

Meeting Minutes from 4/26/2010 C37.04 Kick-off Meeting

- Introductions were made
- Patent slides were reviewed
- Copy of suggested C37.04 outline passed out for review.
- It was discussed whether or not to include C37.06.1 in the new C37.04. If we do not include it now in the PAR, the PAR will need to be modified later on.
- Jeff reviewed the current outline with the attendees of the meeting. No comments were made.
- The 'Potential Annexes' were reviewed. Comment was made to ensure that Annex A TRV Symbols for Two-Parameter Method is included in the new revision.
- Jeff shared with the group that Walt Elmore, who was a long time member of the Power System Relaying Committee, once clarified to him that "A circuit breaker is just a device that enhances the interrupting capability of a relay."
- Next 'Topics for Discussions' were reviewed:
 - Solar Radiation: The question of the 1044W/m^2 being adequate was raised. It was stated that the IEC value is 1000W/m^2 . It was decided to reference the radiation as currently stated in C37.04.
 - Pollution Level: The question of using Level I (Light) or Level II (Medium) as the standard pollution level was raised. C37.017 is adopting Level II (Medium), same as C37.100.1. Table C.1 of C37.100.1 -2007 was reviewed for consideration in C37.04. It was agreed to leave C37.04 using Level I (Light) pollution as the standard for now.
 - Ratings for Temperature Rise of CT's: It agreed that C37.04 needs more detail for directions on how to ensure that CT's are tested with the breaker they are intended to be used on.
 - Out of Phase Switching: Currently out of phase switching is an optional rating. It was decided to make the out of phase rating standard for line ($>100\text{kV}$) breakers and optional for cable connected ($<100\text{kV}$) breakers. C37.04 should define the difference between line and cable breakers, if not already so.
 - TRV Capacitor Requirements: It was suggested that a section on TRV Grading, Line to Ground Capacitors be added since they are not truly covered by any other specification. Partial Discharge (PD) of 1.2pC @ 1.2pu was suggested. WG will review those numbers and decide on an acceptable rating to place in the standard.
 - CT and Bushing Numbering/Location: It was stated that C37.04 will be written using the Doble Standard Convention for CT and Bushing numbering/location.
 - Grounding Connections: It was strongly suggested that this section be written, since many times grounding connections are not made in an optimal fashion. (Ex: Grounding TRV Caps separately)
 - Terminal Loading: Short circuit capabilities were discussed. A detail for requirements on an entire bushing loading, rather than just insulator loading was suggested. Utilizing the formulas in xxx605 to verify the

loading is appropriate. Static or Dynamic or both loading to be included in C37.04 was asked.

- EMC Requirement's: C37.100.1 Sections 5.18 and 6.9 may apply. Mr. John Webb has graciously offered to look into this for the WG. Thanks John!!!
- Magnetic Actuated Mechanisms: It was stated that C37.11 is general enough for these types of mechanisms. It was decided that a section dedicated to mechanisms would be created in C37.04, Bill Long, John Webb and Albert Livshitz has graciously offered to help out on this section. Thanks guys!
- Duty Cycle: The group discussed the O-t-CO-t'-CO requirements, where $t' = 3$ minutes or 15 seconds? Currently C37.04 states $t' = 3$ minutes. It was decided to add 15 seconds as an alternative time. Question: Is t' on the breaker nameplate?
- Long Line Fault TRV: Roy Alexander has offered to lead the section on long line fault TRV, with some help from a few others in the group. Thanks guys!!!
- Additional Topics discussed:
 - Draw out circuit breakers was brought up for defining where standard replacement parts should be located. It was stated that standard replacement parts should be located on the draw out unit, for ease of maintenance.
 - Circuit Breaker Temperature Ratings: It was discussed that C37.09 had made a distinction between indoor and outdoor breakers, but that was removed in the last revision. It was agreed to add some sort of distinction between indoor and outdoor breaker operating temperatures. Currently -30C - +40C is standard for all breakers.
 - Outrush capabilities of breakers: C37.06 now has a note for addressing this very issue.
 - Capacitor Inrush: Was mentioned, but no formal discussion occurred.
 - Control voltage to be defined/clarified for circuit breaker controls and relaying. A question was brought up a while back on this issue, so it was decided to address it in C37.04 and possibly in C37.010.
 - C37.06 and C37.09 use milliseconds (ms) units for denoted interrupting times, C37.04 uses cycles. It was suggested to use a standard set of units, or at minimum define what 'a cycle' is based on, 50/60Hz.
 - The response time of stationing relays was discussed, currently it is in C37.04 as $\frac{1}{2}$ cycle. The criteria may be better suited in an application guide written as Lowest practical time less than 8.335ms.
 - Synchronous Circuit Breakers, or Point on Wave Circuit Breakers or Zero Crossing Breakers, etc...was discussed: It was noted that they may not be applicable to be included under C37.04. IEC-302 has been released which details out requirements for these breakers.
 - C37.04 Table 1 note 8: Should this note be harmonized with IEC?

