Grid Solutions

OSKF

Oil-Insulated Current Transformers 72.5 kV to 800 kV

Designed to Meet the Highest Expectations

For years, network managers have trusted our OSKF current transformers (CTs) and thousands are installed in substations around the world. Customers recognize our top-of-the-line CTs for their long-term strength, safety and reliability for system voltages up to 800 kV. The enduring success of this series is the result of a well executed design entirely focused on addressing the goals of safety and long life.

Long Service Life and Nearly Zero Maintenance

OSKF current transformers have been designed for a 30-year lifetime and, due to the soundness of the technical concepts many well out-live this service life. They have near-zero maintenance requirements, as the oil is hermetically sealed from the air by a stainless steel diaphragm assembly and all external parts are of corrosion-resistant material.

Characteristics

- High-quality paper-oil insulation
- Head-type design with aluminum housing
- Oil expansion and hermetic seal by stainless steel diaphragm bellows
- Oil level indicator
- Secondary cores isolated in heavy walled grounded housing
- Changing of primary ratio by secondary taps or primary connection

Performance

- U_n: 72.5 to 800 kV
- I_n: up to 6,000 A
- I_n short-circuit: up to 120 kA (Isc dyn: 324 kA peak)
- Secondary cores: up to 8

Seismic Withstand

- Standard design up to 0.5 g.
- Compliance with ANSI/IEEE, IEC or equivalent standards.
- Other standards available upon request.

Key Benefits

- Conservative and safe design
- Extensive field and extreme climate experience
- Burst (internal arc) protected
- Nearly maintenance-free
- Stable accuracy over its lifetime
- Rugged, leak-proof design

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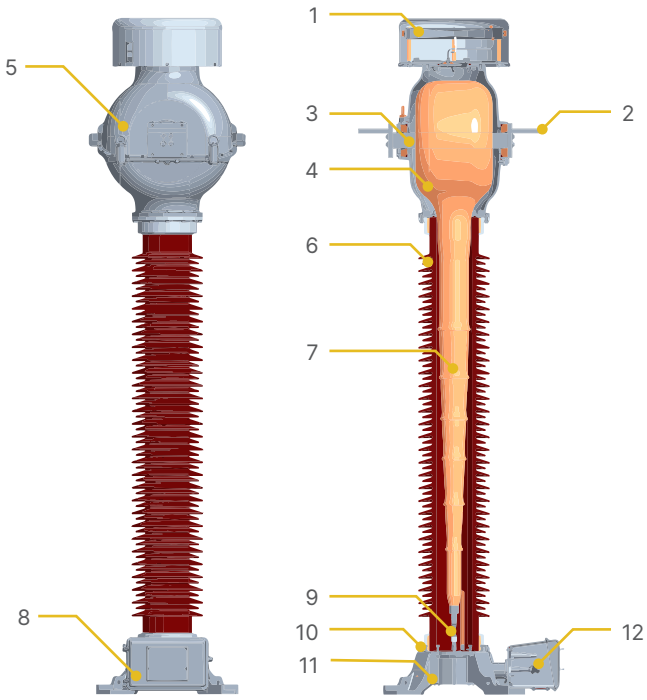
Head-Type Design and Primary Windings

The inverted CT design, with active part in the head, offers particular advantage for higher currents. The primary is normally a straight bar-type conductor with low inductance. Therefore no primary surge protection is required.

Ratio change can be accomplished either by primary series parallel connection (single, double or quadruple ratio) or by secondary taps.

The head-type design also has the advantage of spreading the primary flux in a uniform and symmetrical way through the cores, avoiding local saturation and reducing the leakage flux.

Construction Overview



1. *Diaphragm bellows*
2. *HV primary terminal*
3. *Primary conductor assembly*
4. *Active part*
5. *Head housing*
6. *Porcelain insulator*
7. *Capacitive grading layers*
8. *Secondary terminal box*
9. *Fault current connection to ground*
10. *Grounding pad*
11. *Base assembly*
12. *Secondary terminal blocks*

Cores and Secondary Windings

CTs can have several toroidal laminated cores which are independent of each other. Cores with secondary winding are accommodated in a thick-walled, round aluminum core housing for protection.

