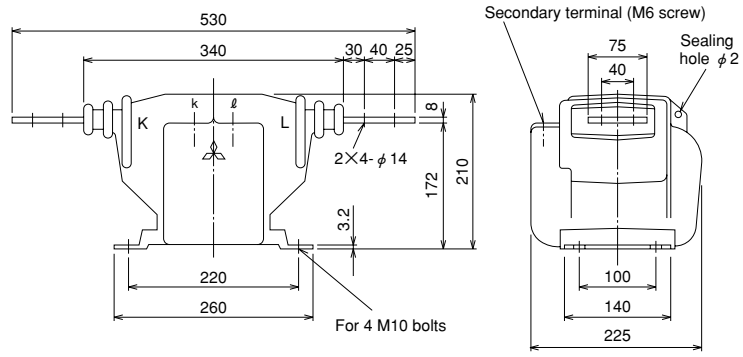


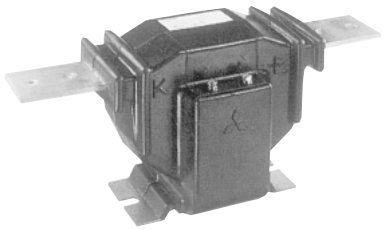

**Fig. 3**



# BN Series Extra-high-voltage Current Transformers (11000V)

## BN-1 (Style LA) 40VA / 40～150times / n>10 / 15VA / 40times / Class 0.5

**Melquid rubber mold**



## ■Use

- ●General-use meters/Relays/Power supply and demand
- ●Verification in combination with Class 2 meters can be done.
- ●Class 0.5W devices are dedicated to Class 1 verification.

## ■Specifications

### (Single ratio)

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BN-1 (Style LA) | 10 | 5 | 40 | 1.0・1PS | 40, 75 | n＞10 | 11500 | 28/90 | 50 or 60 | Fig. 1 | 15 | Yes | △ |
| | 15 | | | | 40, 75, 150 | | | | | | | | |
| | 20 | | | | 40, 75, 150 | | | | | | | | |
| | 25 | | | | 40, 75, 150 | | | | | | | | |
| | 30 | | | | 40, 75, 150 | | | | | | | | |
| | 40 | | | | 40, 75 | | | | | | | | |
| | 50 | | | | 40, 75, 150 | | | | | | | | |
| | 60 | | | | 40, 75, 150 | | | | | | | | |
| | 75 | | | | 40, 75, 150 | | | | | | | | |
| | 80 | | | | 40, 75, 150 | | | | | | | | |
| | 100 | | | | 40, 75, 150 | | | | | | | | |
| | 120 | | | | 40, 75, 150 | | | | | | | | |
| | 150 | | | | 40, 75, 150 | | | | | | | | |
| | 200 | | | | 40, 75, 150 | | | | | | | | |
| | 250 | | | | 40, 75 | | | | | | | | |
| | 300 | | | | 40, 75 | | | | | | | | |
| | 400 | | | | 40, 75 | | | | | | | | |
| | 500 | | | | 40 | | | | | | | | |
| | 600 | | | | 40, 75 | | | | | | | | |
| | 750 | | | | 40, 75 | | | | | | | | |
| | 800 | | | | 40 | | | | | | | | |
| | 1000 | | | | 40 | | | | | | | | |
| | 1200 | | | | 40 | | | | | | | | |
| | 1500 | | | | 40 | | | | | Fig. 2 | 30 | | |

Notes

*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.

*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

*3 An overcurrent intensity value of more than 150 times is guaranteed if 25% of the rated load is connected to the secondary side.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## < Dedicated Class 1 Verification Devices >

Applicable standard: JIS C 1736

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BN-1 (Style LA) | 10 | 5 | 15 | 0.5W | 40 | 11500 | 28/90 | 50 or 60 | Fig. 2 | 30 | Yes | △ |
| | 15 | | | | | | | | | | | |
| | 20 | | | | | | | | | | | |
| | 25 | | | | | | | | | | | |
| | 30 | | | | | | | | | | | |
| | 40 | | | | | | | | | | | |
| | 50 | | | | | | | | | | | |
| | 60 | | | | | | | | | | | |
| | 75 | | | | | | | | | | | |
| | 100 | | | | | | | | | | | |
| | 120 | | | | | | | | | | | |
| | 150 | | | | | | | | | | | |
| | 200 | | | | | | | | | | | |
| | 250 | | | | | | | | | | | |
| | 300 | | | | | | | | | | | |
| | 400 | | | | | | | | | | | |
| | 500 | | | | | | | | | | | |
| | 600 | | | | | | | | | | | |
| | 750 | | | | | | | | | | | |
| | 800 | | | | | | | | | | | |
| | 1000 | | | | | | | | | | | |
| | 1200 | | | | | | | | | | | |
| | 1500 | | | | | | | | | | | |

Notes

*1 Verification in combination with Class 1 meters can be done.
The EV-1 Class 0.5W voltage transformer can be used in combination (refer to page 66).

*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1**

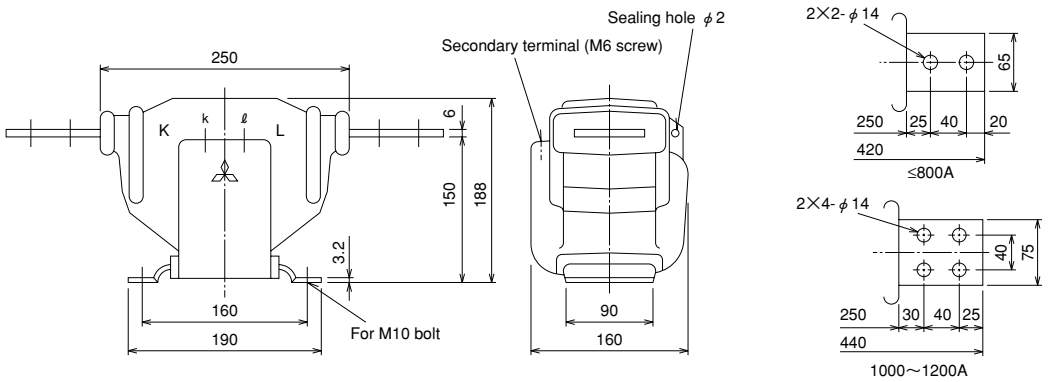
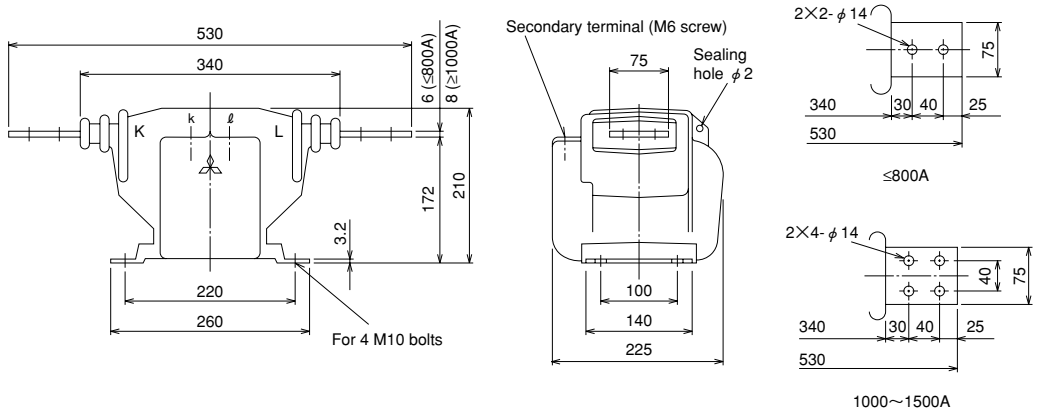



**Fig. 2**



# BN Series Extra-high-voltage Current Transformers (22000V)

## BN-2A 40VA / 40～300times / n>10

**Melquid rubber mold**

## ■Use

●General-use meters/Relays

## ■Specifications

### (Single ratio)

Applicable standards: JIS C 1731-1/JEC-1201-2007

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent strength (times) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BN-2A | 10 | 5 | 25 | 1.0・1PS | 40, 75, 150, 300 | n＞10 | 23000 | 50/125 | 50 or 60 | 30 | No | △ |
| | 15 | | 40 | | 40, 75, 150, 300 | | | | | | | |
| | 20 | | | | 40, 75, 150 | | | | | | | |
| | 25 | | | | 40, 75, 150, 300 | | | | | | | |
| | 30 | | | | 40, 75, 150, 300 | | | | | | | |
| | 40 | | | | 40, 75, 150, 300 | | | | | | | |
| | 50 | | | | 40, 75, 150 | | | | | | | |
| | 60 | | | | 40, 75, 150, 300 | | | | | | | |
| | 75 | | | | 40, 75, 150, 300 | | | | | | | |
| | 80 | | | | 40, 75, 150 | | | | | | | |
| | 100 | | | | 40, 75, 150 | | | | | | | |
| | 120 | | | | 40, 75, 150 | | | | | | | |
| | 150 | | | | 40, 75, 150, 40kA | | | | | | | |
| | 200 | | | | 40, 75, 150, 40kA | | | | | | | |
| | 250 | | | | 40, 75, 150, 40kA | | | | | | | |
| | 300 | | | | 40, 75, 40kA | | | | | | | |
| | 400 | | | | 40, 75, 50kA | | | | | | | |
| | 500 | | | | 40, 75, 50kA | | | | | | | |
| | 600 | | | | 40, 75, 50kA | | | | | | | |
| | 750 | | | | 40, 50kA | | | | | | | |
| | 800 | | | | 40, 50kA | | | | | | | |
| | 1000 | | | | 40, 50kA | | | | | | | |
| | 1200 | | | | 40, 50kA | | | | | | | |

Notes

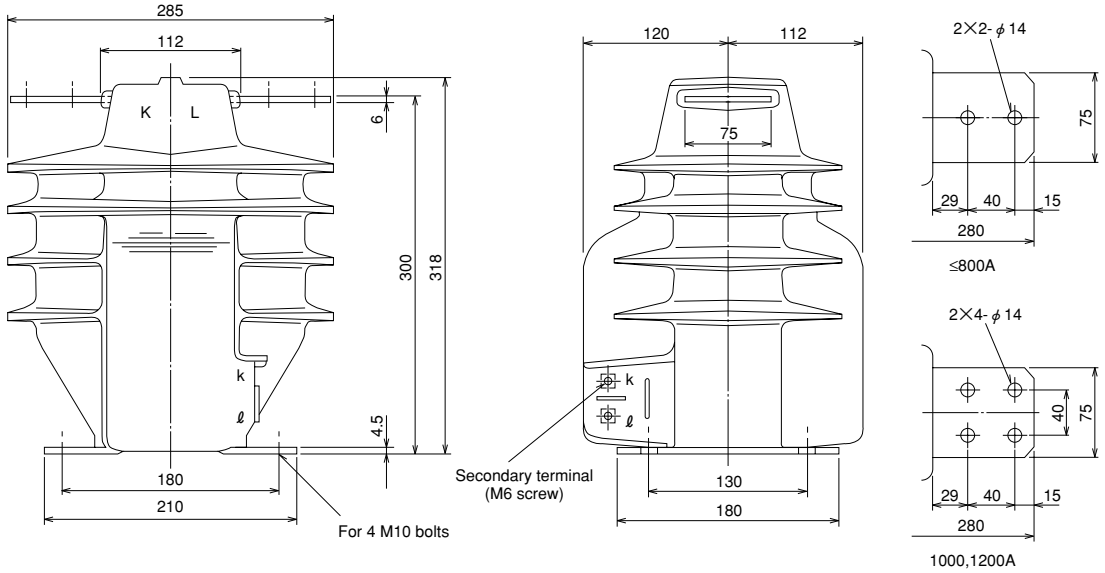
*1 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

*2 An overcurrent intensity value of more than 150 times is guaranteed if 25% of the rated load is connected to the secondary side.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions



# BS Series Through-type Current Transformers

## BS-MD/BS-MC Bare conductor through-type 40VA / 40kA / n>10 Epoxy resin mold

BS-MD

## ■Use

- ●General-use meters/Relays
- ●Using a bare conductor as the primary conductor provides an insulation withstand voltage of 22/60kV. However, the gap between the bare conductor and internal diameter of the current transformer must be 10mm or more.
- ●Using insulated conductors like cables as the primary conductor, this current transformer can be used regardless of the circuit voltage.

## ■Specifications

### (Single ratio)

Applicable standard: JEC-1201-1996

| Type | Window diameter (mm) | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Rated overcurrent (kA) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BS-MD | 60 | 200 | 5 | 40 | 1PS | 40 | n>10 | 6900 | 22/60 | 50 or 60 | Fig. 3 | 25 | No | △ |
| | | 300 | | | | | | | | | Fig. 4 | 15 | | |
| | | 400 | | | | | | | | | | | | |
| | 90 | 500 | | | | | | | | | Fig. 5 | 15 | | |
| | | 600 | | | | | | | | | | | | |
| | | 750 | | | | | | | | | | | | |
| | | 800 | | | | | | | | | | | | |
| | | 1000 | | | | | | | | | | | | |
| | | 1200 | | | | | | | | | | | | |
| | | 1500 | | | | | | | | | Fig. 6 | 10 | | |
| BS-MC | 145 | 400 | 5 | 40 | 1PS | 40 | n>10 | 6900 | 22/60 | 50 or 60 | Fig. 1 | 22 | No | △ |
| | | 500 | | | | | | | | | | | | |
| | | 600 | | | | | | | | | | | | |
| | | 750 | | | | | | | | | | | | |
| | | 800 | | | | | | | | | | | | |
| | | 1000 | | | | | | | | | Fig. 2 | 11 | | |
| | | 1200 | | | | | | | | | | | | |
| | | 1500 | | | | | | | | | | | | |
| | | 2000 | | | | | | | | | | | | |
| | | 2500 | | | | | | | | | | | | |
| | | 3000 | | | | | | | | | | | | |
| | | 4000 | | | | | | | | | | | | |

Note: Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 BS-MC 400～800A**

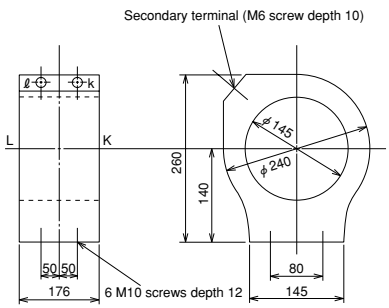



**Fig. 2 BS-MC 1000～4000A**

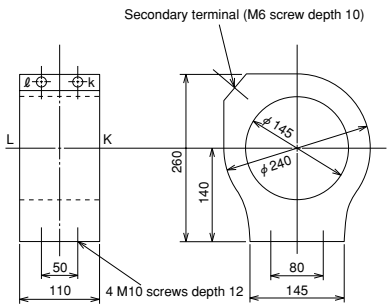



**Fig. 3 BS-MD 200A**

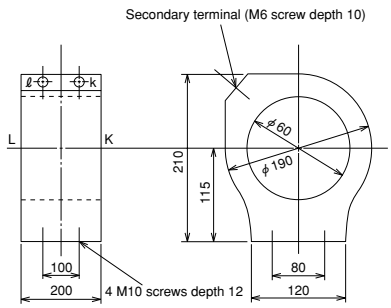



**Fig. 4 BS-MD 300 and 400A**

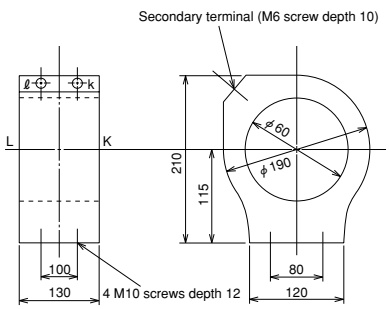



**Fig. 5 BS-MD 500～1200A**

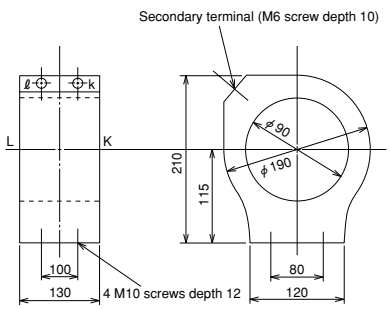
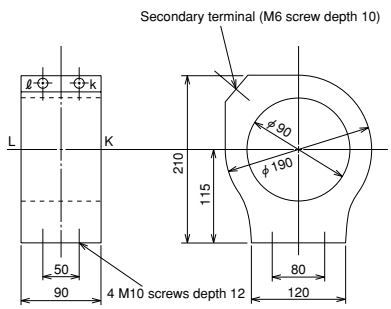



**Fig. 6 BS-MD 1500A**






Manufacturer: Toyo Electric Co., Ltd.

## (Double ratio)

Applicable standard: JEC-1201-1996

| Type | Window diameter (mm) | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Rated overcurrent (kA) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Connection diagram | Terminal layout | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BS-MD | 60 | 300-150 | 5 | 40 | 1PS | 40 | n＞10 | 6900 | 22/60 | 50 or 60 | Fig. 7-1 | 2×18 | Fig. 8 | Fig. 11 | No | △ |
| | | 400-200 | | | | | | | | | Fig. 7-2 | 30 | Fig. 9 | Fig. 12 | | |
| | 90 | 600-300 | | | | | | | | | Fig. 7-3 | 25 | Fig. 10 | Fig. 13 | | |
| | | 800-400 | | | | | | | | | Fig. 7-4 | 20 | | | | |
| | | 1000-500 | | | | | | | | | | | | | | |
| | | 1200-600 | | | | | | | | | | | | | | |
| | | 1500-750 | | | | | | | | | Fig. 7-5 | 15 | | | | |
| BS-MC | 145 | 2000-1000 | | | | | | | | | Fig. 7-6 | | | | | |
| | | 3000-1500 | | | | | | | | | Fig. 7-7 | | | | | |
| | | 4000-2000 | | | | | | | | | Fig. 7-8 | | | | | |

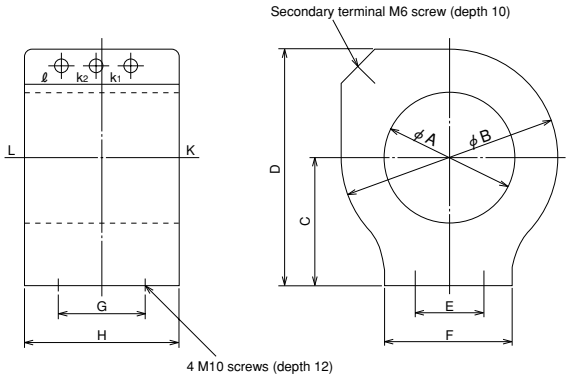
Note: Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

# ■External Dimensions

**Fig. 7 Double ratio**




| Item | Rated primary current (A) | Dimensions (mm) A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 300- 150* | 60 | 190 | 115 | 210 | 80 | 120 | 100 | 2×150 |
| 2 | 400- 200 | | | | | | | | 240 |
| 3 | 600- 300 | 90 | | | | | | | |
| 4 | 800- 400 | | | | | | | | 200 |
| | 1000- 500 | | | | | | | | |
| | 1200- 600 | | | | | | | | |
| 5 | 1500- 750 | | | | | | | | 130 |
| 6 | 2000-1000 | 145 | 240 | 140 | 260 | | 145 | 50 | 110 |
| 7 | 3000-1500 | | 260 | 150 | 280 | | | | |
| 8 | 4000-2000 | | | | | | | 100 | 130 |

Note: * For the current transformer ratio rating of 300～150/5A, two coils shown in the figure to the left make one set.

