

1. CURRENT TRANSFORMERS

Oil-paper insulation

Gas insulation

Dry insulation



> 420 kV Current transformers with gray silicone rubber insulator. Statnett (Norway).

1. CURRENT TRANSFORMERS > Oil-paper, gas and dry insulation

INTRODUCTION

Current transformers are designed to provide a scaled down replica of the current in the HV line and isolate the measuring instruments, meters, relays, etc., from the high voltage power circuit.

Oil-paper insulation:
model CA up to 800 kV,
model CH up to 145 kV.

Gas insulation:
model CG up to 300 kV.

Dry insulation:
model CX up to 72,5 kV.



> Model CA



> Model CH



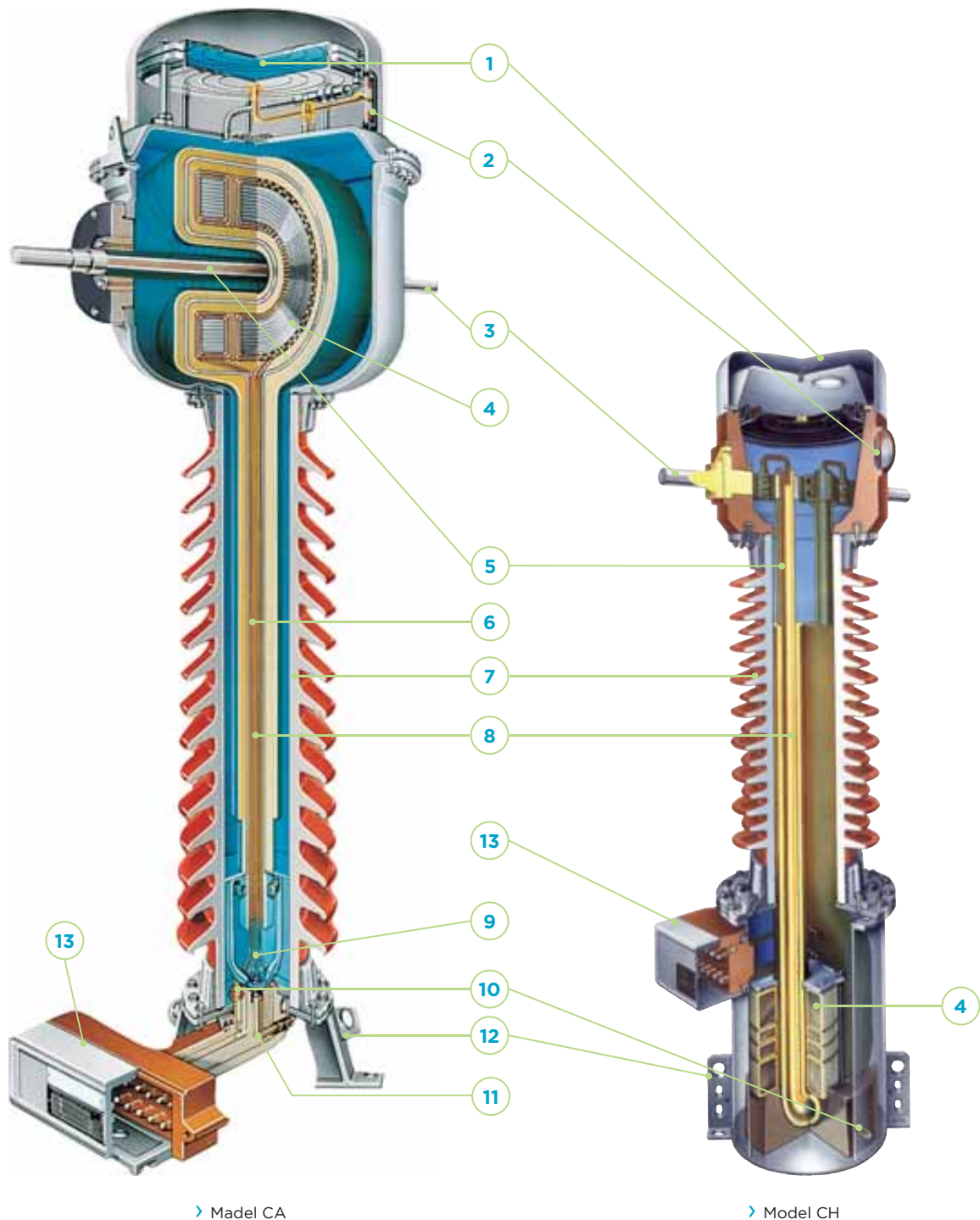
> Model CG



> Model CX

SECTIONS

- | | |
|-----------------------------------|---|
| 1. Oil volume compensating system | 6. Secondary conductors |
| 2. Oil level indicator | 7. Insulator (porcelain or silicone rubber) |
| 3. Primary terminal | 8. Capacitive bushing |
| 4. Cores and secondary windings | 9. Reinforced earth connection |
| 5. Primary winding | 10. Oil sampling valve |