The core housing is mounted on a heavy gauge metal tube inside the insulator which leads to the base plate. Cross sections and connections have been dimensioned to provide a fault current path to ground greatly reducing the opportunity for a secondary arc within the insulator.

As a result of this design, an open secondary winding flashover limited in time will not damage the high voltage insulation; and a high voltage insulation breakdown does not impair the function of the secondaries.

High-Quality Paper-Oil Insulation

Insulating paper is applied to the core housing and its supporting tube by a special wrapping machine to ensure high density and uniform insulation. Low impedance grading layers with well-rounded edges ensure a uniformly distributed field over the entire unit, therefore surge arrestors are not required to protect the CT. Only a name brand mineral oil with excellent durability and gasabsorbing properties is used.

The insulating oil contains no PCB.

Controlled vacuum and temperature treatments withdraw humidity and gas from the paper insulation and insulating oil; the impregnation process results in a high-grade dielectric system.

Hermetically Sealed

The OSKF maintains a completely sealed and pressure-free system through the use of a stainless steel metallic diaphragm assembly. The diaphragm assembly provides oil expansion and pressure compensation, protects the interior from air and moisture, and preserves the dielectric strength of the unit. The movements of the diaphragm assembly are translated to an indirect oil level indicator which is visible behind a window in the diaphragm cover. Effectively oil maintenance, change or inspection are eliminated and the CT operates pressure-free.

Leak-proof Design

The head housing is made of corrosion-proof aluminum alloy. Every housing is subjected to a vacuum leak test by helium leak detection. An overall leak test is performed on every assembled unit before oil filling. All seals are formed by single piece O-Rings in fully machined grooves.

Primary Terminals

The standard primary terminals consist of aluminium flat terminal pads with 4, 6, 8, or more holes. On request, single or double round terminals made of nickel-plated copper can be provided.

Secondary Terminal Box

The terminal box can be provided with conduit entrances for the insertion of cable glands by the factory or performed on-site by the customer. The secondaries are brought out through an oil/air seal block assembly and terminated on separate terminal blocks with 8-32 screws. Other terminals available upon request.

Insulator

The outer insulation consists of aluminum oxide porcelain in grey (ANSI 70) or brown (RAL 8016). Standard creepage distances are available according to the dimension tables. Higher creepage distances and composite insulators are available upon request.

Protection Against Bursting

The improved insulation structure and mechanical design ensure dielectric integrity for a very long time. The following additional measures are taken to prevent the insulator from failing in the event of an inner insulation breakdown. The capacitive grading in the high-voltage insulation is designed to withstand transient overvoltages to be expected during service life:

- The active part is above the porcelain in an aluminium head housing.
- An internal fault current connection is provided between the core housing and the ground terminal on the base.
- A pressure relief plate exists in the area of the expansion body on the head.
- Upon request, a composite insulator consisting of fiberglass-reinforced pipe and silicone rubber screens can be provided instead of the porcelain insulator.

Testing

Testing is in conformance with national and international standards. Along with the power-frequency test, capacitance, dielectric loss factor and inner partial discharges are also measured as routine tests. Tests certificates are issued and supplied with the equipment.

Additional Information

Dielectric loss factor
Tanδ smaller than 0.005 up to the power-frequency withstand test voltage

Radio Influence Voltage (RIV)
Per IEEE C57.13.5

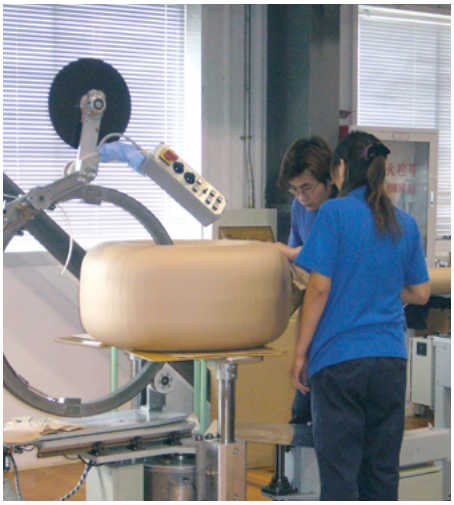
Internal partial discharge
Less than 10 pC at 1.2 U_m

Frequency
50 Hz or 60 Hz or 16 2/3 Hz.
Other value available upon request.