### Connection diagram

**Fig. 8**

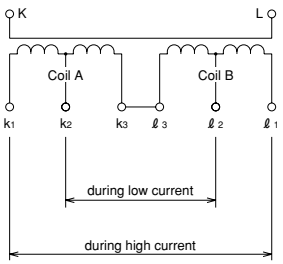



**Fig. 9**

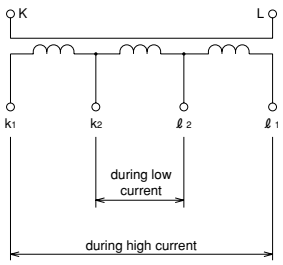
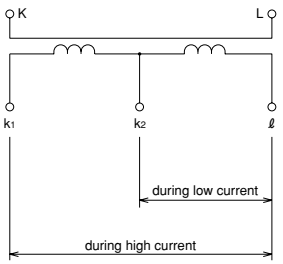



**Fig. 10**




### Terminal layout drawing

**Fig. 11**

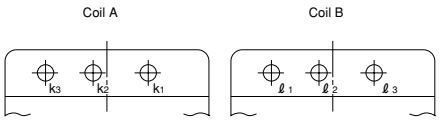



**Fig. 12**

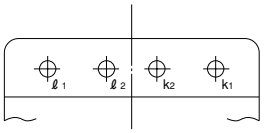
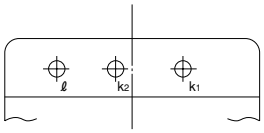


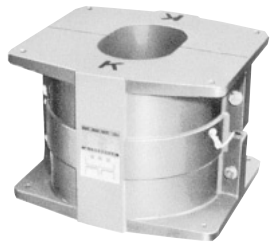

**Fig. 13**




Manufacturer: Toyo Electric Co., Ltd.

# BS Series Through-type Current Transformers

## BS-SA Insulated conductor/Separated $\frac{40VA}{100VA}$ / 40times / n>10 / n>20 Epoxy resin mold



## ■Use

- ●General-use meters/Relays
- ●Using insulated conductors like cables as the primary conductor, this current transformer can be used regardless of the circuit voltage.
- ●Existing cables can be used, making mounting easy.

## ■Specifications

Applicable standard: JEC-1201-1996

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Overcurrent constant | External dimensions | Overcurrent strength (times) | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BS-SA | 200 | 5 | 15 | 3P | n>10 | Fig. 1 | 40 | Depends on primary conductor | Depends on primary conductor | 50 or 60 | No | △ |
| | | | 40 | | | Fig. 2 | | | | | | |
| | | | 15 | | | Fig. 3 | | | | | | |
| | | | 40 | | | Fig. 4 | | | | | | |
| | 300 | | 15 | 3P | n>10 | Fig. 1 | | | | | | |
| | | | 40 | | | Fig. 2 | | | | | | |
| | | | 15 | | | Fig. 3 | | | | | | |
| | | | 40 | | | Fig. 4 | | | | | | |
| | 400 | | 40 | 1PS | n>10 | Fig. 1 | | | | | | |
| | | | 100 | 3P | | Fig. 2 | | | | | | |
| | | | 40 | 1PS | n>20 | | | | | | | |
| | | | | | n>10 | Fig. 3 | | | | | | |
| | | | 100 | 3P | | Fig. 4 | | | | | | |
| | 500 | | 40 | 1PS | n>20 | | | | | | | |
| | | | 40 | | n>10 | Fig. 1 | | | | | | |
| | | | 100 | | | Fig. 2 | | | | | | |
| | | | 40 | | | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | 600 | | 40 | 1PS | n>10 | Fig. 1 | | | | | | |
| | | | 100 | | | Fig. 2 | | | | | | |
| | | | 40 | | n>20 | | | | | | | |
| | | | | | n>10 | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | | | 40 | | n>20 | | | | | | | |
| | 750 | | 40 | 1PS | n>10 | Fig. 1 | | | | | | |
| | | | 100 | | | Fig. 2 | | | | | | |
| | | | 40 | | | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | 800 | | 40 | 1PS | n>10 | Fig. 1 | | | | | | |
| | | | 100 | | n>20 | Fig. 2 | | | | | | |
| | | | 40 | | n>10 | Fig. 3 | | | | | | |
| | | | 100 | | n>20 | Fig. 4 | | | | | | |
| | 1000 | | 40 | 1PS | n>20 | Fig. 1 | | | | | | |
| | | | 100 | | | Fig. 2 | | | | | | |
| | | | 40 | | | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | 1200 | | 40 | 1PS | n>20 | Fig. 1 | | | | | | |
| | | | 100 | | | Fig. 2 | | | | | | |
| | | | 40 | | | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | 1500 | | 40 | 1PS | n>20 | Fig. 3 | | | | | | |
| | | | 100 | | | Fig. 4 | | | | | | |
| | 2000 | | 100 | 1PS | n>20 | Fig. 3 | | | | | | |

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimesions

**Fig. 1**

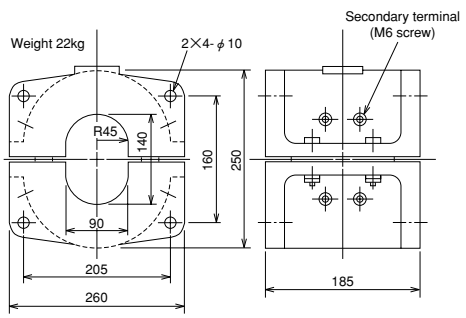



**Fig. 2**

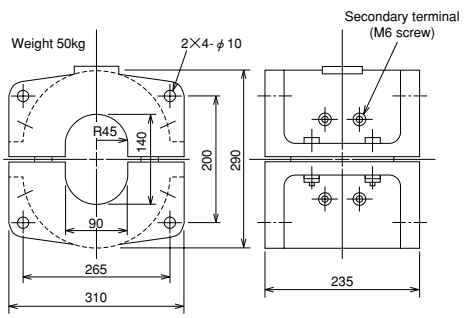



**Fig. 3**

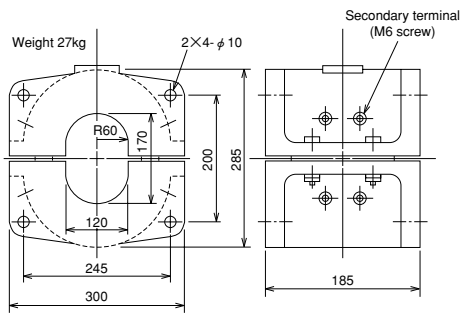
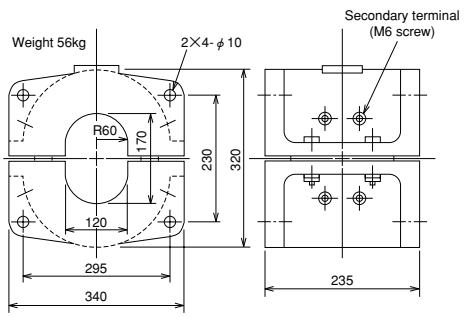



**Fig. 4**

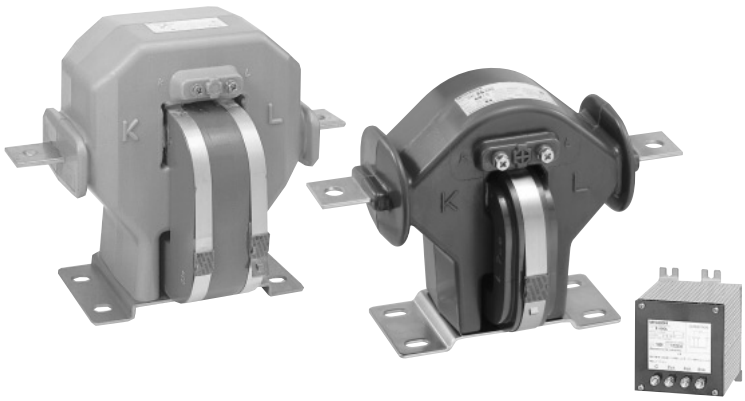



Manufacturer: Toyo Electric Co., Ltd.

# AN/CN Series Current Transformers for Cubicle Type Hight Voltage Power Receiving Units

## CD-10ANA, CD-25ANA and CD-40ANA Withstand current 12.5kA/0.125sec
## CD-10CNA, CD-25CNA and CD-40CNA Withstand current 12.5kA/0.25sec

**Epoxy resin mold**



## ■Use

- ●General-use meters/Relays
- ●These current transformers are used for cubicle-type high-voltage power receiving equipment compliant with JIS standards.

AN/CN Series molded current transformers used for cubicle-type high-voltage power receiving equipment (JIS C 4620) have undergone verification testing in combination with various devices, such as overcurrent relays and high-voltage circuit breakers, and their performance has been confirmed, thus confirming they can be used to configure reliable and economical cubicles.

## ■Specifications

Applicable standard: JIS C 4620 (Appendix)

| Type | Rated primary current (A) | Secondary current (A) | Rated burden (VA) | Accuracy class | Rated overcurrent (kA/s) | Overcurrent constant | Highest voltage (V) | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-10ANA | 20, 30, 40 | 5 | 10 | 1PS | 12.5/0.125 [8/0.125 8/0.16 8/0.25 shared use] | n>10 | 6900 | 22/60 | Both 50/60 | Fig. 3 | 8.5 | No | ◎ |
| | 50, 60, 75 | | | | | | | | | Fig. 2 | 6.5 | | |
| | 100, 150, 200 | | | | | | | | | Fig. 1 | 3.0 | | |
| CD-25ANA | 20, 30, 40 | 5 | 25 | | | | | | | Fig. 4 | 16 | | ◎ |
| | 50, 60, 75 | | | | | | | | | Fig. 3 | 8.5 | | |
| | 100, 150, 200 | | | | | | | | | Fig. 2 | 6.5 | | |
| CD-40ANA | 20, 30 | 5 | 40 | | | | | | | Fig. 5 | 25 | | ◎ |
| | 40, 50, 60 | | | | | | | | | Fig. 4 | 16 | | |
| | 75, 100 | | | | | | | | | Fig. 3 | 8.5 | | |
| | 150, 200 | | | | | | | | | Fig. 2 | 6.5 | | |
| CD-10CNA | 20, 30, 40 | 5 | 10 | 1PS | 12.5/0.25 [12.5/0.16 shared use] | n>10 | 6900 | 22/60 | Both 50/60 | Fig. 3 | 8.5 | No | ○ |
| | 50, 60, 75, 100, 150 | | | | | | | | | Fig. 2 | 6.5 | | |
| | 200 | | | | | | | | | Fig. 1 | 3.0 | | |
| CD-25CNA | 20, 30, 40, 50 | 5 | 25 | | | | | | | Fig. 4 | 16 | | ○ |
| | 60, 75, 100 | | | | | | | | | Fig. 3 | 8.5 | | |
| | 150, 200 | | | | | | | | | Fig. 2 | 6.5 | | |
| CD-40CNA | 20, 30, 40 | 5 | 40 | | | | | | | Fig. 5 | 25 | | ○ |
| | 50, 60, 75 | | | | | | | | | Fig. 4 | 16 | | |
| | 100 | | | | | | | | | Fig. 3 | 8.5 | | |
| | 150, 200 | | | | | | | | | Fig. 2 | 6.5 | | |

Note: Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Models to be Combined and Applicable Conditions

### (1) Overcurrent trip system (current transformer secondary current trip system)

If the relay trip system of a circuit breaker is an overcurrent trip system (secondary current trip system of the current transformer), when a fault current is detected by the instantaneous element of the relay and is cut off, the large current in the secondary circuit of the current transformer will be cut off at contact point b of the relay and contact point b may be damaged. The risk of damage will be high; especially if the primary current of the current transformer is low or the current transformer is being used at a load much lower than the rated load.
Therefore, if the cubicle is both a circuit breaker system and overcurrent trip system, be certain to use these current transformers according to the combination conditions shown in Table 1.

**Table 1 Device combinations and applicable load of current transformers (overcurrent trip system)**

| Device combinations (Mitsubishi Electric products) | | Current transformer specifications | | | Current transformer applicable burden (VA) |
|---|---|---|---|---|---|
| Relay | Circuit breaker *1 | Rated burden | Type | Rated primary current | |
| MOC-A1T-R | VF-8□H-D/DG<br>VF-13□H-D/DG<br>(equipped with overcurrent trip equipment) | 10VA | CD-10ANA<br>CD-10CNA | 20A | 9～10 *2 |
| | | | CD-10ANA<br>CD-10CNA | 30A | 7～10 *2 |
| | | | CD-10ANA<br>CD-10CNA | 40～200A | 5～10 |
| | | 25VA | CD-25ANA<br>CD-25CNA | 20A | 22～25 *2 |
| | | | CD-25ANA<br>CD-25CNA | 30,40A | 18～25 *2 |
| | | | CD-25ANA<br>CD-25CNA | 50～200A | 10～25 |
| | | 40VA | CD-40ANA<br>CD-40CNA | 20～200A | 25～40 |

Notes
*1 The part of the name shown by □ depends on the mounting method. Refer to the Mitsubishi Electric VF-8D/13D Series High-voltage Vacuum Circuit Breakers catalog.
*2 If the load used is less than the rated load, please use the T-100L load regulator (the load used can be adjusted to 2, 4, 6, or 8VA).

### (2) Voltage trip system (capacitor trip system)

Using a voltage trip system to trip relays improves relay reliability.
Table 2 describes the application conditions of this system.

**Table 2 Device combinations and applicable load of current transformers (voltage trip system)**

| Device combinations (Mitsubishi Electric products) | | Current transformer specifications | | | Current transformer applicable burden (VA) *2 |
|---|---|---|---|---|---|
| Relay | Circuit breaker *1 | Rated burden | Type | Rated primary current | |
| MOC-A1V-R | VF-8□H-D/DG<br>VF-8□M-D/DG<br>VF-13□H-D/DG<br>VF-13□M-D/DG<br>(equipped with voltage trip equipment) | 10VA | CD-10ANA<br>CD-10CNA | 20～200A | 5～10 |
| | | 25VA | CD-25ANA<br>CD-25CNA | 20～200A | 10～25 |

Notes
*1 The part of the name shown by □ depends on the mounting method.
*2 If the load used is less than the rated load, please use the T-100L load regulator (the load used can be adjusted to 2, 4, 6, or 8VA).

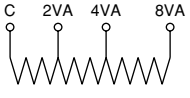
## ■T-100L Load Regulator

This load regulator should be used if the load for connected to the secondary circuit of the current transformer is below the range of applicable load required for the transformer (refer to Tables 1 and 2). Be certain to use the load regulator for each phase (phase the current transformer is set for) and adjust the usage load to a value that is as close as possible to the rated load.

### ●Specifications

| | |
|---|---|
| Rated current | 5A |
| Load value adjustment | 2, 4, 6 or 8VA (power factor 0.8) |
| Short-time current | 800A/0.125sec |
| Withstand voltage | AC2000V 1min |
| External dimensions | Fig. 6 |

### ●Load and Connection Terminals

| Adjusted load value | Connection terminal | Internal connection |
|---|---|---|
| 2VA | C terminal - 2VA terminal |  |
| 4VA | C terminal - 4VA terminal | |
| 6VA | 2VA terminal - 8VA terminal | |
| 8VA | C terminal - 8VA terminal | |

## ■External Dimensions

**Fig. 1**

| Type | Rated current | Rated overcurrent |
|---|---|---|
| CD-10ANA | 100/5～200/5A | 12.5kA/0.125sec |
| CD-10CNA | 200/5A | 12.5kA/0.25sec |

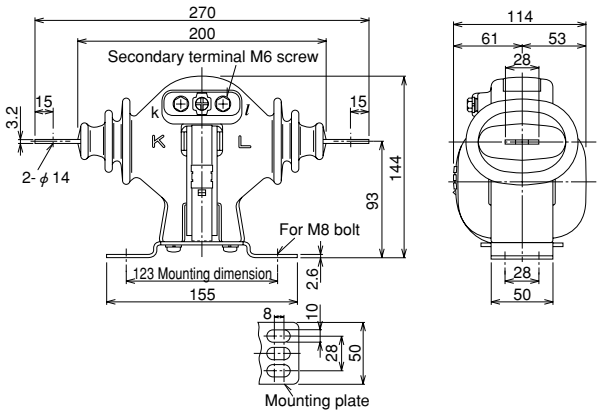



**Fig. 2**

| Type | Rated current | Rated overcurrent |
|---|---|---|
| CD-10ANA | 50/5～75/5A | 12.5kA/0.125sec |
| CD-25ANA | 100/5～200/5A | |
| CD-40ANA | 150/5，200/5A | |
| CD-10CNA | 50/5～150/5A | 12.5kA/0.25sec |
| CD-25CNA | 150/5，200/5A | |
| CD-40CNA | 150/5，200/5A | |

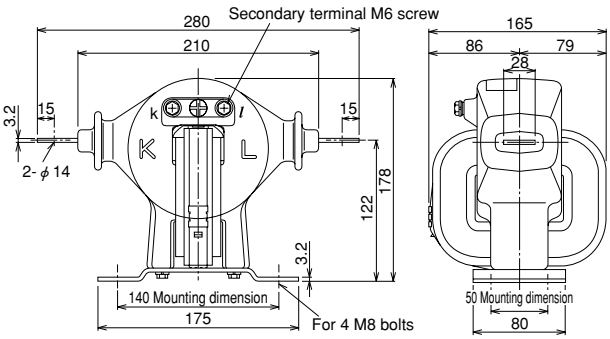



**Fig. 3**

| Type | Rated current | Rated overcurrent |
|---|---|---|
| CD-10ANA | 20/5～40/5A | 12.5kA/0.125sec |
| CD-25ANA | 50/5～75/5A | |
| CD-40ANA | 75/5，100/5A | |
| CD-10CNA | 20/5～40/5A | 12.5kA/0.25sec |
| CD-25CNA | 60/5～100/5A | |
| CD-40CNA | 100/5A | |

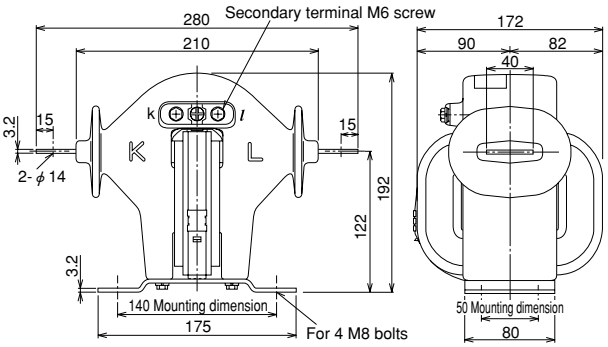


**Fig. 4**

| Type | Rated current | Rated overcurrent |
|---|---|---|
| CD-25ANA | 20/5～40/5A | 12.5kA/0.125sec |
| CD-40ANA | 40/5～60/5A | |
| CD-25CNA | 20/5～50/5A | 12.5kA/0.25sec |
| CD-40CNA | 50/5～75/5A | |

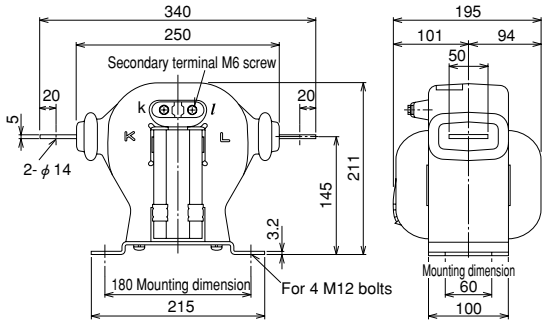



**Fig. 5**

| Type | Rated current | Rated overcurrent |
|---|---|---|
| CD-40ANA | 20/5,30/5A | 12.5kA/0.125sec |
| CD-40CNA | 20/5～40/5A | 12.5kA/0.25sec |