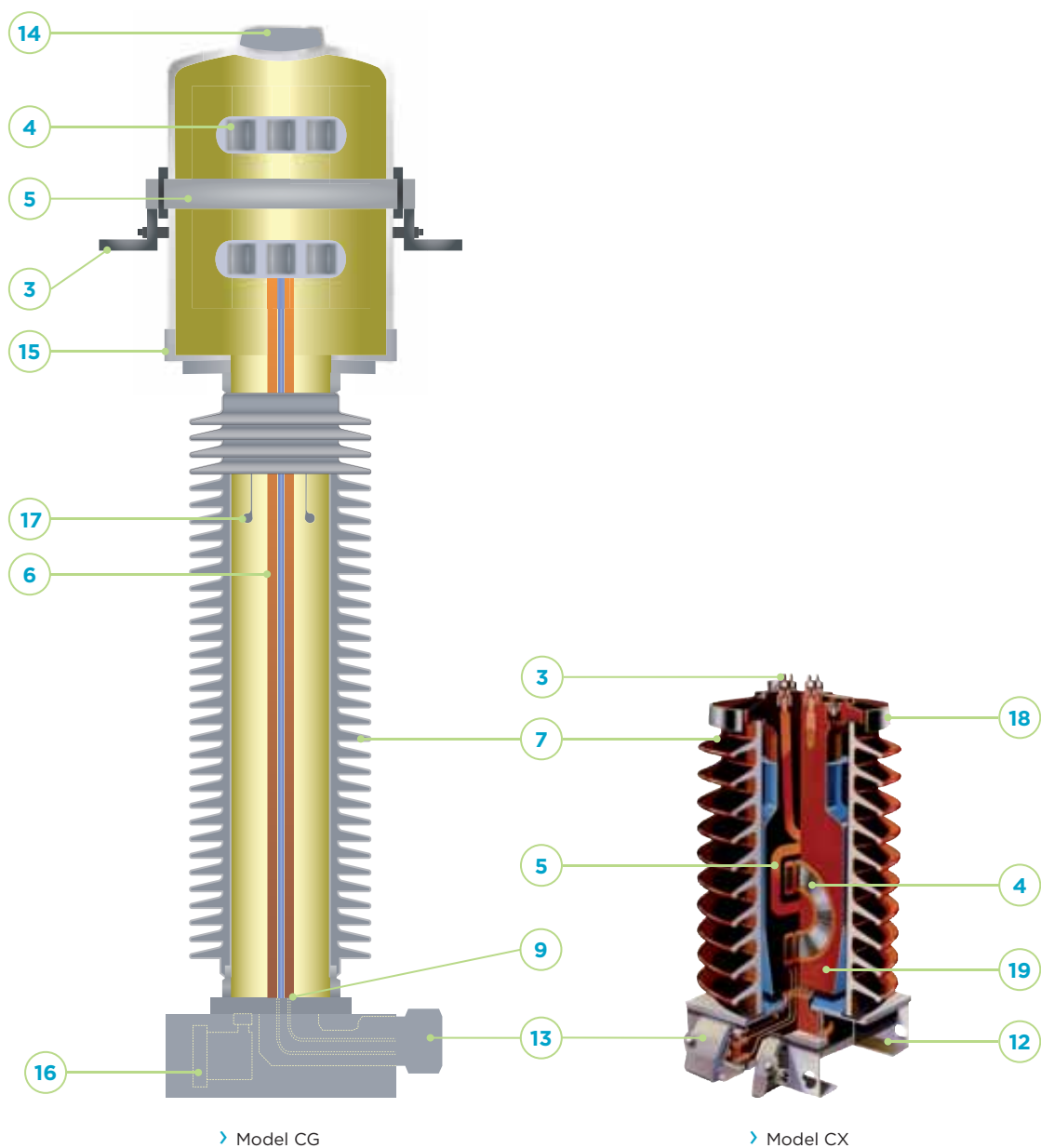


> Model CA

> Model CH

1. CURRENT TRANSFORMERS > Oil-paper, gas and dry insulation

- | | |
|----------------------------|------------------------|
| 11. Tangent delta tap | 16. Manometer |
| 12. Earthing terminal | 17. HV electrode |
| 13. Secondary terminal box | 18. Equipotential ring |
| 14. Pressure relief device | 19. Resin insulator |
| 15. Head | |



APPLICATIONS

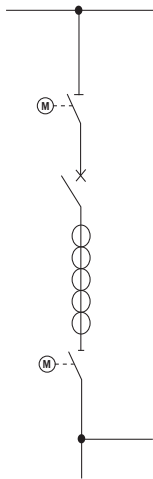
Ideal for installation at metering points due to its very high accuracy.

Excellent frequency response; ideal for monitoring power quality and measuring harmonics.

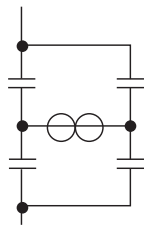
Suitable for installation in AC and DC filters in converter substations for HVDC projects.

Examples of applications:

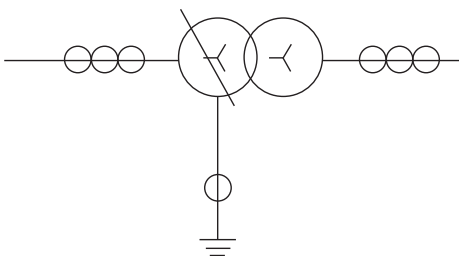
1. Protection for high voltage lines and substations.



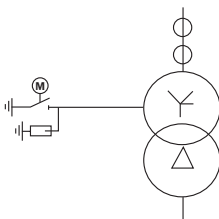
2. Protection for capacitor banks.



3. Protection for power transformers.



4. Revenue metering.



1. 765 kV Current transformer.
RAO-FSK (Russia).



2. 245 kV Current transformer protecting capacitor bank (India).



3. 420 kV Current transformers.
National Grid (UK).



4. 420 kV Current transformers.
Rede Eléctrica Nacional (Portugal).

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DESIGN AND MANUFACTURE

The current transformer consists of one or several cores with their corresponding secondary windings (active parts)

CA RANGE:

The active parts are located in the top part inside a metal box that acts as a low-voltage shield; the main oil-paper insulation is wrapped around, ending up with a high-voltage shield. The primary conductor can be a pass-through bar (with or without external reclosings) or a winding, depending on the case. The secondary cables run through an oil-paper insulated capacitive bushing with several shields for proper electrical field distribution.

CH RANGE:

The active parts are located in the bottom part. The primary conductor is hairpin shaped and the main oil-paper insulation is wrapped around it, including several intermediate capacitive shields so that the electrical field is properly distributed.

CG RANGE:

The active parts are located in the top part, inside a metal box that acts as a low-voltage shield surrounded by SF6 gas insulation. The primary conductor can be a pass-through bar with or without external reclosings. The secondary conductors run through a low voltage tube to the secondary terminal block. Around this metal tube, there is a high voltage electrode so that the electrical field is properly distributed.

CX RANGE:

The active parts are located approximately in the center of the resin body, vacuum cast with epoxy resin, which fixes and isolates the active parts, creating a rigid body with high mechanical resistance, excellent thermal performance and dielectric withstand capability.

This resin body is inside a hollow porcelain or silicone rubber insulator. The chamber between the resin body and the insulator is hermetically sealed with nitrile rubber gaskets; this space is filled with oil for insulation levels above 36 kV.