Slides presented at Kick-off Meeting:



High-Voltage Circuit Breaker Standard Working Group C37.04 Revision Kick-Off Meeting

Chair – Jeffrey Nelson, TVA

Vice-Chair – Mike Crawford, MEPPI

- Introductions
- Working Group Membership
- Patent Slides

IEEE Patent Slides

– **Advise the WG attendees that:**

- The IEEE's patent policy is consistent with the ANSI patent policy and is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
- Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
- There may be Essential Patent Claims of which the IEEE is not aware. Additionally, neither the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.

IEEE Patent Slides

- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
 - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
 - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
 - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.

IEEE Patent Slides

- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 12 and 12a on inclusion of potential Essential Patent Claims by incorporation or by reference.

Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees with a PAR approved by the IEEE-SA Standards Board.

Participants, Patents, and Duty to Inform

All participants in this meeting have certain obligations under the IEEE-SA Patent Policy. Participants:

- | “Shall inform the IEEE (or cause the IEEE to be informed)” of the identity of each “holder of any potential Essential Patent Claims of which they are personally aware” if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
 - | “Personal awareness” means that the participant “is personally aware that the holder may have a potential Essential Patent Claim,” even if the participant is not personally aware of the specific patents or patent claims
- | “Should inform the IEEE (or cause the IEEE to be informed)” of the identity of “any other holders of such potential Essential Patent Claims” (that is, third parties that are not affiliated with the participant, with the participant’s employer, or with anyone else that the participant is from or otherwise represents)

Participants, Patents, and Duty to Inform

The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group

Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2

Early identification of holders of potential Essential Patent Claims is strongly encouraged

No duty to perform a patent search

Patent Related Links

- All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.
- Patent Policy is stated in these sources:
 - IEEE-SA Standards Boards Bylaws
<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>
 - IEEE-SA Standards Board Operations Manual
<http://standards.ieee.org/guides/opman/sect6.html#6.3>
- Material about the patent policy is available at
<http://standards.ieee.org/board/pat/pat-material.html>

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit <http://standards.ieee.org/board/pat/index.html>

This slide set is available at <http://standards.ieee.org/board/pat/pat-slideset.ppt>

Call for Potentially Essential Patents

- If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:
 - Either speak up now or
 - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
 - Cause an LOA to be submitted

Other Guidelines for IEEE WG Meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
 - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
 - **Don't discuss specific license rates, terms, or conditions.**
 - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
 - Technical considerations remain primary focus
 - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
 - **Don't discuss the status or substance of ongoing or threatened litigation.**
 - **Don't be silent if inappropriate topics are discussed ... do formally object.**

See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and "Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy" for more details.

New FAQ

12a. How should Working Groups handle Letters of Assurance when re-using portions of a non-IEEE standard in a [Proposed] IEEE Standard?

The Working Group Chair shall initiate a request for a Letter of Assurance from holders of potential Essential Patent Claims when re-using portions of an existing non-IEEE standard in a [Proposed] IEEE Standard. Any patent letters of assurance (or patent declarations) given to the developer of the non-IEEE standard cannot be stated to also apply to the [Proposed] IEEE Standard. In addition, there are specific requirements that must be incorporated into an IEEE Letter of Assurance in order for it to have the possibility of becoming an Accepted IEEE Letter of Assurance.