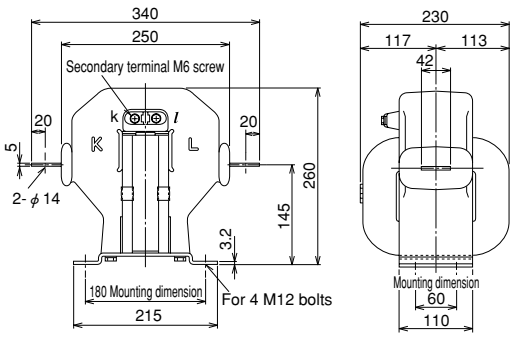
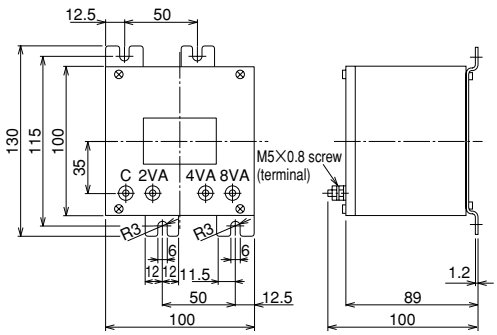



**Fig. 6 T-100L load regulator**




**Various characteristics of AN/CN Series current transformers for cubicle-type high-voltage power receiving equipment**

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-10ANA | 20 | 12.5/0.125 | 31.25 | 1.2 |
| | 30 | | | 1.4 |
| | 40 | | | 1.4 |
| | 50 | | | 2.2 |
| | 60 | | | 2.1 |
| | 75 | | | 1.9 |
| | 100 | | | 6.4 |
| | 150 | | | 8.1 |
| | 200 | | | 8.1 |

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-25ANA | 20 | 12.5/0.125 | 31.25 | 2.0 |
| | 30 | | | 2.1 |
| | 40 | | | 2.2 |
| | 50 | | | 5.4 |
| | 60 | | | 5.9 |
| | 75 | | | 5.7 |
| | 100 | | | 5.6 |
| | 150 | | | 9.3 |
| | 200 | | | 10.2 |

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-40ANA | 20 | 12.5/0.125 | 31.25 | 4.8 |
| | 30 | | | 4.8 |
| | 40 | | | 3.7 |
| | 50 | | | 3.7 |
| | 60 | | | 4.0 |
| | 75 | | | 9.2 |
| | 100 | | | 10.0 |
| | 150 | | | 9.3 |
| | 200 | | | 10.2 |

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-10CNA | 20 | 12.5/0.25 | 31.25 | 1.6 |
| | 30 | | | 1.6 |
| | 40 | | | 1.6 |
| | 50 | | | 2.5 |
| | 60 | | | 2.4 |
| | 75 | | | 2.2 |
| | 100 | | | 3.1 |
| | 150 | | | 3.1 |
| | 200 | | | 8.1 |

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-25CNA | 20 | 12.5/0.25 | 31.25 | 2.0 |
| | 30 | | | 2.3 |
| | 40 | | | 2.4 |
| | 50 | | | 2.6 |
| | 60 | | | 6.7 |
| | 75 | | | 6.5 |
| | 100 | | | 6.2 |
| | 150 | | | 9.3 |
| | 200 | | | 10.2 |

| Type | Rated primary current (A) | Rated overcurrent (kA/s) | Mechanical withstand current (peak value) (kA) | Secondary leakage impedance (VA) |
|---|---|---|---|---|
| CD-40CNA | 20 | 12.5/0.25 | 31.25 | 4.8 |
| | 30 | | | 4.8 |
| | 40 | | | 5.3 |
| | 50 | | | 3.7 |
| | 60 | | | 4.0 |
| | 75 | | | 4.4 |
| | 100 | | | 10.0 |
| | 150 | | | 9.3 |
| | 200 | | | 10.2 |

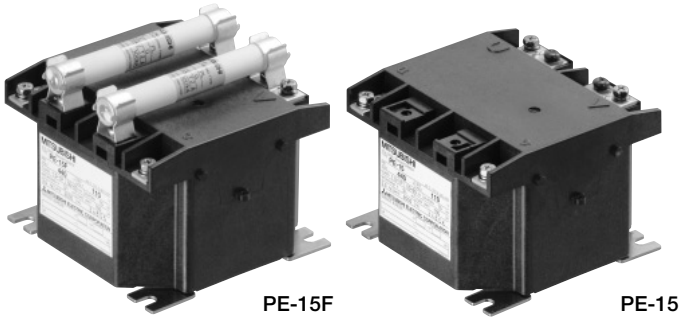
# 5-2 Voltage Transformers (Unearthed Type)

## PE Series Voltage Transformers (less than or equal to 440V)

### PE-15F/PE15/PE-50F/PE-50

15VA/Class 1.0/Class 1P
50VA/Class 3.0/Class 3P

Double mold



PE-15F　　PE-15

## ■Use

●General-use meters/Relays

●Verification of PE-15F and PE-15 voltage transformers combined with Class 2 meters can be done.
For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Limit output (VA) *2 | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | | | |
| PE-15F (with fuse) | 220/110 | 15 | 1.0・1P | 2/— | PL-G | 0.6kV T2A 100kA | Both 50/60 | 100 | Fig. 1 | 3.5 | Yes | ◎ |
| | 440/110 | | | 3/— | | | | | | | | |
| PE-15 | 220/110 | 15 | 1.0・1P | 2/— | — | — | | | Fig. 2 | 3.5 | | |
| | 440/110 | | | 3/— | | | | | | | | |
| PE-50F (with fuse) | 220/110 | 50 | 3.0・3P | 2/— | PL-G | 0.6kV T2A 100kA | | | Fig. 1 | 3.5 | No | ◎ |
| | 440/110 | | | 3/— | | | | | | | | |
| PE-50 | 220/110 | 50 | 3.0・3P | 2/— | — | — | | | Fig. 2 | 3.5 | | |
| | 440/110 | | | 3/— | | | | | | | | |

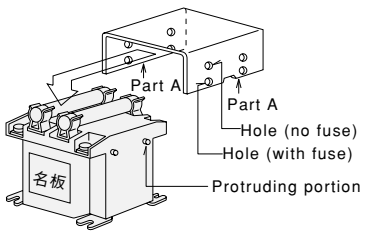
Notes
*1 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*2 If the limiting load is 100A, the error is less than or equal to minus 5%.
*3 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
Remark: A transparent insulation cover can be attached to cover the terminal and fuse sections (option: to be purchased separately).

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ● Insulation cover mounting instructions

Spread part A of the insulation cover outward slightly and place the mounting hole of the insulation cover over the protruding portion of the transformer.




### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | Delivery |
|---|---|---|---|
| | Primary voltage | Secondary voltage | |
| PE-15F<br>PE-50F | 190～550<br>$\frac{380}{\sqrt{3}} \sim \frac{480}{\sqrt{3}}$ | 100～220<br>$\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | △ |
| PE-15<br>PE-50 | 63.5～550<br>$\frac{100}{\sqrt{3}} \sim \frac{480}{\sqrt{3}}$ | | |

Note: For withstand voltage values of specialty transformation ratios, refer to Guidelines for Selecting Voltage Transformers on page 12.

# ■External Dimensions

**Fig. 1 PE-15F and PE-50F**

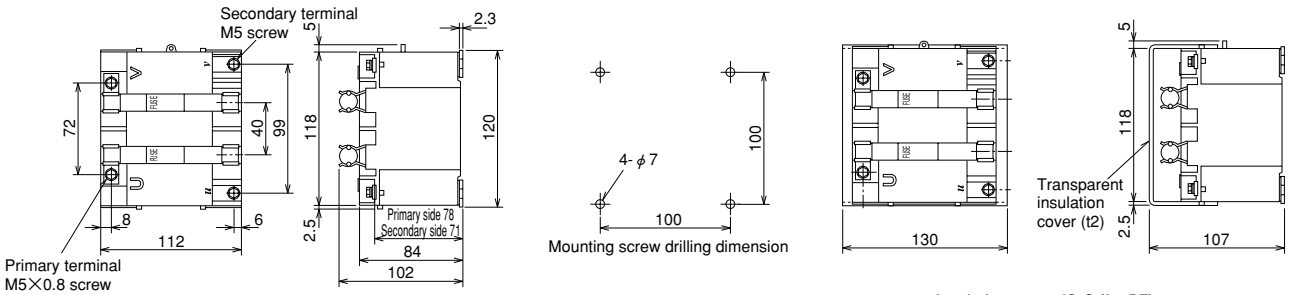
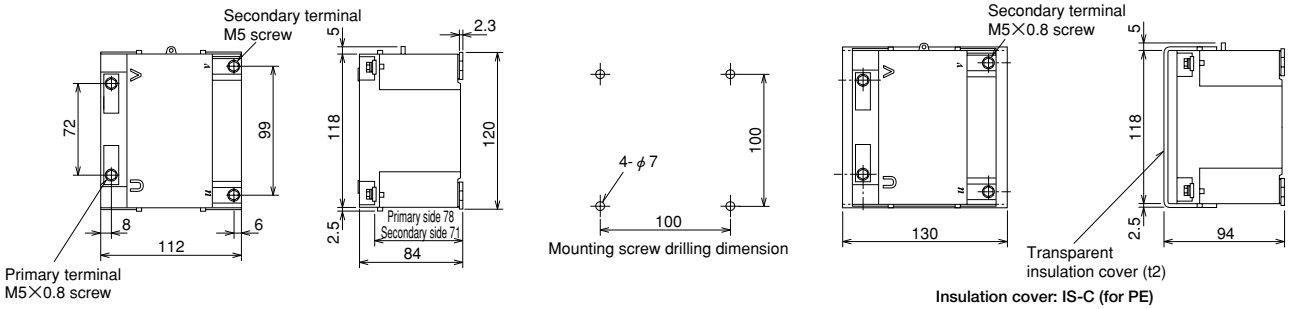



**Fig. 2 PE-15 and PE-50**



# PD Series Voltage Transformers (less than or equal to 6600V)

## PD-50H/PD-50HF 50VA/Class 1.0/Class 1P

Epoxy resin mold

## PD-100H/PD-100HF 100VA/Class 1.0/Class 1P

## ■Use

●General-use meters/Relays

●Verification of PD-50H and PD-50HF voltage transformers combined with Class 2 meters can be done.
For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Limit output (VA) *3 | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | | | |
| PD-50H | 220/110 | 50 | 1.0・1P | 2/— | — | — | Both 50/60 | 200 | Fig. 1 | 8.5 | Yes | ○ |
| | 440/110 | | | 3/— | | | | | | | | |
| PD-50HF (with fuse) | 220/110 | | | 2/— | PL-G | 0.6kV T2A 100kA | | | Fig. 2 | 8.5 | | ◎ |
| | 440/110 | | | 3/— | | | | | | | | |
| | 3300/110 | | | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | | | | | | |
| | 6600/110 | | | 22/60 | | | | | | | | |
| PD-100H | 220/110 | 100 | 1.0・1P | 2/— | — | — | Both 50/60 | 200 | Fig. 1 | 8.5 | No | ○ |
| | 440/110 | | | 3/— | | | | | | | | |
| PD-100HF (with fuse) | 220/110 | | | 2/— | PL-G | 0.6kV T2A 100kA | | | Fig. 2 | 8.5 | | ◎ |
| | 440/110 | | | 3/— | | | | | | | | |
| | 3300/110 | | | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | | | | | | |
| | 6600/110 | | | 22/60 | | | | | | | | |

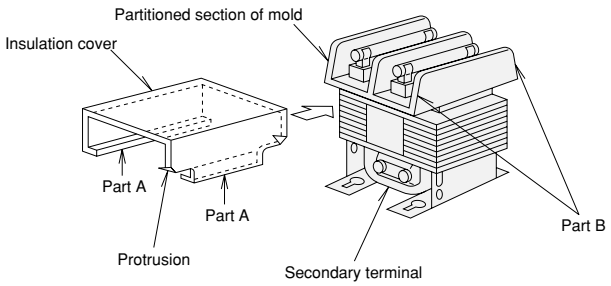
Notes
*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers with voltage transformation ratios of 3300/110V or 6600/110V.
*2 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*3 If the limiting load is 200VA, the error is less than or equal to minus 5%.
*4 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
Remark: A transparent insulation cover can be attached to cover the terminal and fuse sections (option: to be purchased separately).

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ●Insulation cover mounting instructions

Spread part A of the insulation cover outward slightly and insert it into the partitioned section of the mold from the secondary terminal side. The protruding section that attaches to part B prevents the cover from coming off the voltage transformer.



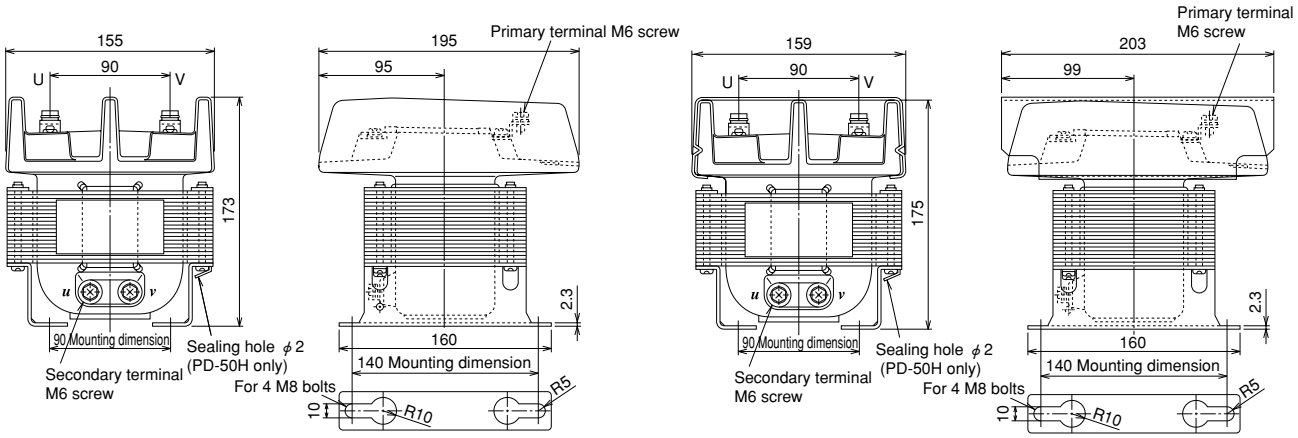

### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | Delivery |
|---|---|---|---|
| | Primary voltage | Secondary voltage | |
| PD-50H<br>PD-100H | 100～600<br>$\frac{200}{\sqrt{3}} \sim \frac{480}{\sqrt{3}}$ | 100～220<br>$\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | △ |
| PD-50HF<br>PD-100HF | 200～6600<br>$\frac{380}{\sqrt{3}} \sim \frac{480}{\sqrt{3}}$ | | |

Notes
*1 PD-50H and PD-50HF have ratings of $\frac{440}{\sqrt{3}}$ V and $\frac{110}{\sqrt{3}}$ V, respectively, with a verification value of 15VA. (The verifiable usage load is 1-12VA.)
*2 For the withstand voltage values of special transformation ratio, refer to Guidelines for Selecting Voltage Transformers on page 12.

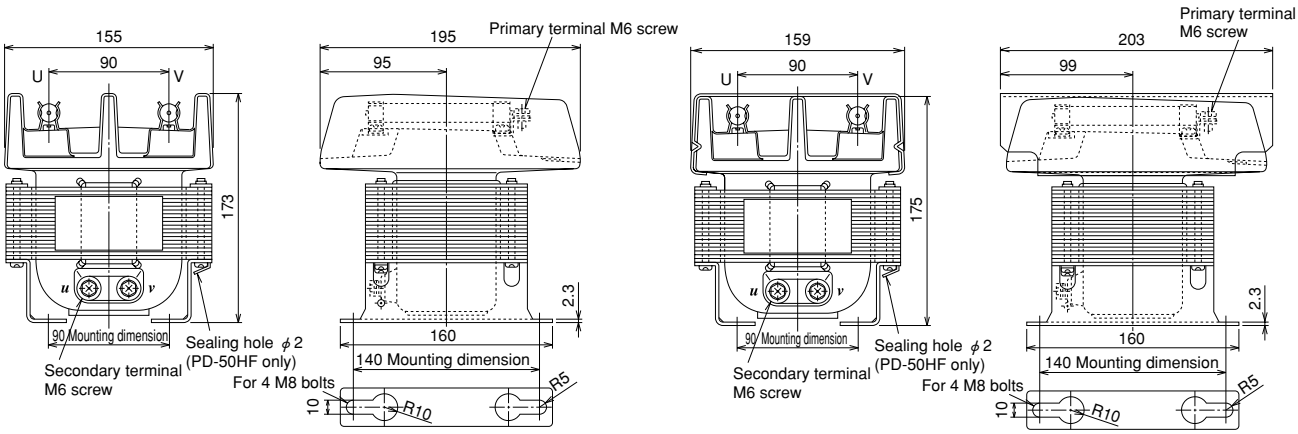
## ■External Dimensions

**Fig. 1 PD-50H and PD-100H** **Insulation cover mounted**




Insulation cover: IS-C (for PD-HF and PD-H)

**Fig. 2 PD-50HF and PD-100HF** **Insulation cover mounted**




Insulation cover: IS-C (for PD-HF and PD-H)

# PD Series Voltage Transformers (less than or equal to 6600V)

## PD-200K/PD-200KFH 200VA/Class 1.0/Class 1P

Epoxy resin mold

## ■Use

●General-use meters/Relays

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Limit output (VA) *2 | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | | | |
| PD-200K | 440/110 | 200 | 1.0・1P | 3/— | | | Both 50/60 | 500 | Fig. 1 | 9.5 | No | △ |
| PD-200KFH (with fuse) | 440/110 | | | 3/— | PL-G | 0.6kV T2A 100kA | | | Fig. 2 | 9.5 | | ◎ |
| | 3300/110 | | | 16/45 | PL-G | 7.2/3.6kV T1A | | | | | | |
| | 6600/110 | | | 22/60 | | 40kA | | | | | | |

Notes

*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers with transformation ratios 3300/110V or 6600/110V.

*2 If the limiting load is 500VA, the error is less than or equal to minus 5%.

*3 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | Delivery |
|---|---|---|---|
| | Primary voltage | Secondary voltage | |
| PD-200K | 380～480 | 100～220 | △ |
| PD-200KFH | 380～6600 | | |

Note: For withstand voltage values of special voltage ratios, refer to "Guidelines for Selecting Voltage Transformers" on page 12.

