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# **CURRENT TRANSFORMERS 24-800kV**





# CURRENT TRANSFORMER

## Description

### 1 General

NISSIN's Current Transformer (CT) has the following superior design/features:

- Well-verified construction.
- Light and compact design.
- No oil change required as metallic bellows are used.
- Slightly positive constant oil pressure irrespective of ambient temperature variation as metallic bellows are used.
- Completely oil filled and hermetically sealed.
- High-reliability of dielectric strength obtained as the electrostatic gradient on the insulation is completely uniformed by condenser layers.

### 2 Application

- Highest system voltage : max.800kV
- Rated primary current : up to 6000A
- Rated secondary current : 1.2 or 5A

We are able to supply linearized characteristics current transformers with core having gaps assuring excellent transient performance by request.

### 3 Service conditions

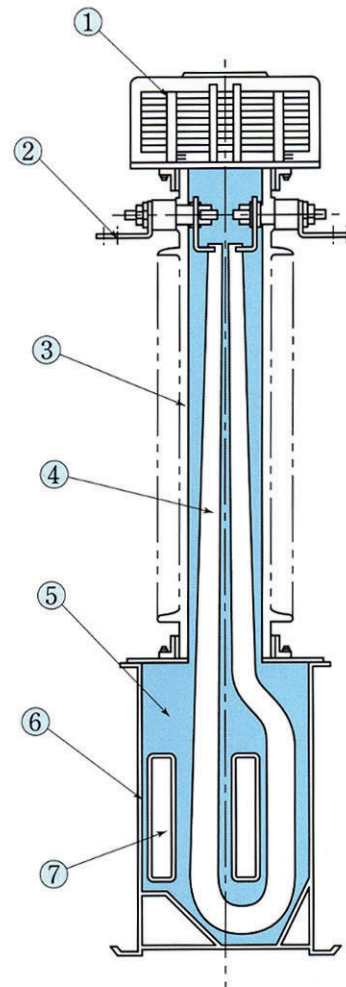
The usual service conditions are as follows, but CTs to be used beyond the limits of the following conditions will be manufactured by request.

- Ambient temperature : max.40°C, min.-20°C
- Altitude above sea level : max.1,000m
- Pollution

Two standard series for normal and polluted atmosphere are available.

- Rated frequency : 50Hz or 60Hz

## Construction



- ① Oil volume adjusting device
- ② Primary terminal pad
- ③ Porcelain shell
- ④ Primary winding
- ⑤ Insulating oil
- ⑥ Tank
- ⑦ Core and secondary winding

Fig. 1 Typical sectional sketch of CT

# Construction (cont'd)

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## 1. Primary winding

The primary winding is made of high conductivity aluminum or copper, and it has suitable sectional area for continuous primary current and short time current.

## 2. Core

High grade oriented silicon steel strips are used. The core's shape is a ring type. Cores with air gap can be manufactured in order to reduce remanent flux by request.

## 3. Secondary windings

The secondary winding is uniformly distributed around whole periphery of the core in order to minimize the secondary leakage reactance in the winding and also between any tapped terminals.

## 4. Primary insulation

The primary insulation applies condenser layers to achieve excellent insulating performance.

## 5. Oil impregnation

The fully insulated windings are dried with heat under vacuum after the assembly of the current transformer. Following the completion of drying process, internal components are impregnated with degasified insulating oil.

## 6. Insulating oil

The insulating oil is mineral oil conforming to Japanese standard JIS C2320. The oil is treated to remove moisture and gas before impregnation.

## 7. Hermetical sealing

The current transformers are completely filled with insulating oil and provided with metallic bellows for oil volume adjustment device at the top. They have no oil surface exposed to air or gas. The gasket for sealing is made of oil resistant synthetic rubber. Effectiveness of oil sealing is verified in the process of production on each current transformer.

## 8. Insulator

The insulators are high quality electrical grade porcelain made by wet process. The glazing color is normally brown. Gray or white can be applied by request. Metal flanges are cemented to insulator in order to avoid local stress to the insulator.

## 9. Tank

The tank is made of steel plate and finished with high quality weather resistant paint. The tank is provided with secondary terminal box, lifting lugs, earth terminal and mounting holes.

## 10. Primary terminal pad

The primary terminal pad is normally made of high conductivity and tinned copper or copper alloy having flat surface with holes conforming to NEMA standard. Another configuration or hole arrangement can be applied by request.

## 11. Earth terminal

The current transformers are normally provided with a clamp type earth terminal suitable for HDCC 22 to 250mm<sup>2</sup> at the base tank.

## 12. Finishing/surface treatments

All external metal parts except non-ferrous metal, galvanized steel, finished or machined surface are covered with chemical etching phosphate coating, and are coated by paint.