With more than 65 years of experience, ARTECHE guarantees the performance of its transformers under challenging operating conditions such as extreme temperature, salty or polluted environment, seismic hazard areas, violent winds or high altitude.



- > Detail of a rupture disc in a CG head.
- > Metallic bellows in a CA.

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ADVANTAGES

- › Variety of designs and technologies of insulation for greater adaptation to client needs.
- › Robust mechanical strength and reduced size due to a compact design that is easy to transport, store and install, and which reduces visual impact.
- › Hermetically sealed to guarantee complete water tightness with the minimum volume of oil or gas (Each unit is tested individually).
- › Excellent response under extreme weather conditions (Oil-paper insulation from -55°C; up to +55°C; gas insulation from -45°C up to +55°C), altitudes over 1.000 m.a.s.l., seismic hazard areas, violent winds, etc.
- › Maintenance-free throughout their lifespan.
- › Very high and invariable accuracy (up to 0,1%).
- › Protection for the secondary windings in the terminal block.
- › Wide range of primary and secondary terminals.
- › Different cable glands and accessories available.
- › Each transformer is routine tested for partial discharges, tangent delta (DDF), insulation and accuracy. Designed to withstand all the type test included in the standards.
- › Compliance to any international standards: IEC, IEEE, UNE, BS, VDE, SS, CAN, AS, NBR, JIS, GOST, NF...
- › Officially homologated in-house testing facilities.
- › May be transported and stored horizontally or vertically.

- › 420 kV Current transformers, model CA. CFE, Chicoasén (Mexico).



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OIL-PAPER INSULATION:

Wide range of primary currents: from 1 to 5.000 A.

Oil level compensating system that effectively regulates changes in oil volume mainly caused by temperature.

Oil sampling valve for periodic analysis.

The materials used for construction are recyclable and resistant to the elements. Its advanced design adheres to environmental regulations through the use of high quality insulating oils, free of PCB.

Top-core Type:

- › All types of measurement and protection cores: multi-ratio, linear...
- › Very high rated currents and short-circuit currents.
- › Reinforced safety design, resistant to internal arc.
- › Metallic oil bellows and tangent delta measurement tap.

Hairpin Type:

- › Excellent seismic performance.
- › Good heat dissipation in the primary conductor.
- › Reduced size makes it extremely easy to handle.
- › Option for metallic oil bellows and tangent delta measurement tap.

OPTIONS:

- › Silicone rubber insulator.
- › Capacitive voltage tap.

GAS INSULATION:

- › Total safety in case of internal arc: overpressure is relieved by the pressure relief device (rupture disc) in the top part of the head.
- › The silicone rubber insulator guarantees safety during transportation and service.
- › Online monitoring of the insulation status with a manometer alarm.
- › Compact and very light design.
- › Designed to minimize gas volume, pressure and leaks, thus reducing its environmental impact.

DRY INSULATION:

- › Cast in high dielectric strength resin.
- › Primary winding with spark gap for over-voltage protection.
- › Compact design for easy handling.
- › May be transported, stored and installed vertically or horizontally.
- › Porcelain or silicone rubber insulators.

Innovations in transformers in recent years have made them more efficient with compact designs, making them easy to transport, store and install; minimizing visual impact.



ARTECHE transformers are installed in over 150 countries.

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RANGE

ARTECHE current transformers are named with the letters CA (top-core type, oil-paper) CH (hairpin type, oil-paper), CG (gas type) or CX (dry type) followed by 2 or 3 numbers indicating the maximum service voltage for which they have been designed.

The table on the next page shows the range manufactured by ARTECHE. These characteristics are merely indicative; ARTECHE can manufacture transformers to comply with any domestic or international standard.

Winding ratios: all types of combinations possible in a single device.

Secondary windings for:

- > Protection: all possible types, including linear cores, low induction, etc.