## ■External Dimensions

**Fig. 1 PD-200K**

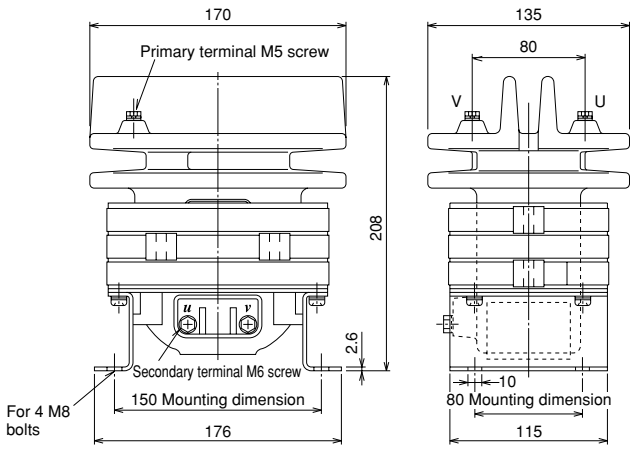
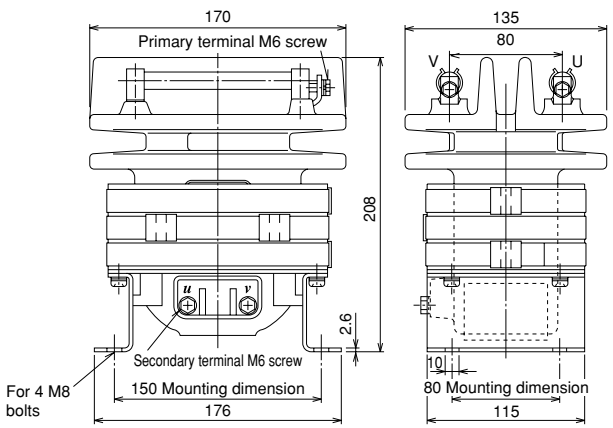



**Fig. 2 PD-200KFH**



# PD Series Voltage Transformers (less than or equal to 6600V)

## PD-50KFH/PD-100KFH Double ratio 50VA/Class 1.0/Class 1P 100VA/Class 3.0/Class 1P Epoxy resin mold

## ■Use

●General-use meters/Relays

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

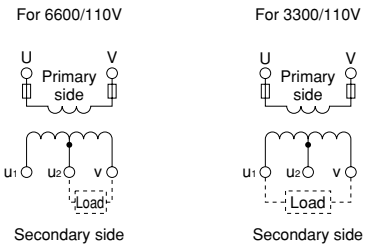
| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Limit output (VA) *2 | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | | |
| PD-50KFH (with fuse) | 6600-3300/110 | 50 | 1.0・1P | 22/60 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | 300 | 9.5 | No | ◎ |
| PD-100KFH (with fuse) | 6600-3300/110 | 100 | 3.0・3P | | | | | | | | |

Notes
*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers.
*2 If the limiting load is 300VA, the error for 6600/110V is less than or equal to minus 5%, and the error for 3300/110V is less than or equal to minus 10%.
*3 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

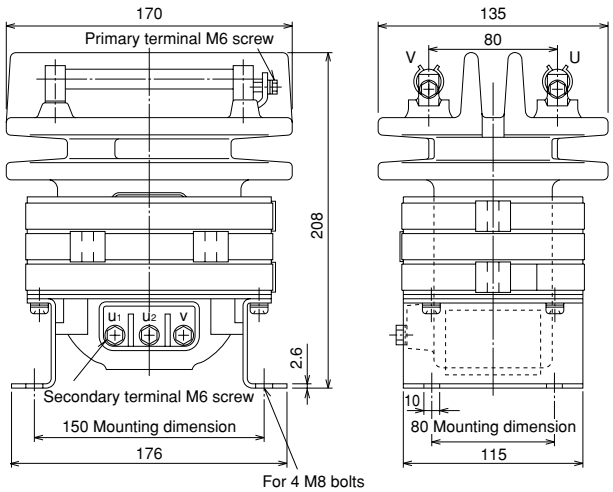
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### Instructions for switching secondary side




## ■External Dimensions

**PD-50KFH and PD-100KFH**

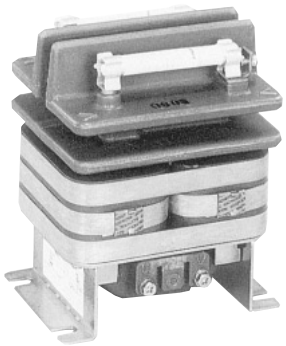


# PD Series Voltage Transformers (less than or equal to 6600V)

## PD-15KFH/PD-25KFH Class 1 / Dedicated verification 15VA/25VA / Class 0.5

## PD-100KFH Class 1 / Dedicated verification 100VA/Class 1.0/Class 1P

Epoxy resin mold



## ■Use

- ●General-use meters/Relays
- ●Verification of PD-15KFH and PD-25KFH in combination with Class 1 meters can be done.
- ●Verification of PD-100KFH in combination with Class 2 meters can be done.

For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | |
| PD-15KFH (with fuse) | 3300/110 | 15 | 0.5 | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | 50 or 60 | 9.5 | Yes | △ |
| | 6600/110 | | | 22/60 | | | | | | |
| PD-25KFH (with fuse) | 3300/110 | 25 | 0.5 | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | 50 or 60 | 9.5 | Yes | △ |
| | 6600/110 | | | 22/60 | | | | | | |
| PD-100KFH (with fuse) | 3300/110 | 100 | 1.0・1P | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | 50 or 60 | 9.5 | Yes | △ |
| | 6600/110 | | | 22/60 | | | | | | |

Notes

*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers.

*2 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.

*3 The production specifications for PD-100KFH are determined based the on characteristics of the current transformer it is combined with as well as the loads and power factors of other meters such as watt-hour meters. Please explain the specification details of the current transformer it is to be combined with, as well as the secondary loads of the voltage transformers and current transformers.

*4 PD -15KFH and PD/25KFH conform to JIS standard C 1731-2.

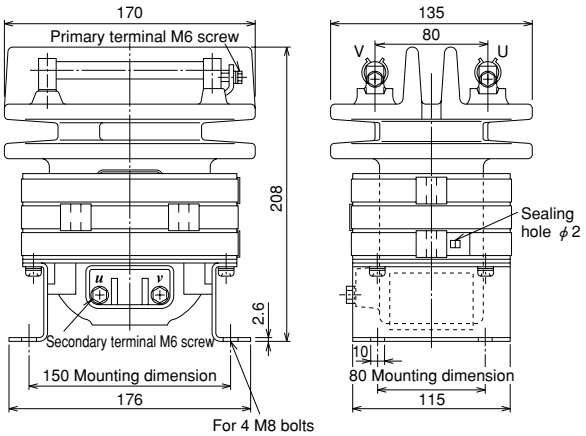
*5 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

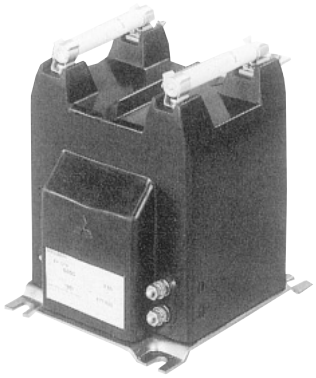
**PD-15KFH, PD-25KFH and PD-100KFH**



# Voltage Transformers (less than or equal to 6600V)

## EP-0FH $\frac{50VA}{100VA}$ /Class 1.0/Class 1P

**Epoxy resin mold (encased in EPT rubber case)**



## ■Use

- ●General-use meters/Relays
- ●Verification of transformers rated at 50VA in combination with Class 2 meters can be done. For combinations, refer to Models Capable of Combining Watt-hour Meters and Verification on page 13.

## ■Specifications

Applicable standards: JIS C 1731-2/JEC-1201-2007

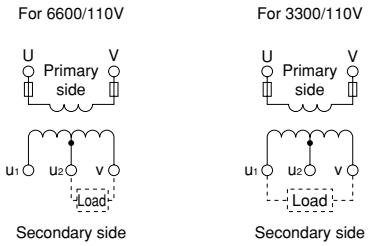
| Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | VT fuse | | Frequency (Hz) | Limit output (VA) *3 | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Model name | Rating | | | | | |
| EP-0FH (with fuse) | 3300/110 | 50 | 1.0・1P | 22/60 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | 300 | 12 | Yes | △ |
| | | 100 | | | | | | | | No | |
| | 6600/110 | 50 | | | | | | | | Yes | ◎ |
| | | 100 | | | | | | | | No | |
| | 6600-3300/110 | 50 | | | | | | | | No | △ |

Notes
*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers.
*2 If ordering a product for verification, be certain to specify "For verification" as well as the frequency.
*3 If the limiting load is 300VA, the error is less than or equal to minus 5%.
*4 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

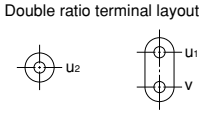
**Delivery time**

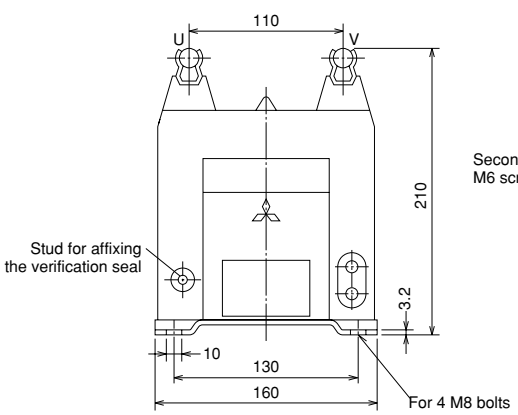
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

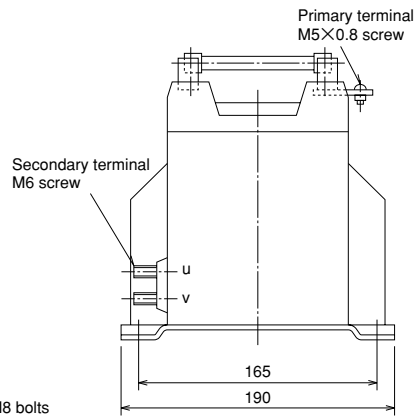
### Instructions for switching secondary side




## ■External Dimensions



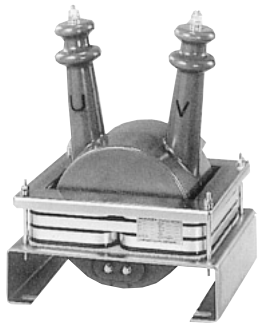



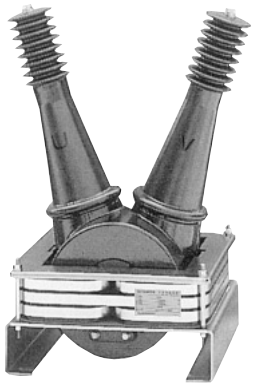
# EV Series Voltage Transformers (11000 to 33000V)

## EV-1/EV-2/EV-3 $\frac{100VA}{200VA}$ /Class 1.0/Class 1P

**Epoxy resin mold**




EV-1




EV-2

## ■Use

- ●General-use meters/Relays/Power supply and demand
- ●The EV-1 Class 0.5W dedicated voltage transformer can be verified in combination with Class 1 meters.

## ■Specifications

Applicable standards: JIS C 1731-2/JEC1201-2007

| Phase | Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Verification (Y/N) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-phase | EV-1 | 11000/110 | 100 | 1.0・1P | 28/90 | 50 or 60 | Fig. 1 | 38 | No | △ |
| | | | 200 | | | | | | | |
| | | | 15 | 0.5W *3 | 28/90 | | | | Yes *2 | |
| | | | 25 | | | | | | | |
| | EV-2 | 22000/110 | 100 | 1.0・1P | 50/125 | 50 or 60 | Fig. 2 | 55 | No | △ |
| | | | 200 | | | | | | | |
| | EV-3 | 33000/110 | 100 | 1.0・1P | 70/170 | 50 or 60 | Fig. 2 | 55 | No | △ |
| | | | 200 | | | | | | | |

Notes

*1 For ratings other than those listed above (voltage transformation ratio, rated load and accuracy class), please contact a Mitsubishi Electric representative.

*2 The current transformer to be combined is the 0.5W-class BN-1 (No. LA) (refer to page 47).

*3 The applicable standard is JIS C1736.

*4 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 EV-1**

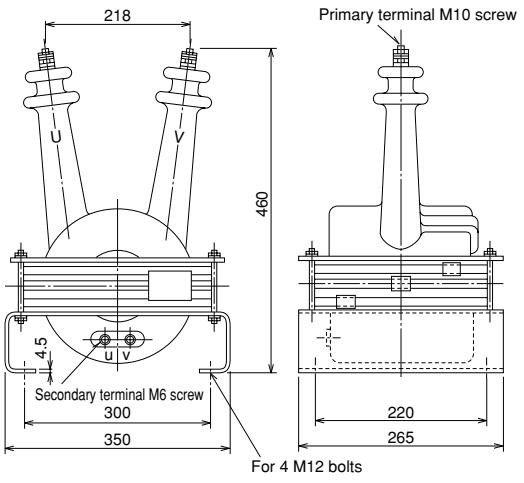
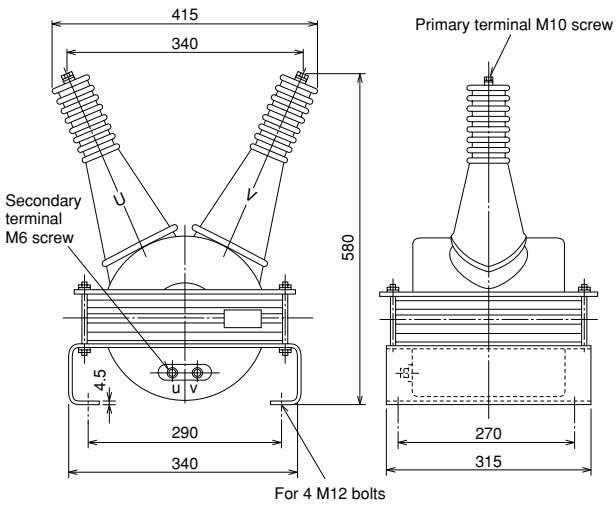



**Fig. 2 EV-2 and EV-3**

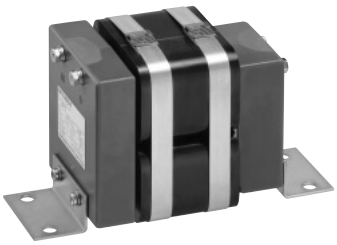


# 5-3 Earthed Voltage Transformers

## EV Series Voltage Transfomers for Grounded Meters (less than or equal to 440V)

### EV-L/EV-LX 50 and 100VA / 50/50 and 100/100VA

Epoxy resin mold



EV-L

## ■Use

●General-use meters/Relays

## ■Specifications

Applicable standard: JEC-1201-2007

| Phase | Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) | Frequency (Hz) | External dimensions | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|
| 1-phase | EV-L | $\frac{220}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 50 | 1P | 0.44/— | Both 50/60 | Fig. 1 | 11 | ○ |
| | | | 100 | | | | | | |
| | | $\frac{440}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 50 | | 0.88/— | | | | |
| | | | 100 | | | | | | |
| | EV-LX | $\frac{220}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 50/50 | 1P/3G | 0.44/— | Both 50/60 | Fig. 2 | 11 | ○ |
| | | | 100/100 | | | | | | |
| | | $\frac{220}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 50/50 | | 0.44/— | | | | |
| | | | 100/100 | | | | | | |
| | | $\frac{440}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 50/50 | | 0.88/— | | | | |
| | | | 100/100 | | | | | | |
| | | $\frac{440}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 50/50 | | 0.88/— | | | | |
| | | | 100/100 | | | | | | |

Note: Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | | Delivery |
|---|---|---|---|---|
| | Primary voltage | Secondary voltage | Tertiary voltage | |
| EV-L | $\frac{200}{\sqrt{3}} \sim \frac{480}{\sqrt{3}}$ | 100～120 | — | △ |
| | | $\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | | |
| EV-LX | | $\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | $\frac{100}{3} \sim \frac{120}{3}$ | |
| | | | $\frac{190}{3} \sim \frac{210}{3}$ | |

Note: For the withstand voltage values of special transformation ratios, please contact a Mitsubishi Electric representative.

●Mitsubishi Electric voltage transfomers for grounded meters comply with the standards of Article 18 Interpretation of Technical Standards for Electrical Equipment. Therefore, disconnect the voltage transformer for grounded meters from the circuit when conducting commercial power frequency withstand voltage testing of boards.

●Be certain to ground the primary ground-side terminal before using the transformer.

## External Dimensions

**Fig. 1 EV-L**

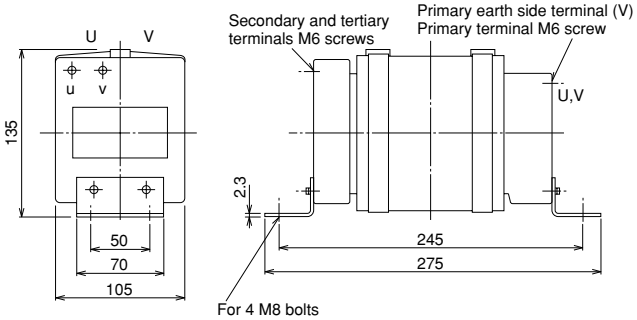
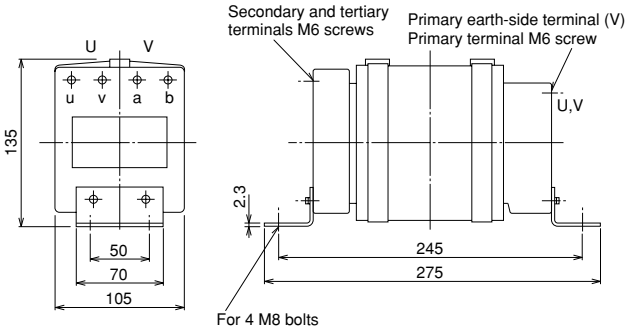



**Fig. 2 EV-LX**

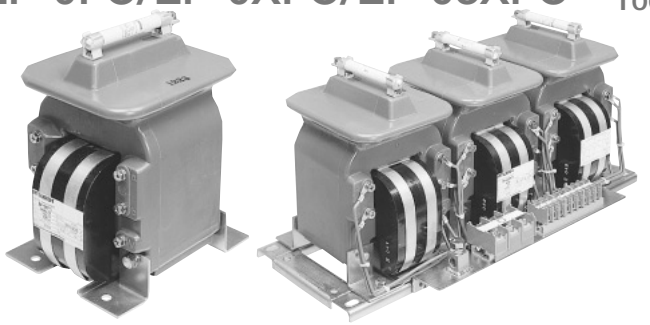


# EF Series Voltage Transfomers for Grounded Meters (less than or equal to 6600V)

## EF-0FC/EF-0XFC/EF-03XFC

100 and 200VA
100/100 and 200/200VA

Epoxy resin mold



## ■Use

●General-use meters/Relays

●These voltage transfomers for grounded meters are used for high-voltage circuits of extra-high-voltage circuits. Before using them, be certain to refer to (5) of 9.3 Precautions when Using Transformers on page 80.

## ■Specifications

Applicable standard: JEC-1201-2007

| Phase | Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) *2 | VT fuse | | Frequency (Hz) | External dimensions | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Model name | Rating | | | | |
| 1-phase | EF-0FC (with fuse) | $\frac{3300}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 100 | 1P | 6.6/45 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | Fig. 1 | 18 | △ |
| | | | 200 | | | | | | | | |
| | | $\frac{6600}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 100 | | 13.2/60 | | | | | | |
| | | | 200 | | | | | | | | |
| | EF-0XFC (with fuse) | $\frac{3300}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 100/100 | 1P/3G | 6.6/45 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | Fig. 1 | 18 | △ |
| | | | 200/200 | | | | | | | | |
| | | $\frac{3300}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 100/100 | | | | | | | | |
| | | | 200/200 | | | | | | | | |
| | | $\frac{6600}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 100/100 | | 13.2/60 | | | | | | |
| | | | 200/200 | | | | | | | | |
| | | $\frac{6600}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 100/100 | | | | | | | | |
| | | | 200/200 | | | | | | | | |
| 3-phase | EF-03XFC (with fuse) | $3300 / 110 / \frac{190}{3}$ | 3×100/3×100 | 1P/3G | 6.6/45 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | Fig. 2 | 58 | △ |
| | | | 3×200/3×200 | | | | | | | | |
| | | $3300 / 110 / \frac{110}{3}$ | 3×100/3×100 | | | | | | | | |
| | | | 3×200/3×200 | | | | | | | | |
| | | $6600 / 110 / \frac{190}{3}$ | 3×100/3×100 | | 13.2/60 | | | | | | |
| | | | 3×200/3×200 | | | | | | | | |
| | | $6600 / 110 / \frac{110}{3}$ | 3×100/3×100 | | | | | | | | |
| | | | 3×200/3×200 | | | | | | | | |

Notes
*1 Mitsubishi Electric does not manufacture no-fuse voltage transformers.
*2 Withstand voltage is induced withstand voltage/lightning impulse withstand voltage.

