

SIEMENS

Ingenuity for life

Replacement current transformers

Siemens SP / SPS SF₆ Power Circuit Breaker



72kV Westinghouse SP breaker



Cracked, weathered CTs on a Westinghouse SP breaker



Heavy corrosion on inside of CT housing illustrates the importance of insulation resistance testing

Current transformers (CTs) on the SP / SPS circuit breaker are enclosed in a die cast aluminum housing, which has provided many years of trouble free protection for the active CT element encapsulated in resin.

Over the past few years Siemens has noticed a select number of CT housings that have shown accelerated weathering and cracking, typically in harsh industrial environments and in high humidity, salt-contaminated areas such as near sea coasts. CTs with significant cracking or those with lessened insulation resistance can be replaced with new CTs with improved weathering capabilities.

Siemens performed engineering stress analysis and enhanced the CT housing in 2002. The nameplate boss on the original housing with its sharp radii and rivet holes was eliminated. Other radii were generously increased to blend one surface into another at locations, which will improve weathering capabilities.

For especially corrosive environments, an anodized aluminum CT housing is

available for extra protection. The anodized CT housing successfully completed five thermal cycles between 105 °C and -40 °C and another five cycles between 105 °C and -50 °C with no debonding between the resin and the aluminum housing.

Siemens successfully completed ASTM B-117 salt spray tests on both the anodized and unanodized CT housings to provide comparative corrosion resistance. The anodized CT housing was found to be superior.

All CTs are manufactured with an external terminal box that facilitates change-out and replacement applications without the need to replace the CT leads, reducing the potential wiring issues at the CT terminal blocks.



New CT design: Non-anodized (left) vs. anodized (right)

Siemens SP / SPS SF₆ power circuit breaker

Ratio	Relay accuracy	TRF	Metering accuracy	Standard replacement	Anodized replacement
600:5	C400	2.0/2.5	0.3B1.8	72281589012	72281784012
1200:5	C200	2	0.3B1.8	72281589057	72281784057
1200:5	C400	2	0.3B1.8	72281589035	72281784035
1200:5	C400	2		72281589001	72281784001
1200:5	C800	2	Special	72281589002	72281784002
1200:5	C800	2.0/2.5		72281589005	72281784005
1200:5 - 2000:5	C800	2		72281589048	72281784048
2000:5	C800	2		72281589084	72281784084
2000:5	C800	2	0.3B1.8	72281589003	72281784003
2000:5	C800	2	0.3B1.8	72281589007	72281784007
3000:5	C800	2		72281589053	72281784053
3000:5	C800 / C1200		0.3B1.8	72281589004	72281784004
4000:5	C800	2	0.3B1.8	72281584023	72281784023

Above ratings are most common. Other ratings available. When contacting the Siemens power circuit breaker factory, please have breaker seal number.

Insulation resistance test

Insulation resistance testing between the CT secondary and ground will verify the integrity of a CT. Insulation resistance can be measured with a 500 or 1000 volt megger or other conventional insulation resistance test instrument.

The neutral ground must be disconnected from ground. All burdens must be removed. A wire jumper should be connected from X1 to X5 on each CT. The neutral ground wire can be used to test all the CTs simultaneously. The minimum acceptable insulation resistance is one megohm.

Anodization process

CT housings are anodized per MIL Std. A-8625, Type II. Anodizing is an electrolytic passivation process used to increase the natural protective oxide layer on aluminum parts. Anodizing seals the pores of the aluminum and provides a good bonding surface for the encapsulating resin.

Anodized aluminum resists corrosion from ambient weather in nearly all locations except in the presence of strong acids (pH<3) or strong bases (pH>8.5) and is used in a variety of automotive and architectural applications.

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