# CURRENT TRANSFORMER

## Technical particulars

Table. 1 Typical electrical characteristics

No.	Type	Highest system voltage (kV)	Withstand voltage			Maximum short-time current (*1)		Creepage distance		Dimensions and weight (*2)			
			BIL (kV)	Sw. impulse (kV)	Power frequency (kV)	Thermal, 1sec. (kA)	Dynamic (kA)	Normal (mm)	Pollution (mm)	Height;H (mm)	Width;W (mm)	Depth;D (mm)	Weight (kg)
1	FGCH-20	24	125	—	50	50	135	384	600	1600	650	760	400
2	FGCH-30	36	170	—	70	50	135	576	900	1600	650	760	400
3	FGCH-60	72.5	325	—	140	50	135	1160	1813	2100	650	760	550
4	FGCH-100	123	550	—	230	50	135	1968	3075	2500	650	760	600
5	FGCH-120	145	650	—	275	50	135	2320	3625	2700	650	760	650
6	FGCH-140	170	750	—	325	50	135	2720	4250	3000	700	840	900
7	FGCH-170	245	900	—	395	50	135	3330	5200	3400	700	840	950
8	FGCH-200	245/300	1050	(850)	460	50	135	3920	6125	3600	700	840	1000
9	FGCH-300	362	1175	950	510	50	135	5792	9050	4900	950	840	1700
10	FGCH-400	420	1425	1050	630	63	170	6720	10500	6500	1600	1200	4000
11	FGCH-500	525	1550/1800	1175	680/790	63	170	8400	13125	6700	1600	1200	4300

Note : \*1 : Values of short-time current depend on primary current.

\*2 : The dimension and weight depend on detailed rating.

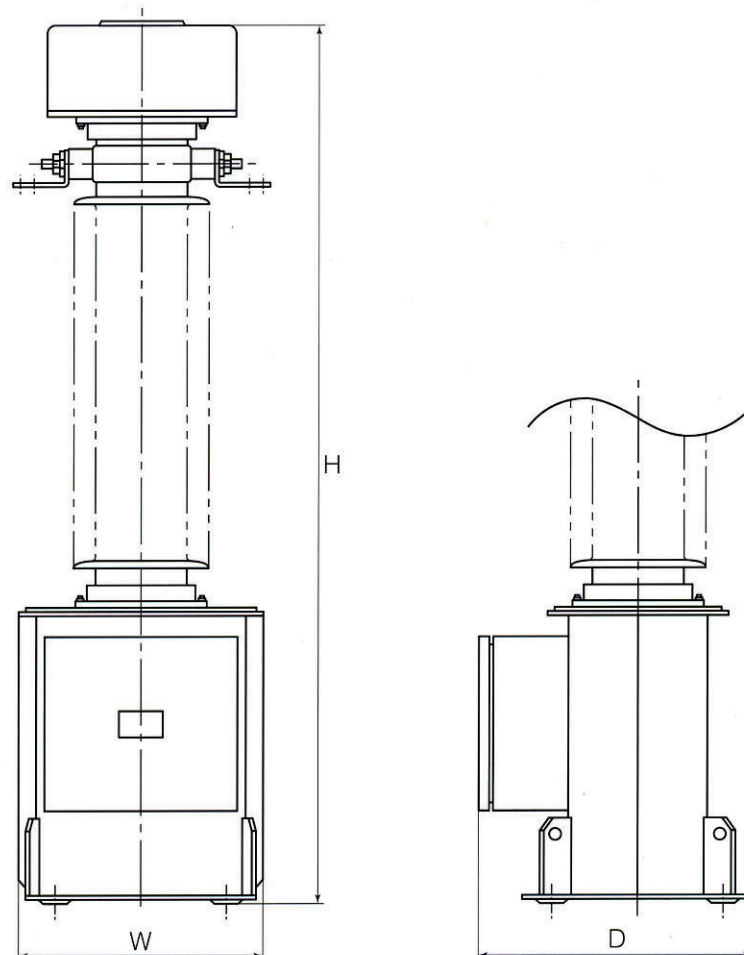


Fig. 2 Outline of CT

# Performance

The ratio and phase angle errors depend on the secondary winding impedance, secondary burden and exciting characteristics of the core.

The errors of CTs vary with the variations of primary current and secondary burden.