●Mitsubishi Electric voltage transfomers for grounded meters comply with the standards of Article 18 Interpretation of Technical Standards for Electrical Equipment. Therefore, disconnect the earthed voltage transformer from the circuit when conducting commercial power frequency withstand voltage testing of boards.

●Be certain to ground the primary ground-side terminal before using the transformer.

### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | | Delivery |
|---|---|---|---|---|
| | Primary voltage | Secondary voltage | Tertiary voltage | |
| EF-0FC | $\frac{2400}{\sqrt{3}} \sim \frac{6900}{\sqrt{3}}$ | 100～120 | — | △ |
| | | $\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | | |
| EF-0XFC | | $\frac{100}{\sqrt{3}} \sim \frac{120}{\sqrt{3}}$ | $\frac{100}{3} \sim \frac{120}{3}$ | |
| EF-03XFC | 2400～6900 | 100～120 | $\frac{190}{3} \sim \frac{210}{3}$ | |

Note: For the withstand voltage values of special transformation ratios, please contact a Mitsubishi Electric representative.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

**Fig. 1 EF-0FC and EF-0XFS**

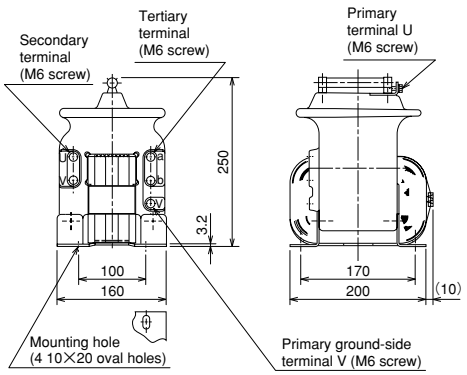
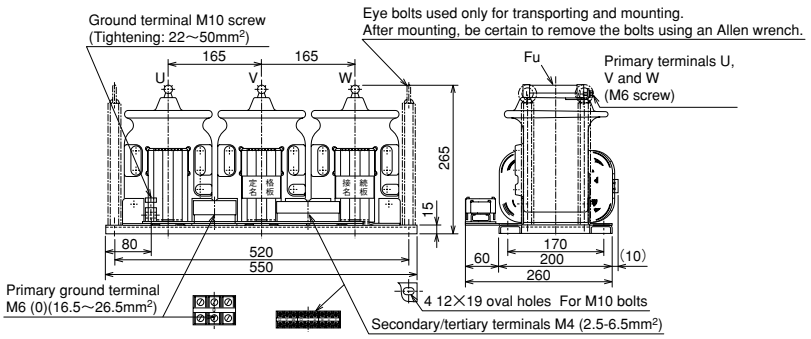
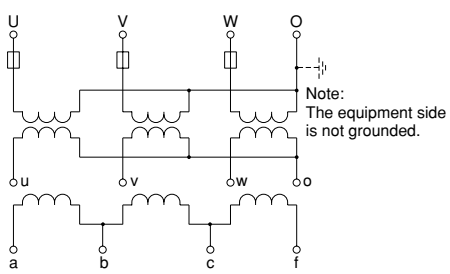



**Fig. 2 EF-03XFC**



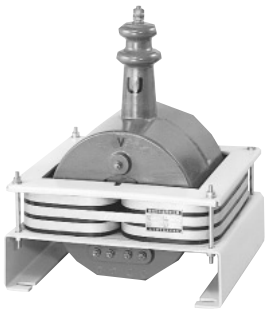

Connection diagram

# EV Series Voltage Transfomers for Grounded Meters (11000~33000V)

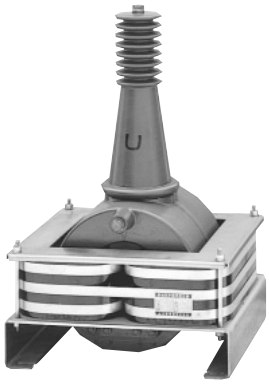
## EV-1/EV-1X/EV-2/EV-2X/EV-3/EV-3X

100 and 200VA
100/100 and 200/200VA

Epoxy resin mold




EV-1X




EV-2X

## ■Use

●General-use meters/Relays

## ■Specifications

Applicable standard: JEC-1201-2007

| Phase | Type | Voltage transformation ratio (V) | Rated burden (VA) | Accuracy class | Withstand voltage (kV) *2 | Frequency (Hz) | External dimensions | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|
| 1-phase | EV-1 | $\frac{11000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 100 | 1P | 22/90 | 50 or 60 | Fig. 1 | 57 | △ |
| | | | 200 | | | | | | |
| | EV-1X | $\frac{11000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 100/100 | 1P/3G | | | | | |
| | | | 200/200 | | | | | | |
| | | $\frac{11000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 100/100 | | | | | | |
| | | | 200/200 | | | | | | |
| | EV-2 | $\frac{22000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 100 | 1P | 44/125 | 50 or 60 | Fig. 2-1 | 64 | △ |
| | | | 200 | | | | | | |
| | EV-2X | $\frac{22000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 100/100 | 1P/3G | | | | | |
| | | | 200/200 | | | | | | |
| | | $\frac{22000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 100/100 | | | | | | |
| | | | 200/200 | | | | | | |
| | EV-3 | $\frac{33000}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ | 100 | 1P | 66/170 | 50 or 60 | Fig. 2-2 | 80 | △ |
| | | | 200 | | | | | | |
| | EV-3X | $\frac{33000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{110}{3}$ | 100/100 | 1P/3G | | | | | |
| | | | 200/200 | | | | | | |
| | | $\frac{33000}{\sqrt{3}} / \frac{110}{\sqrt{3}} / \frac{190}{3}$ | 100/100 | | | | | | |
| | | | 200/200 | | | | | | |

Notes
*1 For ratings other than those listed above (voltage transformation ratio, rated load and accuracy class), please contact a Mitsubishi Electric representative.
*2 Withstand voltage is induced withstand voltage/lightning impulse withstand voltage.

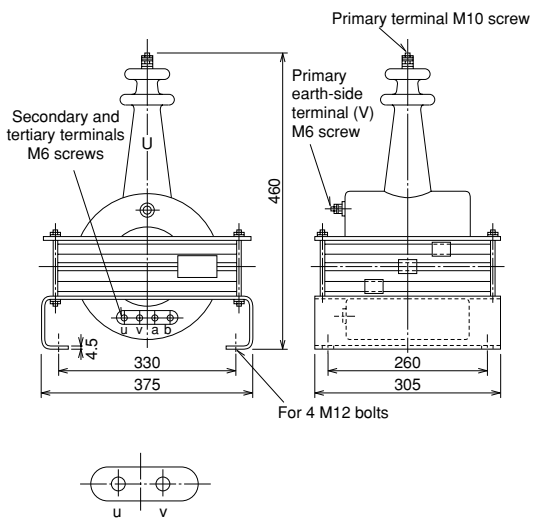
Delivery time

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

●Mitsubishi Electric voltage transfomers for grounded meters comply with the standards of Article 18 Interpretation of Technical Standards for Electrical Equipment. Therefore, disconnect the earthed voltage transformer from the circuit when conducting commercial power frequency withstand voltage testing of boards.
●Be certain to ground the primary ground-side terminal before using the transformer.

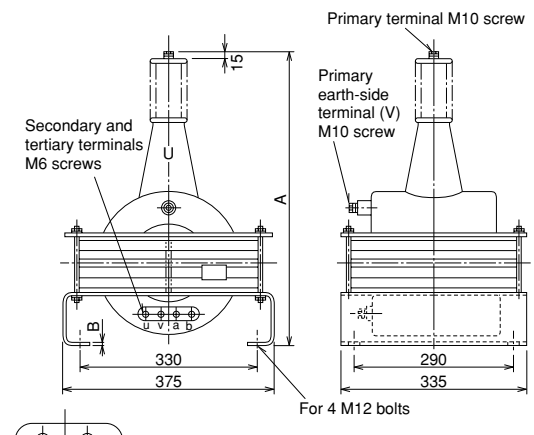
## ■External Dimensions

**Fig. 1 EV-1 and EV-1X**




EV-a secondary terminal layout

**Fig. 2 EV-2, EV-2X, EV-3 and EV-3X**



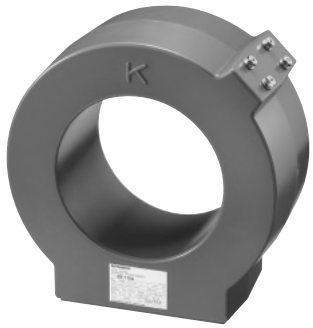

EV-2 and EV-3 secondary terminal layout

| Item | Type | A | B |
|---|---|---|---|
| 1 | EV-2, EV-2X | 580 | 3.2 |
| 2 | EV-3, EV-3X | 595 | 4.5 |

# 5-4 Zero-phase Current Transformers

## BZ Series Zero-phase Current Transformers

### BZ-60A/BZ-90A/BZ-110A/BZ-170A Cable through-type **Epoxy resin mold**



BZ-170A

## ■Specifications

Applicable standard: JEC-1201-2007

| Type | BZ-60A | BZ-90A | BZ-110A | BZ-170A |
|---|---|---|---|---|
| Window diameter ( $\phi$ mm) | 60 | 90 | 110 | 170 |
| Rated primary current (A) | 300 | 600 | 1000 | 1200 |
| Rated zero-phase primary current | 200mA | | | |
| Rated zero-phase secondary current | 1.5mA | | | |
| Rated burden | 10Ω | | | |
| Frequency | Both 50/60Hz | | | |
| Accuracy class | L | | | |
| Overcurrent factor | ＞2000 | | | |
| Excitation impedance | ＞10Ω | | | ＞5Ω |
| Mass (kg) | 5 | 7 | 10 | 20 |
| Delivery | ◎ | ◎ | ◎ | ◎ |

Note: Each rated primary current indicates the maximum current value that is applicable to the corresponding window diameter.

**Delivery time**

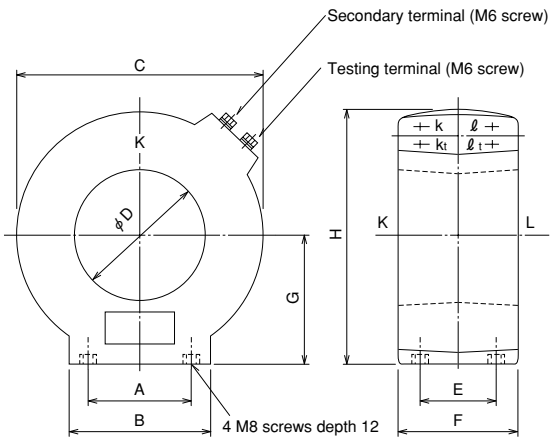
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Use

●Grounding relays
●Test winding (kt, ℓ t) included

**For the primary conductor, be certain to use shielded cables with a circuit insulation function.**

## ■External Dimensions



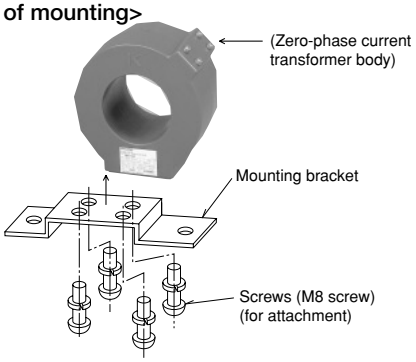

### Dimension variations table

| Type | Window diameter D | A | B | C | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| BZ-60A | 60 | 50 | 80 | 155 | 40 | 70 | 85 | 163 |
| BZ-90A | 90 | 80 | 115 | 195 | 40 | 70 | 100 | 197 |
| BZ-110A | 110 | 80 | 120 | 215 | 60 | 100 | 110 | 218 |
| BZ-170A | 170 | 140 | 190 | 285 | 70 | 125 | 145 | 288 |

## ■Optional Part (mounting bracket)

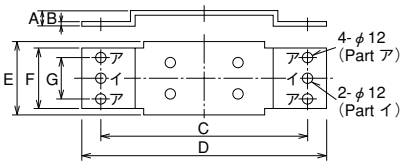
When ordering, be certain to specify the model name, product and quantity required.
(Example: 1 mounting bracket for a BZ-90A)

**<Structural drawing of mounting>**

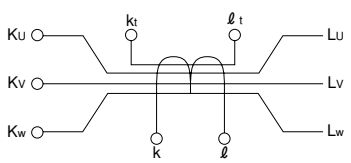



### <Mounting bracket dimension table >

| Type of appropriate zero-phase current transformer | Dimension variations (mm) | | | | | | | Mounting hole |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | |
| BZ-60A | 15 | 3.2 | 110 | 140 | 60 | 60 | — | Part イ |
| BZ-90A | 15 | 3.2 | 150 | 190 | 60 | 60 | — | |
| BZ-110A | 12 | 3.2 | 160 | 200 | 80 | 70 | — | |
| BZ-170A | 20 | 4.5 | 240 | 280 | 100 | 100 | 70 | Part ア |




## ■Connection diagram



# BZ Series Zero-phase Current Transformers

## BZ-120SA Cable through-type/Separated

**Epoxy resin mold**

BZ-120SA

## ■Specifications

Applicable standard: JEC-1201-2007

| Type | BZ-120SA |
|---|---|
| Window diameter ( $\phi$ mm) | 120 |
| Rated primary current (A) | 1000 |
| Rated zero-phase primary current | 200mA |
| Rated zero-phase secondary current | 1.5mA |
| Rated burden | 10Ω |
| Frequency | Both 50/60Hz |
| Accuracy class | L |
| Overcurrent factor | ＞2000 |
| Excitation impedance | ＞5Ω |
| Mass (kg) | 23 |
| Delivery | △ |

Note: Rated primary current indicates the applicable maximum current value.

**Delivery time**

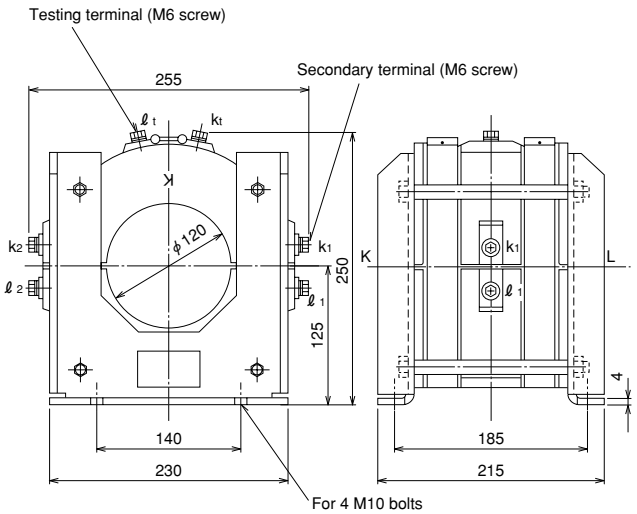
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■Use

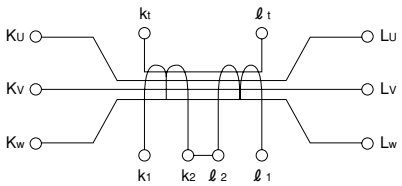
- Grounding relays
- Can be connected using existing cables.
- Test winding (terminal kt, ℓ t) included

**For the primary conductor, be certain to use shielded cables with a circuit insulation function.**

## ■External Dimensions

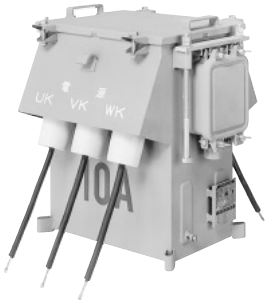



## ■Connection diagram



# 5-5 Voltage&Current Transformers

## PO-2HB/PO-6HB Outdoor-use 15VA • Class 1.0W / Class 0.5W Epoxy resin mold




## ■Use

●Power supply and demand

●Verification of Class 1.0W devices in combination with Class 2 meters, and Class 0.5 devices with Class 1 meters can be done.

## ■Specifications

Applicable standard: JIS C 1736

| Type | Phase wiring system *5 | Meter voltage transformer | | Current Transformer | | Accuracy class *2 | Overcurrent strength (times) | Withstand voltage (kV) | Frequency (Hz) *1 | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage transformation ratio (V) | Rated burden (VA) | Current transformation ratio (A) | Rated burden (VA) | | | | | | |
| PO-2HB | 3-phase, 3-wire | 3300/110 | 2×15 | 10/5, 15/5, 20/5, 30/5, 40/5, 50/5, 60/5, 75/5, 100/5, 150/5, 200/5 | 2×15 | 1.0W or 0.5W | 40 *4 | 16/45 | 50 or 60 | 72 | △ |
| | | 6600/110 | 2×25*3 | | | | | 22/60 | | | |
| | | | | 250/5, 300/5, 400/5 | | | | | | 74 | |
| PO-6HB | 3-phase, 3-wire | 6600/110 | 2×15 | 20/5, 50/5 | 2×15 | 1.0W or 0.5W | 150 | 22/60 | 50 or 60 | 72 | △ |

Notes

*1 When ordering, be certain to specify the frequency.

*2 Be certain to specify the accuracy class. If it is not specified, Class 1.0W used applied.

*3 Mitsubishi Electric manufactures voltage transformers with a rated load of 2×25VA upon requested.

*4 For ratings less than or equal to 100/5A, Mitsubishi Electric manufactures devices with an overcurrent strength times of 75.

*5 Do not use combination voltage/current transformers in single phase as the internal voltage transformer can burn out (refer to page 5 for details).

*6 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

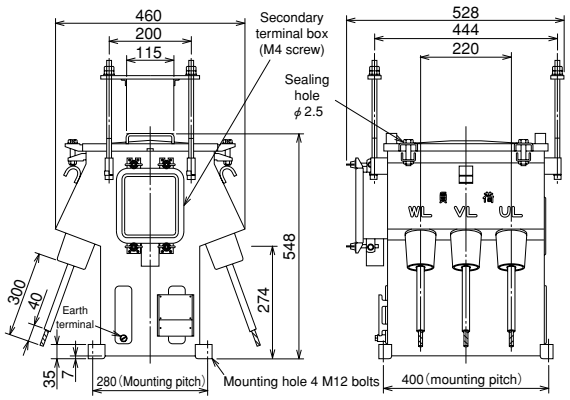
| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ●Primary-side cable size

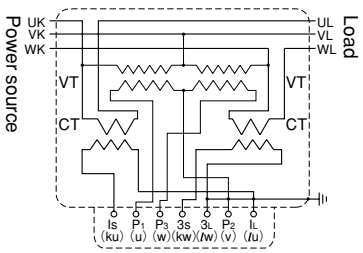
| Type | Primary current (A) | Cable size |
|---|---|---|
| PO-2HB | 10～50 | 22mm$^2$ |
| | 60～100 | 60mm$^2$ |
| | 150, 200 | 80mm$^2$ |
| | 250～400 | 125mm$^2$ |

| Type | Primary current (A) | Cable size |
|---|---|---|
| PO-6HB | 20 | 22mm$^2$ |
| | 50 | 60mm$^2$ |

## ■External Dimensions




## ■Connection Diagram

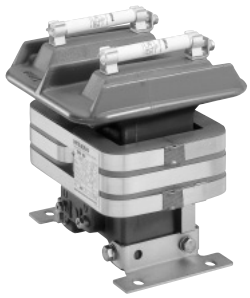


# 5-6 Transformer for control circuits

## EMT-K/EMT-BB 300 and 600VA

Epoxy resin mold

EMT-K



EMT-BB

## ■Use

●Operating power supplies of high-voltage circuit breakers

## ■Specifications

Applicable standard: JEC-2200

| Type | Voltage transformation ratio (V) | Capacity (VA) | | Withstand voltage (kV) *2 | VT fuse | | Frequency (Hz) | External dimensions | Mass (kg) | Delivery |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Continuous | 2sec rating *1 | | Model name | Rating | | | | |
| EMT-K (with fuse) | 3300/110 | 300 | 1500 | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | Fig. 1 | 9.5 | ◎ |
| | 6600/110 | | | 22/60 | | | | | | |
| EMT-BB (with fuse) | 3300/110 | 600 | 4000 | 16/45 | PL-G | 7.2/3.6kV T1A 40kA | Both 50/60 | Fig. 2 | 13 | |
| | 6600/110 | | | 22/60 | | | | | | |

Notes
*1 Considering a 10-cycle duty with 0.2-sec current and 1.8-sec interval.
*2 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.