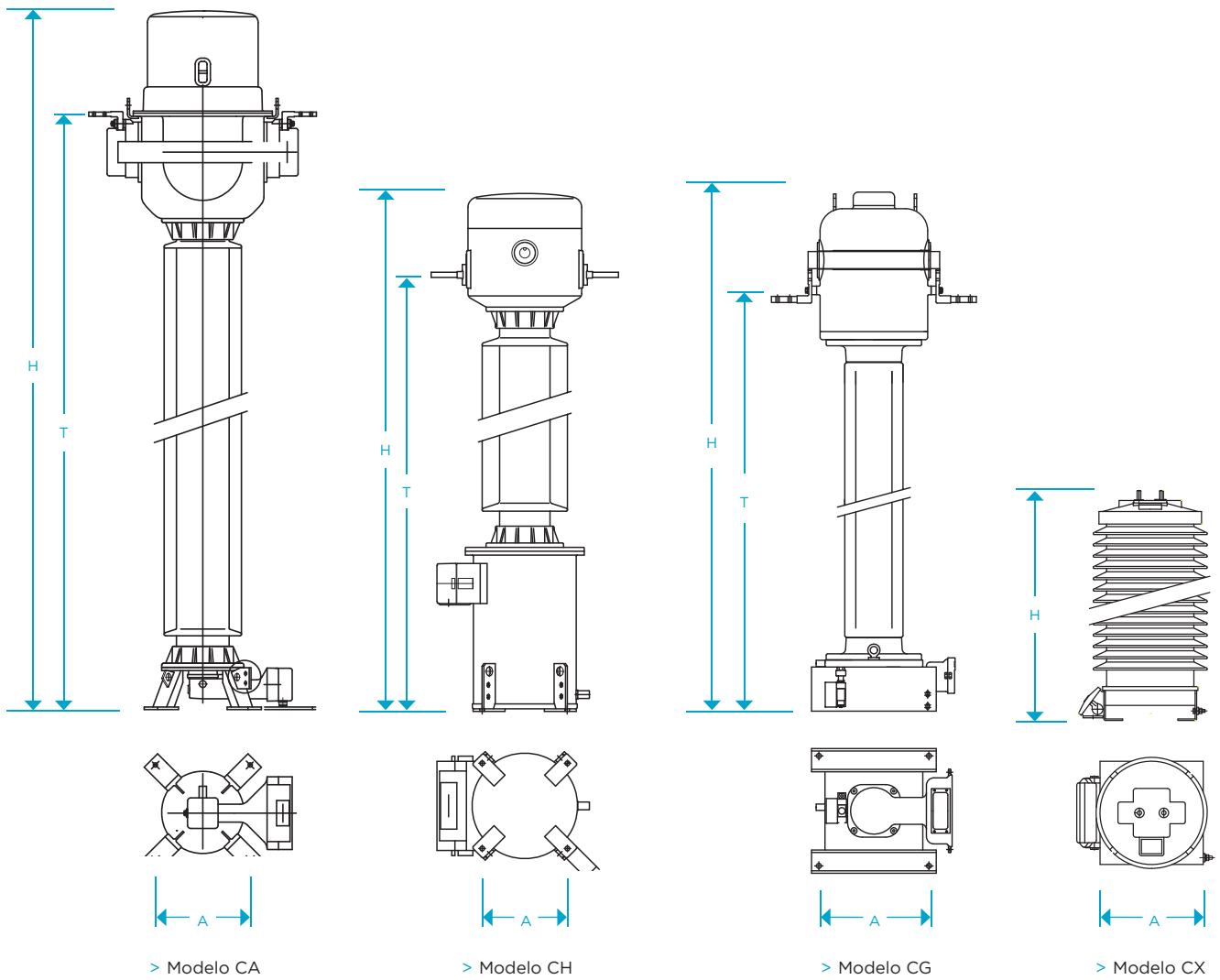
- > Metering: accuracy classes for any metering/billing need (including high accuracy class 0,1 / 0,15 with extended range in current).

Number of secondary windings: as per customer needs, up to 10 secondary windings (or more) are possible in a single device.



- > 420 kV Current transformers. Tennet (The Netherlands).
- > 123 kV Current transformers. Eesti Energia (Estonia).

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- > Routine test performed on a CG 145 kV.
- > 36 kV Current transformers. Fingrid, Kimy (Finland).