Ambient temperature
-35°C ... +40°C on a 24 h average.
Other designs can be provided upon request for temperature ranges falling outside of the mentioned range.

Mechanical strength

According to IEC 61689-1 & IEEE C57.13.5.
Other values available upon request.



Dimensions and Weights

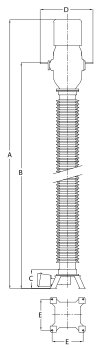
The following dimensions refer to standard versions. Other U_m values affect other dimensions. The head size can change, depending on the core data and the primary nominal current. With regard to the creepage distance and clearance, the insulator can be adapted to the customers' request.

TYPE		OSKF72		OSKF123		OSKF145		OSKF170		OSKF245		OSKF362	
Highest voltage for equipment (U_m)	kV	72.5		123		145		170		245		362	
Lightning impulse withstand voltage (BIL)	kV	350		550		650		750		1,050		1,300	
		mm	In	mm	In	mm	In	mm	In	mm	In	mm	In
Minimum creepage distance		1,813	71.4	3,150	124.0	3,750	147.6	4,583	180.4	6,300	248.0	10,418	410.2
Dimensions	A	1,844	72.6	2,224	87.6	2,582	101.7	2,837	111.7	3,442	135.5	4,517	177.9
	B	1414	55.7	1795	70.7	2029	79.9	1720	89.9	2305	113.4	3027	143.8
	C	305	12.0	305	12.0	305	12.0	305	12.0	305	12.0	377	14.9
	D	798	31.4	798	31.4	849	33.4	849	33.4	935	36.8	1021	40.2
	E	450	17.7	450	17.7	450	17.7	450	17.7	600	23.6	600	23.6
		kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
Total weight (approx.)		270	595	340	750	446	983	489	1,078	609	1,342	1,150	2,535
Oil volume (approx.)	gal.	11.6		15.5		26.2		31.8		37.8		83.1	

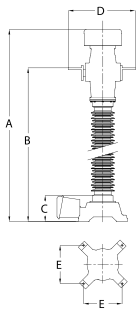
TYPE		OSKF550		OSKF800	
Highest voltage for equipment (U_m)	kV	550		800	
Lightning impulse withstand voltage (BIL)	kV	1800		2100	
		mm	In	mm	In
Minimum creepage distance		15,225	599.4	20,000	147.6
Dimensions	A	5,737	2,25.9	8,250	101.7
	B	4,148	189.7	6,980	79.9
	C	418	16.4	420	12.0
	D	1,043	41.1	1,075	33.4
	E	600	23.6	900	17.7
		kg	lb	kg	lb
Total weight (approx.)		1,780	3,924	3,500	983
Oil volume (approx.)	gal.	137.0		218.9	

Inquiry Checklist

- Applicable standards
- Rated frequency
- Highest system voltage
- Test voltages (power frequency, lightning impulse)
- Primary/secondary rated currents
- Short time current and duration
- Core rating (burden, accuracy)
- Environmental conditions (altitude, temperatures, pollution, seismic conditions)
- Options:
  - Composite insulator
  - Spark gap on secondary winding
  - Ground fault current transformer
  - Capacitive tap
  - Specific design for use in highly active seismic regions
- Available accessories:
  - Ground cable connector
  - Primary terminal connectors
  - Oil sampling kit



OSKF 362 to OSKF 800



OSKF 72 to OSKF 245

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For more information visit gevernova.com/grid-solutions

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English
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