**Delivery time**

| Symbol | ◎Standard product | ○ Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

### ●Special transformation ratio range manufactured

| Type | Voltage range manufactured (V) | | Delivery |
|---|---|---|---|
| | Primary voltage | Secondary voltage | |
| EMT-K | 3000～6600 | 100～220 | △ |
| EMT-BB | | | |

## ■External Dimensions

**Fig. 1 EMT-K**

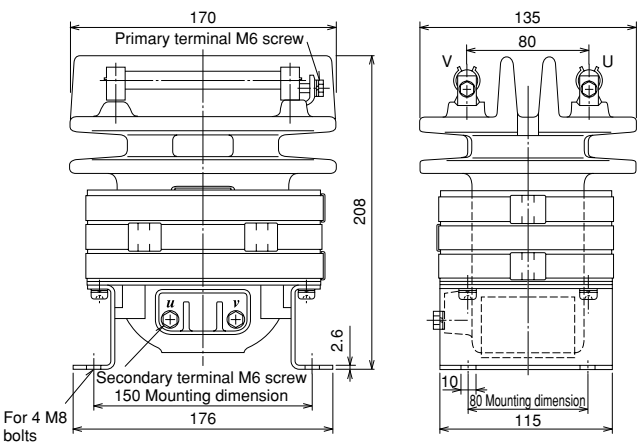
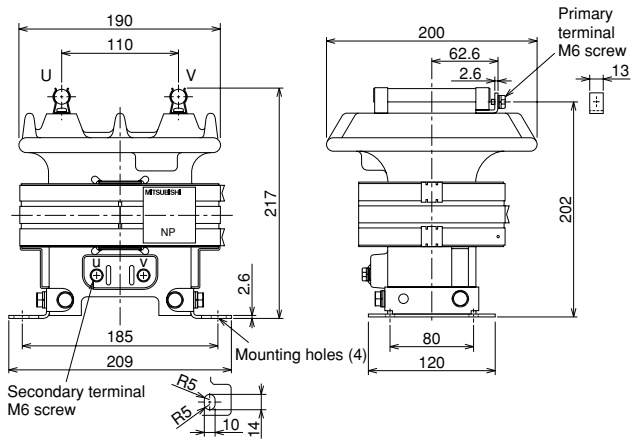



**Fig. 2 EMT-BB**

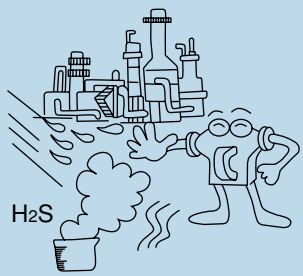
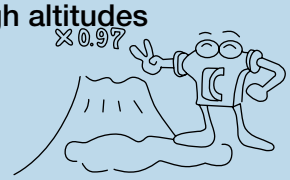
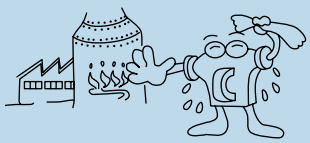
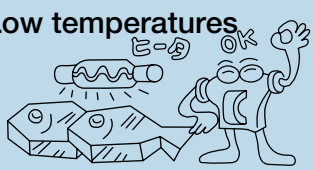


# 1. Special Environments

Meter transformers are used extensively and in various environments. Mitsubishi Electric meter transformers are manufactured based on the standard operating conditions shown in the box to the right. If a transformer is to be used in environmental conditions other than specified, be certain to take the following issues into account.

### Standard Operating Conditions (JIS and JEC standard values)

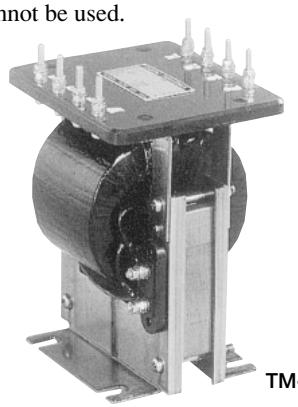
- Ambient temperature: -20～40℃ Plus average 24hr temperature of 35℃ or less.
- Humidity: No humidity (condensation)
- Altitude: 1000m or less
- Environmental conditions: Minimal dust, corrosive gas or salt-laddened wind

| Special Environment | Specifications | Applicable type |
|---|---|---|
| **High-temperature/humidity**  | **Anti-fungus/moisture-proof treatment**<br>High humidity may lead to degradation in performance, such as weakening dielectric strength. To avoid this, meter transformers are treated with a special anti-fungus/moisture-proof coating and corrosion-resistant plating. | **Current transformers**<br>●CW Series (excluding heat-resistant, distribution board and separated design)<br>●CD-40K, CD-40, CD-40NA, CD-40ENA, CD-40GNA<br>**Voltage transformers**<br>●PE Series<br>●PD-50HF, PD-100HF, PD-200KFH |
| **Corrosive gases**   | **Supplemental corrosion resistance**<br>If meter transformers are to be used where there is much corrosive gas, they are generally encased in a protective corrosion-resistant case. However, places where there is minimal corrosive gas, for convenience, corrosion-resistant plating can be used for meeting corrosion-resistant specifications. The metallic portions of meter transformers are treated with corrosion-resistant plating. | **Current transformers**<br>●CD-40K, CD-40NA, CD-40ENA, CD-40GNA, EC-0 (LA) and BN-0 (LA)<br>**Earthed voltage transformers**<br>●EF-0FC, EF-0XFC<br>Standard specifications can be applied to the following models.<br>**Current transformers**<br>●CW Series<br>●CD-40<br>**Voltage transformers**<br>●PE Series<br>●PD-50HF, PD-100HF, PD-200KFH |
| **High altitudes**   | If a meter transformer will be used at an altitude of more than 1000m above sea level, it must be used at reduced withstand voltage and current. The ANSI standard specifies applying the withstand voltage value and rated current value of the current transformer multiplied by the corresponding constants in the table to the right. | |
| **Pollution/humidity**   | The mold materials use for voltage and current transformers have unique organic material tracking phenomenon, and are not to be used in places that are polluted or the humidity (condensation) is 85% or higher. A space heater must be installed for use in humid environments subject to generating condensation. | |
| **High temperatures**  | If a meter transformer is to be used in a place where the temperature is higher than the ambient temperature range stated in the standard operating conditions, be certain to select one of the following:<br>Current transformer ●Select a transformer that has a current transformation ratio higher than the predefined value.<br>●Select a transformer that has an overcurrent intensity larger than the predefined value.<br>Voltage transformer ●Reduce the use load. | |
| **Low temperatures**   | If a meter transformer is to be used in a place where the temperature is lower than the ambient temperature range stated in the standard operating conditions, be certain to use a double mold, epoxy resin mold or Melkid rubber mold model. If a transformer is to be used in a place where the temperature may be below -20℃, be certain to use a space heater so that the temperature is maintained at -20℃ or above. | |

| Altitude (m) | Correction value | |
|---|---|---|
| | Withstand voltage | CT rated current |
| 1000 | 1.00 | 1.00 |
| 1500 | 0.95 | 0.985 |
| 3000 | 0.80 | 0.97 |

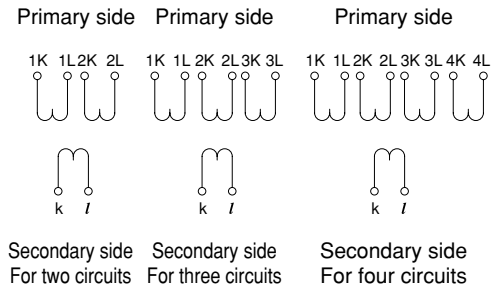
# 2. Totalizing Current Transformers

A synthetic current transformer measures the total of all multiple circuits, inputs the output from the primary current transformer into itself and then executes vector-based current synthesis. It should be noted that synthetic current transformers are used in cases where the current transformation ratio of the primary current transformer is the same. If the ratios are different, the synthetic current transformer cannot be used.



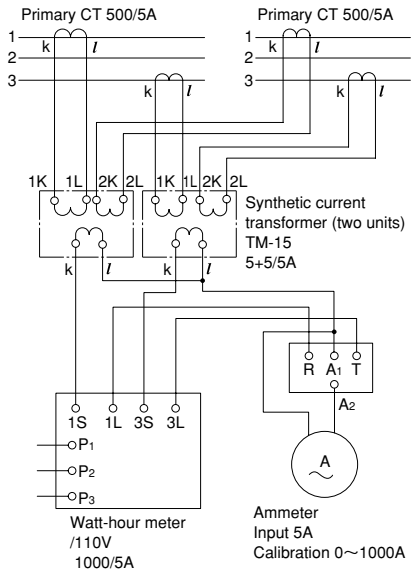
TM-40 (4-circuit model)

## Connection diagram




## Example use of synthetic current transformer (low-voltage circuit)

In the case of synthesizing 3-phase, 3-wire and two circuits, and measuring the electric energy and current.




## ■Specifications (5+5A system)

Applicable standard: JIS C 1731-1

| Type | TM-15 | | | TM-40 | | |
|---|---|---|---|---|---|---|
| No. of synthetic circuits | 2 | 3 | 4 | 2 | 3 | 4 |
| Rated primary current (A) | 5+5 | 5+5+5 | 5+5+5+5 | 5+5 | 5+5+5 | 5+5+5+5 |
| Rated secondary current (A) | 5 | | | 5 | | |
| Rated burden (VA) | 15 | | | 40 | | |
| Accuracy class | 1.0 or 0.5 *1 | | | 1.0 | | |
| Frequency (Hz) | Both 50/60 | | | Both 50/60 | | |
| Highest voltage/withstand voltage*4 (kV) | 0.23/2/— or 1.15/4/— *2 | | | 0.23/2/— or 1.15/4/— *2 | | |
| Overcurrent strength (times) | 40 | | | 40 | | |
| Insulation method | Special varnishing process | | | Special varnishing process | | |
| External dimensions | Fig. 1 | Fig. 2 | Fig. 3 | Fig. 1 | Fig. 2 | Fig. 3 |
| Mass (kg) | 7 | | | 7 | | |
| Delivery | △ | | | △ | | |
| Verification (Y/N) | No | | | No | | |

Notes
*1 If the accuracy class is Class 0.5, be certain to specify it.
*2 If the peak in voltage is 1150V, be certain to specify it.
*3 A 5A system (5+5/10A) (only for two circuits) can also be manufactured.
*4 Withstand voltage value indicates commercial power frequency withstand voltage/lightning impulse withstand voltage.
Remarks:
1) 5+5A system: This synthesizes each of circuit current and outputs a 5A current to the secondary side of the synthetic current transformer.
2) 5A system: This uses only one of two circuits and outputs a 5A current to the secondary side of the synthetic current transformer. Therefore, if two circuits are used at the same time, the current transformer can be used only when the current synthesized from the two circuits is 5A or less.

**Delivery time**

| Symbol | ◎Standard product | ○Semi-standard product | △Special product |
|---|---|---|---|
| Standard delivery time | In inventory | Within 20 days | 21-60 days |

## ■External Dimensions

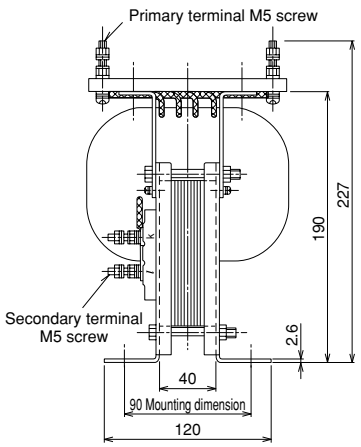



**Fig. 1 2-circuit synthesis**

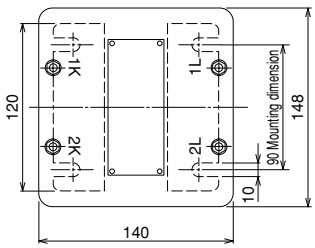



**Fig. 2 3-circuit synthesis**

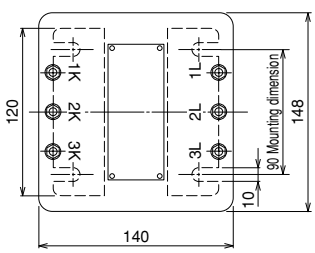
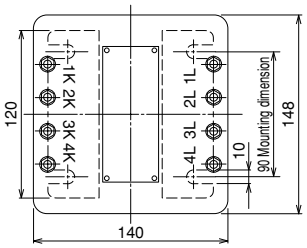



**Fig. 3 4-circuit synthesis**




## ●Self-load VA

| | |
|---|---|
| 5+5A system | 10VA per circuit |
| 5A system | 15VA per circuit |

# 7 Foreign Standard Applications

Products can be manufactured to meet foreign standards (IEC, BS or ANSI) as requested.
If ordering a product that must comply to foreign standards, be certain to specify the applicable standard, ratings (current transformation ratio and voltage transformation ratio), accuracy class and load (VA). Mitsubishi Electric's standard specifications are shown in the following table.

### Applicable standard

| | Current transformer | Inductive voltage transformer |
|---|---|---|
| IEC standards | IEC 60044-1 | IEC 60044-2 |
| BS standards | BS 3938 | BS 3941 |
| ANSI standards | ANSI C57.13 | |

## ■Standard Specifications List

| Type | Circuit | Type | IEC standards: Accuracy class | IEC standards: Rated output (VA) | IEC standards: Ins. class (kV)*1 | BS standards: Accuracy class | BS standards: Rated output (VA) | BS standards: Insulation class (kV)*1 | ANSI standards: Accuracy class-Burden | ANSI standards: Ins. class (kV) |
|---|---|---|---|---|---|---|---|---|---|---|
| Current transformer | Low-voltage | CW-5LP | 1.0 | 5 | 0.72/3/— | 1 | 5 | 0.66/2.5/— | 1.2B—0.2 | BIL10 |
| | | CW-15LP | | 15 | | | 15 | | 1.2B—0.5 | |
| | | CW-40LP | | 30 | | | 30 | | 1.2B—0.9 | |
| | | CW-5L | | 5 | | | 5 | | 1.2B—0.2 | — |
| | | CW-15L | | 15 | | | 15 | | 1.2B—0.5 | |
| | | CW-40L | | 30 | | | 30 | | 1.2B—0.9 | |
| | | CW-15LM | | 15 | | | 15 | | 1.2B—0.5 | |
| | | CW-40LM | | 30 | | | 30 | | 1.2B—0.9 | |
| | High-voltage | CD-40K | 1.0 | 40 | 7.2/20/60 | 1 | 30 | 7.2/20/60 | 1.2B—0.9 | BIL60 |
| | | CD-40NA | | | | | | | | |
| | | CD-40ENA | | | | | | | | |
| | | CD-40GNA | | | | | | | | |
| | | BN-0 (LA) | | | | | | | | |
| | | BS-MD | | | | | | | | |
| | | BS-MC | | | | | | | | |
| | Extra-high-voltage | BN-1 (LA) | 1.0 | 40 | 12/28/75 | 1 | 30 | 12/28/75 | 1.2B—0.9 | — |
| | | BN-2A | | | 24/50/125 | | | 24/50/125 | | BIL150 |
| Inductive voltage transformer | Low-voltage | PE-15 | 1.0 | 15 | 3/— | 1.0 | 15 | 2.5/— | 1.2W | BIL10 |
| | | PE-15F | | | | | | | | |
| | | PE-50 | 3.0 | 50 | | 3.0 | 50 | | — | |
| | | PE-50F | | | | | | | | |
| | | PD-50HF | 1.0 | 50 | | 1.0 | 50 | | 1.2X | |
| | | PD-100HF | | 75 | | | 75 | | 1.2X | |
| | | PD-200KFH | | 100・150 | | | 200 | | 1.2Y | |
| | High-voltage | PD-50HF | 1.0 | 50 | 3.6/10/40 7.2/20/60 | 1.0 | 50 | 3.6/10/40 7.2/20/60 | 1.2X | BIL45 BIL60 |
| | | PD-100HF | | 75 | | | 75 | | 1.2X | |
| | | PD-200KFH | | 100・150 | | | 200 | | 1.2Y | |
| | Extra-high-voltage | EV-1 | 1.0 | 100 200 | 12/28/75 | 1.0 | 100 200 | 12/28/75 | 1.2Y 1.2Z | BIL95 |
| | | EV-2 | | | 24/50/125 | | | 24/50/125 | | BIL150 |
| | | EV-3 | | | 36/70/170 | | | 36/70/170 | | BIL170 |
| Earthed voltage transformer | Low-voltage | EV-L | 1.0 | 50 100 | 0.72/3/— | 1.0 | 50 100 | 0.66/2.5/— | 1.2X 1.2Y | BIL10 |
| | | EV-LX | 1.0/3P | 50/50 100/100 | | 1.0/3P | 50/50 100/100 | | — | — |
| | High-voltage | EF-0FC | 1.0 | 100 200 | 3.6/10/40 7.2/20/60 | 1.0 | 100 200 | 3.6/10/40 7.2/20/60 | 1.2Y 1.2Z | BIL60 |
| | | EF-0XFC | 1.0/3P | 100/100 200/200 | | 1.0/3P | 100/100 200/200 | | — | — |
| | Extra-high-voltage | EV-1 | 1.0 | 100 200 | 12/28/75 | 1.0 | 100 200 | 12/28/75 | 1.2Y 1.2Z | BIL95 |
| | | EV-1X | 1.0/3P | 100/100 200/200 | | 1.0/3P | 100/100 200/200 | | — | — |
| | | EV-2 | 1.0 | 100 200 | 24/50/125 | 1.0 | 100 200 | 24/50/125 | 1.2Y 1.2Z | BIL150 |
| | | EV-2X | 1.0/3P | 100/100 200/100 | | 1.0/3P | 100/100 200/200 | | — | — |
| | | EV-3 | 1.0 | 100 200 | 36/70/170 | 1.0 | 100 200 | 36/70/170 | 1.2Y 1.2Z | BIL170 |
| | | EV-3X | 1.0/3P | 100/100 200/200 | | 1.0/3P | 100/100 200/200 | | — | — |

Notes
*1 Insulation class indicates peak voltage/commercial power frequency withstand voltage/lightning impulse withstand voltage.
*2 For specifications other than those listed above, please contact a Mitsubishi Electric representative.