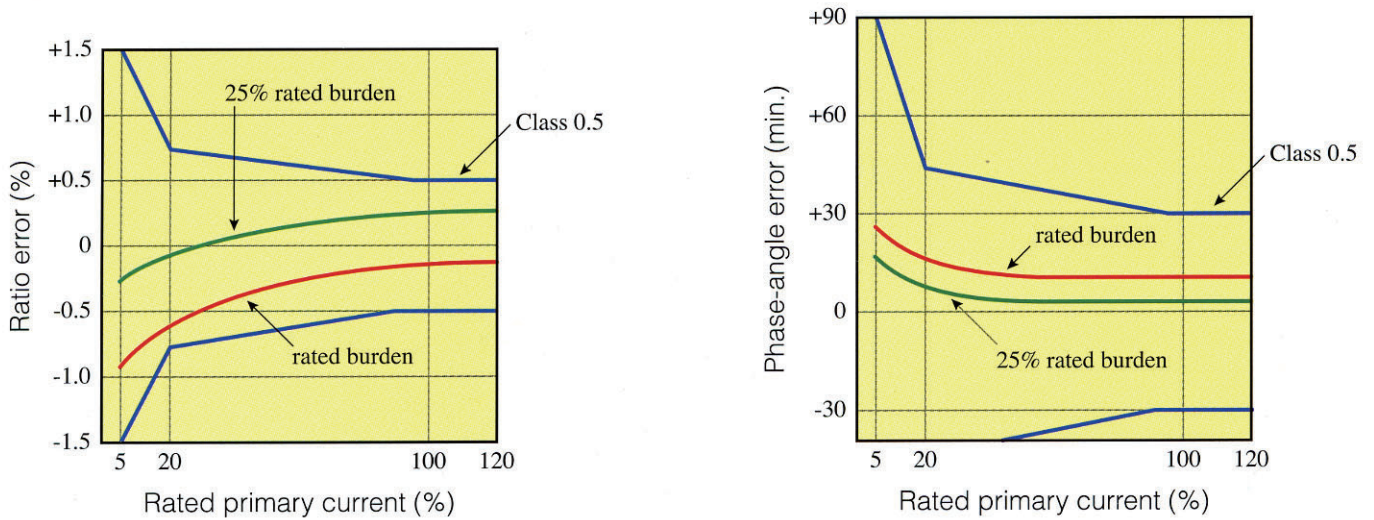


Fig. 3 The figures above show the limits for accuracy class 0.5 in accordance with IEC60044-1. The curves for class 0.5 are plotted as an example.

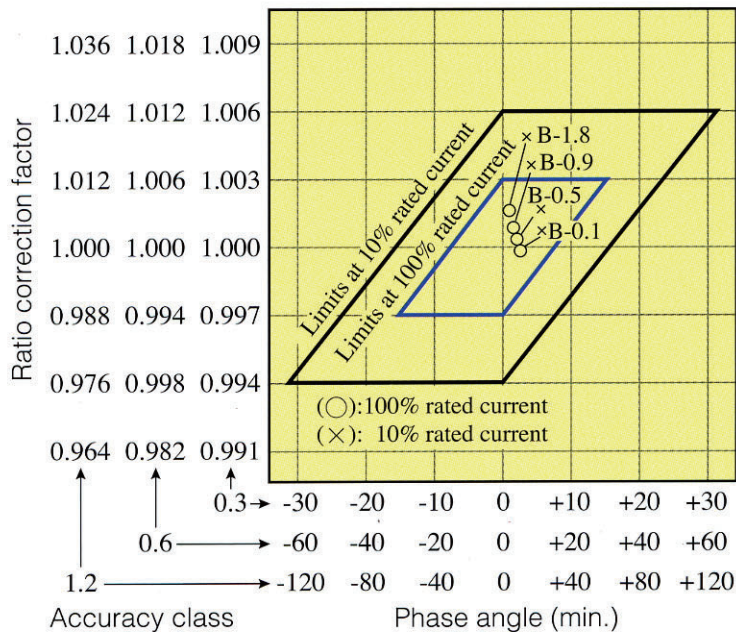


Fig. 4 The figure above shows the limits of accuracy class for metering service in accordance with ANSI C57.13. The curves are plotted as an example.



# CURRENT TRANSFORMER

## Accessories

The following accessories are normally provided.

- |  |       |
|--|-------|
| 1) Rating plate (in English)                                 | 1pce. |
| 2) Lifting lugs  | 1set  |
| 3) Earth terminal<br>(clamp type for 22-250mm <sup>2</sup> ) | 1pce. |
| 4) Secondary terminal box                                    | 1set  |
| 5) Secondary terminal block                                  | 1set  |
| 6) Drain plug  | 1pce. |
| 7) Filling plug  | 1pce. |
| 8) Line terminal pad<br>(Flat pad type)                      | 1set  |
| 9) Undrilled plate for cable entry                           | 1pce. |
| 10) Mounting bolt  | 1set  |

## Tests

### 1. Routine tests

Before shipment from factory, the following routine tests are carried out on each complete assembled CT.

- 1) Verification of terminal markings
- 2) Polarity check
- 3) Power-frequency withstand voltage test
- 4) Inter-turn over voltage test or Induced voltage test
- 5) Accuracy tests

### 2. Type tests

Type test reports will be submitted by request with extra charge.



550kV, 1250 × 2500A

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