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Oil-paper insulation > Model CA

Model	Highest voltage (kV)	Rated insulation level			Standard creepage distance (mm)	Dimensions			Weight (kg)
		Power frequency (kV)	Lightning impulse (BIL) (kVp)	Switching impulse (kVp)		A (mm)	T (mm)	H (mm)	
CA-36	36	70	170	-	900	350	1.185	1.625	250
CA-52	52	90	250	-	1.300	350	1.185	1.625	260
CA-72	72,5	140	325	-	1.825	350	1.335	1.775	280
CA-100	100	185	450	-	2.500	350	1.335	1.775	290
CA-123	123	230	550	-	3.075	350	1.665	2.095	300
CA-145	145	275	650	-	3.625	350	1.665	2.095	310
CA-170	170	325	750	-	4.250	350	1.895	2.335	330
CA-245	245	460 395	1.050 950	-	6.125	450	2.755	3.055	560
CA-300	300	460	1.050	850	7.500	450	3.170	3.580	650
CA-362	362	510	1.175	950	9.050	600	3.875	4.355	870
CA-420	420	630 575	1.425 1.300	1.050	10.500	600	3.875	4.355	920
CA-525	(525) 550	680	1.550	1.175	13.125	600	4.530	5.365	1.200
CA-550	(525) 550	800	1.800	1.175	13.750	600	5.205	5.960	1.700
CA-765	(765) 800	880 975	1.950 2.100	1.425 1.550	15.300	600	5.770	6.590	2.050

Approximate dimensions and weights. For special requirements, please consult.

Primary currents: from 1 A to 5.000 A. Short circuit currents: up to 120 kA.

Oil-paper insulation > Model CH

Model	Highest voltage (kV)	Rated insulation level		Standard creepage distance (mm)	Dimensions			Weight (kg)
		Power frequency (kV)	Lightning impulse (BIL) (kVp)		A (mm)	T (mm)	H (mm)	
CH-36	36	70	170	900	330	1.450	1.765	330
CH-52	52	90	250	1.300	330	1.450	1.765	330
CH-72	72,5	140	325	1.825	330	1.690	2.005	370
CH-100	100	185	450	2.500	330	1.690	2.005	380
CH-123	123	230	550	3.075	330	2.090	2.405	410
CH-145	145	275	650	3.625	330	2.250	2.565	430

Approximate dimensions and weights. For special requirements, please consult.

Primary currents: from 1 A to 2.000 A. Short circuit currents: up to 48 kA.

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Gas insulation > Model CG									
Model	Highest voltage (kV)	Rated insulation level			Standard creepage distance (mm)	Dimensions			Weight (kg)
		Power frequency (kV)	Lightning impulse (BIL) (kVp)	Switching impulse (kVp)		A (mm)	T (mm)	H (mm)	
CG-145	123	230	550	-	3.625	450x450	1.895	2.330	205
CG-145	145	275	650	-	3.625	450x450	1.895	2.330	205
CG-170	170	325	750	-	4.250	450x450	2.070	2.505	235
CG-245	245	395	950	-	6.125	450x450	2.795	3.370	400
		460	1.050	-					
CG-300	300	460	1.050	850	7.500	450x450	3.180	3.755	430

Approximate dimensions and weights. For special requirements, please consult.

Primary currents: up to 5.000 A. Short circuit currents: up to 120 kA/1 s.

Dry insulation > Model CX							
Model	Highest voltage (kV)	Rated insulation level		Standard creepage distance (mm)	Dimensions		Weight (kg)
		Power frequency (kV)	Lightning impulse (BIL) (kVp)		A (mm)	H (mm)	
CXD-24	24	50	125	744	210	462	43
CXE-24	24	50	125	744	250	480	72
CXE-36	36	70	170	900	250	532	80
CXG-36	36	70	170	900	250	670	150
CXE-52	52	90	250	1440	250	712	111
CXG-52	52	90	250	1560	250	798	186
CXH-52	52	90	250	1560	330	800	263
CXG-72	72,5	140	325	1860	250	918	190
CXH-72	72,5	140	325	1860	330	920	305

Approximate dimensions and weights. For special requirements, please consult.

Primary currents: from 1 A to 2.400 A. Short circuit currents: up to 120 kA/1 s.



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