# 1. Current Transformer Characteristics

| Type | Rated primary current (A) | Short-time current: Thermal kA (effective value) Energizing time (sec) 1.00 | 0.20 | 0.13 | Mechanical kA (peak value) | Secondary leakage impedance (VA) *1 |
|---|---|---|---|---|---|---|
| CD-40K n>3 | 5 | 0.23 | 0.50 | 0.57 | 1.5 | 4.9 |
| | 10 | 0.45 | 1.00 | 1.14 | 3.0 | 6.3 |
| | 15 | 0.68 | 1.50 | 1.71 | 4.5 | |
| | 20 | 0.90 | 2.00 | 2.28 | 6.0 | |
| | 25 | 1.20 | 2.60 | 2.93 | 7.5 | |
| | 30 | 1.40 | 3.00 | 3.42 | 9.0 | |
| | 40 | 1.80 | 4.00 | 4.56 | 12.0 | |
| | 50 | 2.30 | 5.00 | 5.70 | 15.0 | |
| | 60 | 2.70 | 6.00 | 6.84 | 18.0 | |
| | 75 | 3.40 | 7.60 | 8.55 | 22.5 | |
| | 80 | 3.60 | 8.00 | 9.12 | 24.0 | |
| | 100 | 4.50 | 10.10 | 11.40 | 30.0 | |
| | 120 | 5.40 | 12.00 | 13.68 | 36.0 | |
| | 150 | 6.80 | 15.10 | 17.10 | 45.0 | |
| | 200 | 9.00 | 20.10 | 22.80 | 60.0 | |
| | 250 | 11.30 | 25.20 | 28.50 | 75.0 | 4.9 |
| | 300 | 13.50 | 30.20 | 34.20 | 90.0 | 6.3 |
| | 400 | 18.00 | ○ | ○ | ◎ | 8.3 |
| | 500 | 22.50 | ○ | ○ | ◎ | 4.9 |
| | 600 | 27.00 | ○ | ○ | ◎ | 6.3 |
| | 750 | 33.80 | ○ | ○ | ◎ | 7.0 |
| CD-40NA n>10 | 5 | 0.25 | 0.56 | 0.59 | 1.5 | 9.5 |
| | 10 | 0.50 | 1.10 | 1.17 | 3.0 | |
| | 15 | 0.75 | 1.70 | 1.75 | 4.5 | 10.2 |
| | 20 | 1.00 | 2.20 | 2.34 | 6.0 | 9.5 |
| | 25 | 1.25 | 2.80 | 2.92 | 7.5 | |
| | 30 | 1.50 | 3.40 | 3.51 | 9.0 | 10.2 |
| | 40 | 2.00 | 4.50 | 4.68 | 12.0 | 9.5 |
| | 50 | 2.50 | 5.60 | 5.85 | 15.0 | |
| | 60 | 3.00 | 6.80 | 7.02 | 18.0 | |
| | 75 | 3.80 | 8.40 | 8.80 | 22.5 | 10.2 |
| | 80 | 4.00 | 8.96 | 9.36 | 24.0 | 9.5 |
| | 100 | 5.00 | 11.20 | 11.70 | 30.0 | |
| | 120 | 6.00 | 13.40 | 14.04 | 36.0 | 10.2 |
| | 150 | 7.50 | 16.80 | 17.50 | 45.0 | 11.2 |
| | 200 | 10.00 | 22.40 | 23.40 | 60.0 | 9.5 |
| | 250 | 12.50 | 28.00 | 29.25 | 75.0 | 10.2 |
| | 300 | 15.00 | 33.50 | 35.10 | 90.0 | 11.2 |
| | 400 | 20.00 | ○ | ○ | ◎ | 9.5 |
| | 500 | 25.00 | ○ | ○ | ◎ | 12.3 |
| CD-40H n>10 | 600 | ○ | ○ | ○ | ◎ | 9 |
| | 750 | ○ | ○ | ○ | ◎ | 13.1 |
| | 800 | ○ | ○ | ○ | ◎ | 14.3 |
| | 1000 | ○ | ○ | ○ | ◎ | 20.6 |
| | 1200 | ○ | ○ | ○ | ◎ | — |
| | 1500 | ○ | ○ | ○ | ◎ | — |
| | 2000 | ○ | ○ | ○ | ◎ | — |

| Type | Rated primary current (A) | Short-time current: Thermal kA (effective value) Energizing time (sec) 1.00 | 0.20 | 0.13 | Mechanical kA (peak value) | Secondary leakage impedance (VA) *1 |
|---|---|---|---|---|---|---|
| CD-40ENA n>10 | 5 | 0.43 | 0.95 | 1.01 | 2.6 | 9.2 |
| | 10 | 0.85 | 1.90 | 2.03 | 5.2 | |
| | 15 | 1.30 | 2.90 | 3.04 | 7.9 | |
| | 20 | 1.70 | 3.80 | 4.06 | 10.5 | 9.4 |
| | 25 | 2.20 | 4.90 | 5.07 | 13.1 | 9.2 |
| | 30 | 2.60 | 5.70 | 6.09 | 15.8 | |
| | 40 | 3.40 | 7.60 | 8.10 | 21.0 | 9.4 |
| | 50 | 4.30 | 9.50 | 10.10 | 26.3 | 9.2 |
| | 60 | 5.20 | 11.40 | 12.18 | 31.6 | 9.6 |
| | 75 | 6.40 | 14.30 | 15.20 | 39.4 | 9.2 |
| | 80 | 6.80 | 15.20 | 16.24 | 42.0 | 9.6 |
| | 100 | 8.50 | 19.00 | 20.30 | 52.5 | 10.1 |
| | 120 | 10.20 | 22.80 | 24.30 | 63.0 | 10.6 |
| | 150 | 12.80 | 28.50 | 30.40 | 78.8 | 9.2 |
| | 200 | 17.00 | 38.00 | ○ | ◎ | 10.1 |
| | 250 | 21.25 | ○ | ○ | ◎ | 9.2 |
| | 300 | 25.50 | ○ | ○ | ◎ | 12.0 |
| | 400 | 34.00 | ○ | ○ | ◎ | 10.1 |
| CD-40GNA n>10 | 5 | 0.85 | 1.90 | 1.98 | 5.1 | 3.7 |
| | 10 | 1.70 | 3.80 | 3.97 | 10.1 | |
| | 15 | 2.60 | 5.70 | 5.95 | 15.2 | 3.8 |
| | 20 | 3.40 | 7.60 | 7.94 | 20.3 | 3.7 |
| | 25 | 4.20 | 9.30 | 9.81 | 25.3 | |
| | 30 | 5.10 | 11.40 | 11.91 | 30.4 | 3.8 |
| | 40 | 6.80 | 15.20 | 15.88 | 40.5 | 3.7 |
| | 50 | 8.50 | 19.00 | 19.80 | 50.6 | |
| | 60 | 10.20 | 22.80 | 23.82 | 60.8 | 3.8 |
| | 75 | 12.80 | 28.50 | 29.70 | 75.9 | 4.4 |
| | 80 | 13.60 | 30.40 | 31.76 | 80.9 | 3.7 |
| | 100 | 17.00 | 38.00 | 39.70 | ◎ | |
| | 150 | 25.50 | ○ | ○ | ◎ | 4.4 |
| | 200 | 34.00 | ○ | ○ | ◎ | 3.7 |
| CD-40LN n>10 | 5 | 1.70 | 3.80 | 4.15 | 11.2 | 4.8 |
| | 10 | 3.50 | 7.80 | 8.54 | 22.5 | |
| | 15 | 5.20 | 11.60 | 12.70 | 33.7 | |
| | 20 | 7.00 | 15.60 | 17.10 | 45.0 | |
| | 25 | 8.70 | 19.40 | 21.20 | 56.2 | |
| | 30 | 10.50 | 23.50 | 25.60 | 67.5 | |
| | 40 | 14.00 | 31.30 | 34.20 | 90.0 | |
| | 50 | 17.50 | 39.10 | ○ | ◎ | |
| | 60 | 21.00 | ○ | ○ | ◎ | |
| | 75 | 26.20 | ○ | ○ | ◎ | |
| | 80 | 28.00 | ○ | ○ | ◎ | |
| | 100 | 35.00 | ○ | ○ | ◎ | |

Notes
*1 This is the value for 60Hz, and the value for 50Hz is much the same.
*2 ○ indicates 40kA and ◎ indicates 100kA.
*3 The Short-time current value is the value if 25% of the rated load is connected to the secondary side.

| Type | Rated primary current (A) | Short-time current | | | | Secondary leakage impedance (VA) *1 |
|---|---|---|---|---|---|---|
| | | Thermal kA (effective value) | | | Mechanical kA (peak value) | |
| | | Energizing time (sec) | | | | |
| | | 1.00 | 0.20 | 0.13 | | |
| CD-15BB n＞10 | 5 | 0.25 | 0.56 | 0.59 | 1.5 | 9.5 |
| | 10 | 0.50 | 1.10 | 1.17 | 3.0 | |
| | 15 | 0.75 | 1.70 | 1.75 | 4.5 | 10.2 |
| | 20 | 1.00 | 2.20 | 2.34 | 6.0 | 9.5 |
| | 25 | 1.25 | 2.80 | 2.92 | 7.5 | |
| | 30 | 1.50 | 3.40 | 3.51 | 9.0 | 10.2 |
| | 40 | 2.00 | 4.50 | 4.68 | 12.0 | 9.5 |
| | 50 | 2.50 | 5.60 | 5.85 | 15.0 | |
| | 60 | 3.00 | 6.80 | 7.02 | 18.0 | |
| | 75 | 3.80 | 8.40 | 8.80 | 22.5 | 10.2 |
| | 80 | 4.00 | 8.96 | 9.36 | 24.0 | 9.5 |
| | 100 | 5.00 | 11.20 | 11.70 | 30.0 | |
| | 120 | 6.00 | 13.40 | 14.04 | 36.0 | 10.2 |
| | 150 | 7.50 | 16.80 | 17.50 | 45.0 | 11.2 |
| | 200 | 10.00 | 22.40 | 23.40 | 60.0 | 9.5 |
| | 250 | 12.50 | 28.00 | 29.25 | 75.0 | 10.2 |
| | 300 | 15.00 | 33.50 | 35.10 | 90.0 | 11.2 |
| | 400 | 20.00 | ○ | ○ | ◎ | 9.5 |

Notes
*1 This is the value for 60Hz, and the value for 50Hz is much the same.
*2 ○ indicates 40kA and ◎ indicates 100kA.
*3 The Short-time current value is the value if 25% of the rated load is connected to the secondary side.

| Type | Rated primary current (A) | Rated overcurrent intensity (times) | Short-time current | | | | Secondary leakage impedance (VA) *1 |
|---|---|---|---|---|---|---|---|
| | | | Thermal kA (effective value) | | | Mechanical kA (peak value) | |
| | | | Energizing time (sec) | | | | |
| | | | 1.00 | 0.20 | 0.13 | | |
| EC-0 (Style LA) n＞5 | 5 | 40 | 0.27 | 0.60 | 0.60 | 1.5 | 7.5 |
| | 10 | | 0.54 | 1.20 | 1.20 | 3.0 | |
| | 15 | | 0.84 | 1.80 | 1.80 | 4.5 | |
| | 20 | | 0.93 | 2.07 | 2.40 | 6.0 | |
| | 30 | | 1.68 | 3.60 | 3.60 | 9.0 | |
| | 40 | | 2.69 | 4.80 | 4.80 | 12.0 | |
| | 50 | | 3.36 | 6.00 | 6.00 | 15.0 | |
| | 60 | | 3.36 | 7.20 | 7.20 | 18.0 | |
| | 75 | | 3.36 | 7.51 | 9.00 | 22.5 | |
| | 100 | | 6.72 | 12.00 | 12.00 | 30.0 | |
| | 120 | | 6.72 | 14.40 | 14.40 | 36.0 | |
| | 150 | | 6.72 | 15.02 | 18.00 | 45.0 | |
| | 200 | | 10.08 | 22.53 | 24.00 | 60.0 | |
| | 300 | | 16.81 | 36.00 | 36.00 | 90.0 | |
| BN-0 (Style LA) n＞10 | 10 | 40 | 0.69 | 1.54 | 1.91 | 5.0 | 7.3 |
| | | 75 | 0.82 | 1.83 | 2.24 | 5.6 | |
| | | 150 | 1.56 | 3.36 | 3.36 | 8.4 | |
| | 15 | 40 | 1.03 | 2.30 | 2.85 | 7.5 | 7.3 |
| | | 75 | 1.23 | 2.75 | 3.36 | 8.4 | |
| | | 150 | 2.50 | 5.04 | 5.04 | 12.6 | |
| | | 300 | 4.80 | 8.00 | 8.00 | 20.0 | 8.5 |
| | 20 | 40 | 1.38 | 3.08 | 3.82 | 10.0 | 7.2 |
| | | 75 | 1.64 | 3.66 | 4.48 | 11.2 | |
| | | 150 | 3.10 | 6.72 | 6.72 | 16.8 | |
| | | 300 | 6.40 | 10.68 | 10.68 | 26.7 | 8.5 |
| | 25 | 40 | 1.72 | 3.84 | 4.77 | 12.7 | 7.2 |
| | | 75 | 2.05 | 4.58 | 5.60 | 14.0 | |
| | | 150 | 3.90 | 8.40 | 8.40 | 21.0 | |
| | 30 | 40 | 2.07 | 4.62 | 5.74 | 15.0 | 7.2 |
| | | 75 | 2.46 | 5.50 | 6.72 | 16.8 | |
| | | 150 | 4.60 | 10.08 | 10.08 | 25.2 | |
| | | 300 | 9.40 | 16.00 | 16.00 | 40.0 | 8.4 |
| | 40 | 40 | 2.76 | 6.17 | 7.65 | 20.0 | 7.1 |
| | | 75 | 3.28 | 7.33 | 9.00 | 22.5 | |
| | | 150 | 6.20 | 13.44 | 13.44 | 33.6 | 8.4 |
| | | 300 | 12.80 | 21.36 | 21.36 | 53.4 | |
| | 50 | 40 | 3.45 | 7.71 | 9.56 | 25.0 | 7.1 |
| | | 75 | 4.10 | 9.16 | 11.24 | 28.1 | |
| | | 150 | 7.80 | 16.80 | 16.80 | 42.0 | |
| | | 300 | 16.00 | 26.68 | 26.68 | 66.7 | 8.4 |
| | 60 | 40 | 4.14 | 9.25 | 11.48 | 30.0 | 7.2 |
| | | 75 | 4.92 | 11.00 | 13.48 | 33.7 | |
| | | 150 | 11.70 | 20.16 | 20.16 | 50.4 | |
| | | 300 | 19.20 | 32.04 | 32.04 | 80.1 | 8.4 |
| | 75 | 40 | 5.17 | 11.56 | 14.33 | 37.5 | 7.1 |
| | | 75 | 6.15 | 13.75 | 16.84 | 42.1 | |
| | | 150 | 11.70 | 25.20 | 25.20 | 63.0 | |
| | | 300 | 24.00 | ○ | ○ | ◎ | 8.4 |
| | 80 | 40 | 5.44 | 12.16 | 15.09 | 37.7 | 7.8 |
| | | 75 | 6.54 | 14.62 | 18.13 | 45.3 | |
| | | 150 | 12.03 | 27.01 | 27.01 | 67.5 | |
| | 100 | 40 | 6.90 | 15.42 | 19.13 | 50.0 | 7.1 |
| | | 75 | 8.20 | 18.33 | 22.48 | 56.2 | |
| | | 150 | 15.60 | 33.60 | 33.60 | 84.0 | |
| | | 300 | 32.00 | ○ | ○ | ◎ | 8.4 |
| | 120 | 40 | 8.28 | 18.51 | 22.96 | 60.0 | 7.1 |
| | | 75 | 9.84 | 22.00 | 27.00 | 67.5 | |
| | | 150 | 19.50 | ○ | ○ | ◎ | |
| | | 300 | 38.40 | ○ | ○ | ◎ | 8.2 |

Remark: Various characteristics of the AN and CN series current transformers for cubicle high-voltage power receiving equipment are described on page 57.

Notes
*1 This is the value for 60Hz, and the value for 50Hz is much the same.
*2 ○ indicates 40kA and ◎ indicates 100kA.
*3 The Short-time current value is the value if 25% of the rated load is connected to the secondary side.

| Type | Rated primary current (A) | Rated overcurrent intensity (times) | Short-time current: Thermal kA (effective value) Energizing time (sec) 1.00 | 0.20 | 0.13 | Mechanical kA (peak value) | Secondary leakage impedance (VA) *1 |
|---|---|---|---|---|---|---|---|
| BN-0 (Style LA) n＞10 | 150 | 40 | 10.35 | 23.14 | 28.70 | 75.0 | 7.0 |
| | | 75 | 12.30 | 27.50 | 33.72 | 84.3 | |
| | | 150 | 23.40 | ○ | ○ | ◎ | |
| | | 40kA | ○ | ○ | ○ | ◎ | 8.1 |
| | 200 | 40 | 13.80 | 30.85 | 38.27 | ◎ | 7.0 |
| | | 75 | 16.40 | 36.67 | ○ | ◎ | |
| | | 150 | 31.20 | ○ | ○ | ◎ | |
| | | 40kA | ○ | ○ | ○ | ◎ | 8.0 |
| | 250 | 40 | 17.00 | 38.00 | ○ | ◎ | 12.1 |
| | | 75 | 20.43 | ○ | ○ | ◎ | |
| | | 150 | 37.64 | ○ | ○ | ◎ | |
| | 300 | 40 | 20.70 | ○ | ○ | ◎ | 8.4 |
| | | 75 | 24.60 | ○ | ○ | ◎ | |
| | | 40kA | ○ | ○ | ○ | ◎ | 7.9 |
| | 400 | 40 | 27.60 | ○ | ○ | ◎ | 12.7 |
| | | 75 | 31.75 | ○ | ○ | ◎ | |
| | | 40kA | ○ | ○ | ○ | ◎ | 12.9 |
| | 500 | 40kA | ○ | ○ | ○ | ◎ | 17.7 |
| | 600 | 40kA | ○ | ○ | ○ | ◎ | 9.2 |
| | 750 | 40kA | ○ | ○ | ○ | ◎ | 13.0 |
| | 800 | 40kA | ○ | ○ | ○ | ◎ | 10.4 |
| | 1000 | 40kA | ○ | ○ | ○ | ◎ | 20.5 |
| | 1200 | 40kA | ○ | ○ | ○ | ◎ | 26.5 |
| | 1500 | 40kA | ○ | ○ | ○ | ◎ | 34.5 |

Notes
*1 This is the value for 60Hz, and the value for 50Hz is much the same.
*2 ○ indicates 40kA and ◎ indicates 100kA.
*3 The Short-time current value is the value if 25% of the rated load is connected to the secondary side.

# 2. Voltage Transformer Characteristics

| Type | | PE-15F | | PD-50HF | | | PD-100HF | | | PD-200KFH | | | EP-0FH*1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated voltage (V) | | 220 | 440 | 440 | 3300 | 6600 | 440 | 3300 | 6600 | 440 | 3300 | 6600 | 3300 | 6600 |
| Limiting load Limit output (VA) | Continuous rating | 100 | | 200 | | | 200 | | | 500 | | | 300 | |
| | 2sec rating | 200 | | 500 | | | 500 | | | 1000 | | | 700 | |
| Limit output error (%) | Continuous rating | -5 | | -5 | | | -5 | | | -5 | | | -5 | |
| | 2sec rating | -10 | | -10 | | | -10 | | | -10 | | | -10 | |
| Primary fuse | Rated current (A) | T2 | | T2 | T1 | | T2 | T1 | | T2 | T1 | | T1 | |
| | Breaking current (kA) | 100 | | 100 | 40 | | 100 | 40 | | 100 | 40 | | 40 | |
| Impedance voltage (%) | Resistance voltage (%) | 0.80 | | 0.93 | | | 1.99 | | | 1.59 | | | 0.77 | 0.71 |
| | Reactance voltage (%) | 0.32 | | 0.21 | | | 0.49 | | | 1.01 | | | 0.17 | 0.19 |
| | Impedance voltage (%) | 0.86 | | 0.95 | | | 2.05 | | | 1.88 | | | 0.79 | 0.73 |

Notes
*1 The impedance voltage for EP-0FH is the same as that for 50VA.
*2 The 2-sec rating is the value considering a 10-cycle duty with 0.2-sec current and 1.8-sec interval.