Scope of Revision

- General revision
- Incorporate C37.06
- Incorporate parts of NEMA SG 4
- Incorporate C37.04a
- Incorporate C37.04b
- Incorporate relevant portions of the C37.04 Corrigendum

Proposed Standard Outline

1. Overview
2. References
3. Definitions
4. Service Conditions
5. Description of Ratings & Capabilities
6. Preferred Ratings
7. Construction & Functional Components
8. Nameplate Markings

Potential Annexes

- A. Bibliography
- B. TRV Symbols for Two-Parameter Method (Annex A from C37.06)
- C. TRV Symbols for Four-Parameter Method (Annex B from C37.06)
- D. Special Application – Repetitive Duty Circuit Breakers for Arc Furnace Switching (Section 5 of NEMA SG4)
- E. Free Standing Current Transformers

Topics For Consideration

- Solar radiation (C37.100.1)

2.1.2 Outdoor switchgear

- a) The ambient air temperature does not exceed 40 °C. The minimum ambient air temperature is -30 °C for class “minus 30 outdoor.”

Rapid temperature changes should be taken into account.

- b) Solar radiation as much as 1044 W/m² (a clear day at noon). The specific latitude of location should be considered. See IEEE Std C37.24 for details on evaluating the effects of solar radiation.

NOTE—Under certain conditions of solar radiation, appropriate measures, e.g., roofing, forced ventilation, etc., may be necessary, or derating may be used in order not to exceed the specified allowable temperature rises.

Topics For Consideration

- Pollution level (Level I (light) per current C37.04 or Level II (medium) per C37.100.1

6.2 Creepage distance

Creepage distance over external insulation for outdoor circuit breakers is listed in ANSI C37.06-1997. These minimum values are for light pollution level conditions of atmospheric contamination and represent generally satisfactory service operations under these conditions. For special cases of pollution, refer to IEEE Std C37.010-1999 or to the manufacturer.

2.1.2 Outdoor switchgear

- d) The ambient air may be polluted by dust, smoke, corrosive gas vapors, or salt. The pollution does not exceed the pollution level II—medium according to Table C.1.

Topics For Consideration

- Ratings temperature rise of CTs

4.6 Temperature rise

The limits of observable temperature rise in instrument transformers when tested in accordance with their ratings shall be as given in Table 4, and the transformers shall be designed so that the hottest-spot winding temperature rise above ambient will not exceed the values given in Table 4.

Table 4—Limits of temperature rise^a

Type of instrument transformer	30 °C ambient		55 °C ambient	
	Average winding temperature rise determined by resistance method (°C)	Hottest-spot winding temperature rise (°C) ^b	Average winding temperature rise determined by resistance method (°C)	Hottest-spot winding temperature rise (°C)
55 °C rise	55 ^c	65	30	40
65 °C rise	65 ^c	80	40	55
80 °C rise dry-type	80	110	55	85

^aTemperature rise of current transformers that are a part of high-voltage power circuit breakers or power transformers shall be in accord with IEEE Std C37.04 or IEEE Std C57.12.00, respectively.

^bTemperature rise of other metallic parts shall not exceed these values.

^cTemperature rise at the top of the oil in sealed transformers shall not exceed these values.

Topics For Consideration

- Out of phase switching

5. Ratings

- n) Out-of-phase switching current capability (5.12) (out-of-phase switching current is an optional rating that may be assigned where applicable).

5.12 Out-of-phase switching current capability

Since the out-of-phase switching duty is required for only certain circuit breaker applications, it is not considered necessary to include this as a standard rating for general purpose circuit breakers.

This rating applies to circuit breakers intended to be used for switching the connection between two parts of a three-phase system during out-of-phase conditions. Out-of-phase is an abnormal circuit condition of loss or lack of synchronism between parts of an electrical system on either side of a circuit breaker. The phase angle between rotating vectors representing the voltages on either side of the circuit breaker at the instant of its operation may differ by as much as full-phase opposition.

Topics For Consideration

- TRV Capacitor Requirements
 - 1.2 pC at 1.2 p.u. Phase-to-ground voltage
- CT and bushing numbering/location
- Ground connections (Frames, TRV caps, etc.)
- Terminal loading (Consider new C37.017)
- EMC requirements/test per C37.100.1 (Clauses 5.18 and 6.9)
- Magnetic actuated mechanisms
- Duty cycle (t' time delay – 3 min or 15 sec)
[O – t – CO – t' – CO]
- Long line fault TRV

Additional Topics For Consideration from Kick-Off

- ???



FINAL QUESTIONS?