# 9 Handling and Maintenance

## 1. Cleaning

Be certain to handle transformers carefully at the time of the routine inspection, which is to be performed when all power to the device is turned off.

### (1) Dust removal

Carefully remove dust that has collected on the transformer, doing so as follows:
Do not use running water, cleansers or chemical-treated wipes because they contain surface-active agents that could cause degradation of the insulation.
① Mold surface: Clean with a gauze soaked with deionized water.
② Metallic sections (cores, terminals, attached brackets, screws, etc.): Clean with a dry duster, compressed-air blower or similar method.
③ Name plate section: Clean with a dry duster, compressed-air blower or similar method.

### (2) If any of the connections have become loose or appear loss, retighten them.

## 2. Storage

When placing transformers in storage, be certain to use the following procedure:

### (1) Removing the transformer

① Turn off the power sources of circuits connected to the transformer. Check to ensure that all voltage in the system has been removed.
② Using a screwdriver, loosen the terminal screws of the secondary conductor wiring and disconnect the wires.
③ Remove the primary conductor (conducting wire).
④ Remove the mounting screws and nuts holding the transformer, and then remove the transformer itself.

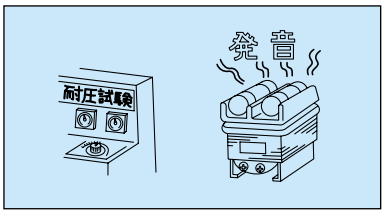
### (2) Storage

For storage conditions, refer to Section 8 on page 7.

## 3. Precautions when Using Transformers

### (1) Noise generated during withstand voltage testing

When conducting a withstand voltage test for coil-mold transformers, high-voltage electricity is shared in the air space between the coil-mold section and core, causing discharge noise to be generated. During general use, the voltage of the electricity passing through this space is low and discharge noise is not generated. Do not become alarmed and continue to use the transformer as normal even if discharge noise is generated during the withstand voltage test.




### (2) Disconnect earthed voltage transformers from the primary-side circuit during commercial frequency withstand voltage testing of boards.

If not disconnected, burnout will occur.
(This happens because Mitsubishi Electric earthed voltage transformers comply with the standard of Article 18 of the Interpretation of Technical Standards for Electrical Equipment.)
Additionally, if the earthed voltage transformer is not disconnected from the primary-side circuit and disconnected from the secondary-side circuit only and a commercial frequency withstand voltage test is conducted with the transformer isolated from the circuit, dielectric breakdown between the primary and secondary coils may occur.

### (3) Voltage transformer primary-side fuse meltdown

Dielectric breakdown may occur in voltage transformers as the result of circuit burn out due to improper connection or overload, or insulation may deteriorate due to extremely abnormal phenomenon. Primary-side fuses will melt as the result of the phase-to-phase short-circuiting current at the time of dielectric breakdown.
If the fuses meltdown, be certain to carefully check the insulation performance of the voltage transformer as abnormalities may exist (refer to items to be checked in Table 4 on page 81). If an abnormality is found, the transformer may need to be replaced.
If no abnormalities are found in insulation performance, replace the melted fuses with new ones as they have been subjected to excitation rush current, thereby degrading them. (Replace all of the fuses with new ones even if only one fuse has melted). After replacing all of the fuses, if fuse meltdown occurs again within a short period, replace the transformer with a new one as dielectric breakdown may have occurred in the current transformer.

### (4) Influence on current transformer secondary circuit devices at the time of a short-circuiting incident

When short-circuiting occurs, large current flows into the secondary circuit of the current transformer. When resuming use of the meters, relays and other devices that are connected to the secondary circuit after the incident, carefully check to ensure that all are operating properly. Additionally, if the high-voltage circuit breaker is an overcurrent trip system and a static relay is used, be certain to check the b contact point of the relay.

### (5) Selecting an Earthed Voltage Transformer

The EF Series transformers described on page 68 are used for extra-high-voltage circuits. Because high-voltage systems are generally isolated neutral systems, earthed voltage transformers cannot be used at the power-receiving point of high-voltage customers. This is because when a high-voltage customer uses an earthed voltage transformer that point becomes a direct-current grounding point, thereby causing problems such as insufficient insulation when a utilities company conducts an insulation resistance test on distribution lines.

## 4. Maintenance and Inspection

As transformer accidents lead to power-supply failure and have a negative effect on productivity, it is best to proactively work to prevent power loss accidents by being very careful and precise when conducting maintenance and inspections. It is recommended that maintenance inspections be conducted based on a technical information announcement, Notice No. 164 Guidelines for Meter Transformer Maintenance, published by the Japan Electrical Manufacturers' Association in September 1988.
An abstract of the technical information from Notice No.164 is shown in Table 1-4.
Please observe the following issues regarding maintenance and inspections. To ensure safety, maintenance and inspections should only be performed by an experienced electrician such as the chief electrical engineer.

# Danger

### (1) Connecting earthing wires

To ensure safety, be certain to connect all required earthing wires to terminals before beginning any maintenance or inspections. If it is believed all power sources to the transformer have been turned off and this is not confirmed, it may lead to electrical shock, electrical burn injury or death.
If a person must touch the main body of a transformer, be certain to check whether or not the transformer is disconnected from all circuits. Confirm this using circuit breakers or switches, and then use a detection meter suitable for the circuit voltage to confirm that the circuit no longer carries a charge before beginning maintenance or inspections.

### (2) Contact with a transformer while a current is applied is prohibited

If electricity is turned on during maintenance or inspections, be certain to prevent anyone from touching the main body of the transformer, terminals or any other part thereof. It could lead to not only electrical shock, electrical burn injury, equipment burnout or a fire, but also death.

## Table 1 Mounting Inspection for Molded Meter Transformers

| No. | Inspection item | Contents | Basic criteria | Remarks |
|---|---|---|---|---|
| 1 | Mounting bolt | Tightness | Sufficiently tight | |
| 2 | Grounding | Connections and tightness | Sufficiently tight | Some transformers are grounded via the mounting bracket |
| 3 | High-voltage terminal | Tightness | Sufficiently tight | |
| 4 | Low-voltage terminal | Tightness | Sufficiently tight | |
| 5 | Paint | Condition of paint/coating | No problem with paint/coating | |
| 6 | Measure insulation resistance (main body of meter transformer) | (1) Between high/low-voltage winding and ground | Insulation resistance test of 1000MΩ or more and 1000V | |
| | | (2) Between low-voltage winding and the ground<br>Between low-voltage windings | Insulation resistance test of 10MΩ or more and 500V | |
| 7 | Polarity test | Use direct-current kick method | Polarity is negative | |
| 8 | Low-voltage circuit wiring | Wiring condition | (1) Current transformer should low-voltage circuit closed | |
| | | | (2) Voltage transformer should have low-voltage circuit not shorted | |
| 9 | Molded portion appearance | Damage, cracks, pollution | No damage, cracks or pollution exist | |
| 10 | Withstand voltage test | Conforming to Article 18 of the Interpretation of Technical Standards for Electrical Equipment | No trouble exists | Disconnect the earthed voltage transformer from the circuit |

## Table 2 Daily Inspection of Molded Meter Transformers

| No. | Inspection item | Contents | Basic criteria | Remarks |
|---|---|---|---|---|
| 1 | Operating conditions | Values indicated by meter | Abnormal values are not indicated | |
| 2 | Noise and vibration | Whether or not abnormal noise is generated<br>(1) Alarming noise in core<br>(2) Resonance noise<br>(3) Discharge noise | No abnormal noise or vibration exists | |
| 3 | Odor | Whether or not abnormal odors are present | No abnormal odor | |
| 4 | Visual appearance | Rust development/corrosion | No rust development/corrosion exists | |
| | | Terminal local overheating | No change of color or overheating exists | Especially applies to current transformers |
| | | Change in shape/damage (e.g. terminals and mounting bracket) | No change in shape or damage exists | |
| | | Cracks | No cracks exist | |
| | | Pollution | No pollution exists | |
| | | Discharge craters | No discharge craters exist | |
| | | Tracking | No tracking exists | |
| | | Invasion of small animals | No invasion or evidence of invasion exists | |

## Table 3 Periodic Inspection of Molded Meter Transformers

| No. | Inspection item | | Contents | Basic criteria | Frequency | Remarks |
|---|---|---|---|---|---|---|
| 1 | Insulating materials | Measure insulation resistance* | Between high/low-voltage winding and ground | 100MΩ or more<br>1000V insulation resistance tester | 1 time/yr | Main body |
| | | | Between low-voltage winding and ground<br>Between low-voltage windings | 2MΩ or more<br>500V insulation resistance tester | | Including low-voltage circuit wires |
| 2 | | Partial discharge test | Based on JIS C 1731 and JEC 1201.<br>Clean transformer before measurements because collected dust may lead to the occurrence of external corona. | For this test, there are two criteria:<br>(1) Check to ensure that discharge intensity has not significantly increased compared to the previous year<br>(2) Check the absolute value of the discharge intensity.<br>(3) However, (1) is recommended because for (2), at this point, there is not always enough data to support the correlation between discharge intensity and service life. | 1 time/yr after 10yr | |
| 3 | Mounting | Check each mounting point | Tightness | Sufficiently tight | 1 time/yr | |
| 4 | Connections | Check each connection | Tightness | Sufficiently tight | 1 time/yr | |
| 5 | Mold surface | Clean mold surface | Clean with dry duster or compressed-air blower | No dust collected on transformer | 1 time/yr | |
| | | Check for discharge craters on mold surface | Discharge craters | No discharge craters exist | | |
| | | Check for cracking on mold surface | Cracks | No cracks exist | | |
| 6 | Primary-side fuse | Check for disconnections (in voltage transformer) | Disconnections | No disconnection exists | 1 time/yr | For inspection at meltdown, refer to Table 4 |

* Perform measurements after cleaning the surface using a dry duster or compressed-air blower.

## Table 4 Inspection Items after Primary-side Fuse Meltdown in Voltage Transformer

| No. | Inspection item | Contents | Basic criteria | Remarks |
|---|---|---|---|---|
| 1 | Visual appearance | Cracks | No cracks exist | |
| | | Discharge craters | No discharge craters exist | |
| 2 | Odor | Whether or not there is abnormal odor | No abnormality exists | |
| 3 | Measure winding resistance | High /low-voltage winding | No difference in measured values of each phase | |
| 4 | Measure insulation resistance | Between high/low-voltage winding and ground | 100MΩ or more, 1000V insulation resistance tester | |
| 5 | Withstand voltage test | Between high/low-voltage winding and ground (Conforming to Article 18 of the Interpretation of Technical Standards for Electrical Equipment) | No abnormality exists | |

# 5. Recommended Renewal Timing

In technical information announcement, Notice No.164, published by the Japan Electrical Manufacturers' Association, a recommended timing for renewal has been established. It is recommend that meter transformers be renewed based on the information in that announcement. However, the recommended renewal time is not a guaranteed value for product service life. The recommended timing for renewal shown in the chart at the right is determined assuming that daily and periodic inspections are conducted on a continuing basis.

| Recommended renewal time for meter transformers (years of use) | |
|---|---|
| Molded transformers (including other dry models) | 15 years |

# 10 How to Order

When placing an order, be certain to specify the following items.

: This information is required. Be certain to specify it.

: This is manufactured according to customer specifications. If not specification is provided, the product will be manufactured according to the standard specification of Mitsubishi Electric transformers.

## ■Current Transformers

### ●Low-voltage Current Transformers (<440V) Separated

CW-5S,2SL,5SL (Separated/Cable wiring)

| Type | Current Transformation Ratio | No. of Units |
|---|---|---|
| CW-5S | 300/5A | 10 |

### ●CW Series Low-voltage Current Transformers (≤1100V)

CW-L (Cable wiring/Round window through-type)

| Type | Current Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| CW-40L | 200/5A | Foreign standards, Anti-fungus/Moisture-proof treatment, Etc. Class 2 heat-resistant | 10 |

●Current transformation ratio ···Specify current transformation ratio calculated as primary conductor through number per 1 turn.

CW-LP (Small current/Primary winding)

| Type | Current Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| CW-15LP | 20/5A | Foreign standards, Anti-fungus/ Moisture-proof treatment, Etc. | 10 |

CW-LM (Busbar wiring/Square window through-type)

| Type | Current Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| CW-40LM | 500/5A | Foreign standards, Anti-fungus/Moisture-proof treatment, Etc. Class 2 heat-resistant | 10 |

CW-LS, CW-LMS, CW-LS3 and CW-LMS3 (Dedicated verification)

| Type | Current Transformation Ratio | Frequency | Models Combined for Verification | No. of Units |
|---|---|---|---|---|
| CW-15LS | 100/5A | 50Hz | Combine with M2LHM-V and PE-15F | 2 |

●Be certain to specify the frequency and model to be combined for verification.

### ●CD/BN Series High-voltage Current Transformers (≤6600V)

CD Current Transformers

| Type | Current Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| CD-40K | 100/5A | Foreign standards, Models Combined for Verification, Etc. | 10 |

●If ordering “For verification”, be certain to specify the frequency and model to be combined for verification.

Example: CD-40K — 100/5A — 50Hz — Combine with M2LHM-K5V and PD-50HF

CD-15BB (Class 1/Dedicated verification)

| Type | Current Transformation Ratio | Frequency | Models Combined for Verification | No. of Units |
|---|---|---|---|---|
| CD-15BB | 50/5A | 60Hz | Combine with WP3P-K30VR and PD-15KFH | 2 |

●Be certain to specify the frequency and model to be combined for verification.

BN Current Transformers

| Type | Current Transformation Ratio | Rated Burden | Overcurrent Intensity | Accuracy Class | Frequency | Special Specifications | No. of Units |
|---|---|---|---|---|---|---|---|
| BN-0 (LA) | 100/5A | 40VA | 150× | 1.0•1PS | 50Hz | Models to be combined for verification, Etc. | 2 |

●Overcurrent Intensity ··· If the withstand current (effective value) needs to be indicated in the nameplate, be certain to specify the withstand current value (kA).
●Accuracy Class ··· Be certain to specify the desired class if it is other than the standard specification (1.0/Class 1PS).
●Frequency ··· The standard specification is both (50/60). If a single frequency needs to be indicated in the name plate, be certain to specify the desired frequency.
●If ordering “For verification”, be certain to specify the accuracy class, frequency and model to be combined for verification.

### ●AN/CN Series Current Transformers for Cubicle-type High-voltage Power Receiving Equipment

| Type | Current Transformation Ratio | No. of Units |
|---|---|---|
| CD-10ANA | 30/5A | 4 |

### ●Extra-high-voltage Current Transformers (≥11000V)

| Type | Current Transformation Ratio | Rated Burden | Overcurrent Intensity | Accuracy Class | Frequency | Special Specifications | No. of Units |
|---|---|---|---|---|---|---|---|
| BN-2A | 100/5A | 40VA | 40× | 1.0•1PS | 60Hz | Foreign standards, Etc. | 2 |

●Overcurrent Intensity ··· If the withstand current (effective value) needs to be indicated in the nameplate, be certain to specify the withstand current value (kA).
●Accuracy Class ··· Be certain to specify the desired class if it is other than the standard specification (1.0/Class 1PS).

## ■Meter Voltage Transformers

### ●PE Series Voltage Transformers (≤440V)

| Type | Voltage Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| PE-15F | 440/110V | Foreign standards, Models to be combined for verification, Etc. | 10 |

●If ordering “For verification”, be certain to specify the frequency and model to be combined for verification.

### ●PD Series High-voltage Voltage Transformers (≤6600V)

PD Voltage Transformers

| Type | Voltage Transformation Ratio | Special Specifications | No. of Units |
|---|---|---|---|
| PD-50HF | 6600/110V | Foreign standards, Models to be combined for verification, Etc. | 10 |

●If ordering “For verification”, be certain to specify the frequency and model to be combined for verification.

PD-15KFH, PD-25KFH and PD-100KFH (Dedicated verification)

| Type | Voltage Transformation Ratio | Frequency | Models to be Combined for Verification | No. of Units |
|---|---|---|---|---|
| PD-15KFH | 6600/110V | 50Hz | Combine with WP3P-K30VR and CD-15BB | 2 |

### ●EV Series Voltage Transformers (≥11000V)

| Type | Voltage Transformation Ratio | Rated Burden | Accuracy Class | Frequency | Special Specifications | No. of Units |
|---|---|---|---|---|---|---|
| EV-1 | 11000/110V | 200VA | 1.0•1P | 50Hz | Foreign standards, Base color, Etc. | 2 |

●Accuracy Class ··· Be certain to specify the desired class if it is other than the standard specification (1.0/Class 1P).
●If ordering “For verification”, be certain to specify the accuracy class, frequency and model to be combined for verification.

## ■Earthed Voltage Transformers

EF/EV Earthed Voltage Transformers (Single-phase/Tertiary winding not included)

| Type | Voltage Transformation Ratio | Rated Burden | Accuracy Class | Frequency | Special Specifications | No. of Units |
|---|---|---|---|---|---|---|
| EV-2 | $\frac{22000}{\sqrt{3}}/\frac{110}{\sqrt{3}}$ V | 200VA | 1P | 60Hz | Foreign standards, Base color, Etc. | 3 |

●Accuracy Class ··· Be certain to specify the desired class if it is other than the standard specification (Class 1P).
●Frequency ··· If the desired frequency is higher than or equal to 11000V, be certain to specify it.

EF/EV Earthed Voltage Transformers (Single-phase/Tertiary winding included)

| Type | Voltage Transformation Ratio | Rated Burden | Accuracy Class | Frequency | Special Specifications | No. of Units |
|---|---|---|---|---|---|---|
| EF-0XFC | $\frac{6600}{\sqrt{3}}/\frac{110}{\sqrt{3}}/\frac{190}{3}$ V | 200/200VA | 1P/3G | 50Hz | Foreign standards, Etc. | 3 |

●Accuracy Class ··· Be certain to specify the desired class if it is other than the standard specification (Class 1P/3G).
●Frequency ··· If the desired frequency is higher than or equal to 11000V, be certain to specify it.

EF-03XFC Earthed Voltage Transformers (Three-phase/Tertiary winding included)

| Type | Voltage Transformation Ratio | Rated Burden | Accuracy Class | Frequency | No. of Units |
|---|---|---|---|---|---|
| EF-03XFC | $6600/110/\frac{190}{3}$ V | 200/200VA | 1P/3G | 60Hz | 1 |

## ■Zero-phase Current Transformers

| Type | Rated Primary Current | No. of Units |
|---|---|---|
| BZ-90A | 600A | 5 |

●Rated Primary Current ··· If a rated primary current other than that specified in the standard specification needs to be indicated in the name plate, be certain to specify the desired current.

Example: BZ-90A — 300A

## ■Combined Voltage/Current Transformers

| Type | Voltage Transformation Ratio | Current Transformation Ratio | Accuracy Class | Frequency | Voltage Transformer Load | Models to be Combined for Verification | No. of Units |
|---|---|---|---|---|---|---|---|
| PO-2HB | 6600/110V | 50/5A | 1.0W | 50Hz | VT25VA | Combine with M2LHM-K5V | 1 |

●Accuracy Class ··· If the accuracy class is Class 0.5, be certain to specify it.
●Voltage Transformer Load ··· If the load is 25VA, be certain to specify it.
●If ordering “For verification”, be certain to specify the model to be combined for verification.
●Overcurrent Intensity ··· If the intensity is 75 times, be certain to specify it.

# Mitsubishi Electric Instrument Transformers

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

**MITSUBISHI ELECTRIC CORPORATION**
HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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