

WG: C37.010 - Circuit breaker application Guide

Chair: Helmut Heiermeier

Vice Chair: Xi Zhu

Secretary: Mike Skidmore

Location: San Diego, CA

Participants: (Including Chair, Vice Chair, and Secretary)

35 members

44 guests

- 1.) The meeting started with the chair introduction and introductions of the attendees. The chair asked all attendees to sign the roster and provide affiliation if not noted on the roster.
- 2.) There is no longer the need to obtain a motion to approve the meeting minutes from previous meetings. This was discussed at the main switchgear committee at Saint Pete (spring of 2015). The meeting minutes are approved as posted on the IEEE PES Switchgear website: <http://www.ewh.ieee.org/soc/pes/switchgear/minutes/Minutes.html>. Please review the meeting minutes and if there are any errors then please notify the secretary or chair for corrections
- 4.) The PAR extension was approved and extended until December 2016.
- 5.) The chair updated the committee on the status of the working group and the work performed to date. Helmut said he will go over the ballot recirculation results, and review selected comments. C37.010 Draft 11 ballot was recirculated on 7-13-15 and ended on 7-29-15. Draft 7 was the first ballot. Draft 8 and 9 were reviewed and circulated within the working group for updates and improvements. Draft 10 was the ballot recirculated to the working group where he received 191 comments. Draft 11 ballot recirculation had 6 participants with 114 comments.
- 6.) In order to save time on the comments from the ballot recirculation, the Chair (Helmut), Vice Chair (Xi), Secretary (Mike Skidmore), and Carl Schuetz reviewed and modified comments from Draft 11 ballot recirculation. Mike Skidmore and Carl Schuetz met to review and update the document. Many of the comments received from the recirculation were editorial and accepted. There are approximately 6 comments that were rejected. The chair showed slides of the rejected comments received during the ballot recirculation. He also covered other “accepted” and “revised” comments from the ballot.

7.) Discussion of selected rejected comments:

- Comment r02-101 (Line 4 Title Page)

Document Title: In order to be consistent with other IEEE standards, the symbol ">" shall be changed to "Rated Above"

Proposed Change by balloter:

It should read " ...Circuit Breakers Rated Above 1000 V on a Symmetrical...". If this change is acceptable, then make this change on page 1, line 2.

Result:

The Working Group (WG) agreed to reject this comment; otherwise the PAR needs to be changed.

- Comment r02-111(Sub-clause 4.2.1, page 3, Line 25)

Include what may need to be done if circuit breakers are working in harsh environment such as ambient temperature over 40 deg C.

Proposed Change by balloter:

Add some of the deleted contents back - "The rated nominal current carrying capability may be decreased. Special lubricants may be required."

Result:

The WG agreed to reject this comment, the requirement for special needs are already listed on page 3 Lines (27 to 31)

- Comment r02-58 (Sub-clause 5.10.2.3, page 34, Line 18)

"Medium and maximum" appears to be inconsistent with definition provided in parenthesis in same sentence

Proposed Change by balloter:

Please correct to ensure consistency

Result:

During the meeting the comment was marked form rejected to revise.

In general the statement is correct however wording could be improved. The min arcing time for the first pole to clear defines the corresponding arcing time for the medium and max arcing time

John Webb wondered if there is better wording to replace the words in Clause 5.10.2.3, Page34, lines 18 and 19: "based on"

- Medium and maximum arcing times (**based on** the minimum arcing time for the first pole to clear condition which the breaker is able to clear)

Some suggestions were to replace "based on" with "which are based "or "determined by"

John Webb agreed to provide wording as an "informative note" to Helmut. The function of the circuit is different than the condition that is created during a synthetic test.

- Comment r02-56 -(sub-clause 5.10.2.2, line , page 32 line 9)

It would help the reader to understand the message better, perhaps, if the text accompanying Figures 6 to 8 mentioned which phase current is being addressed when referring to minor, major or intermediate minor loops. In the absence of this, it is difficult to understand what is being referenced.

Proposed Change by balloter:
Please clarify as indicated at left

Result:

During the meeting the comment was marked form rejected to revise

The information is given in the title of the figures i.e. clearing after a minor loop with f.p.t.c factor 1.5 shows that this is the first clearing phase which can be identified in the graph.

John Webb suggested to add an informative guide and reference IEC 306 – to the bibliography.

Xi Zhu recommended that maybe we just need clarification currents I1 (interrupts first) and I2 and I3... add reference on current trace of figures. This should be done in all figures.

- Comment r02-27 (sub-clause 5.10.2.2)

Figures 9 and 10 and the text around them describe how laboratories adjust circuit parameters in order to comply with the requirements. That does not belong in an application guide.

Proposed Change by balloter:

Remove figures 9 and 10 plus the inserted text.

Result:

Rejected: Figures 9 and 10 are used to compare test results from different test labs. The figures were added to allow the user a means to verify the circuit breaker capability when tested using differing parameters. This information was requested to be added to the document by the working group during the spring 2015 meeting. The WG agreed to reject this comment.

- Comment r02-26 (sub-clause 5.10.2.2)

The text below the indents is a testing matter and it does not belong in an application guide. Furthermore, the suggestion that clearing after a major loop is the most critical condition for a circuit breaker is not true. There are circuit breakers that clear after a minor loop only.

Proposed Change by balloter:

Suggest to remove the text below the indents together with figures 6, 7 and 8, but leave the inserted text below figure 8.

Result:

Rejected: The texts as well as the figures have been introduced after the spring meeting 2015 in order to give some background information for the user to understand test reports better. It provides useful information for better understanding. The WG agreed to reject this comment.

- Comment r02-1

Dispositions to comments R01-174, R01-173, R01-172, R01-170, and R01-169 are all "accepted" but in each case the proposed change involved multiple choices. So, "accepted" is incorrect, even though the changes made to the document are valid.

Proposed Change by balloter:

No response necessary.

Result:

The chair asked if he should reject this comment. This was an old comment that “breaker” should be referred to “circuit breaker” throughout the document. The WG chair said this was done in the latest draft but explain why there was an error, which was a mistake on his part. Disposition comments can’t be corrected / changed once entered into the iee system. Going forward the document revision will be corrected in the actual re-balloted document.

The WG agreed to mark R02-1 comment to revise and to create a better note in the system explaining what actually happened.

- Comment R02-8

Comment R01-08 says "accepted" and "ask Anne". This is not a valid disposition status or detail.

Proposed Change by balloter:

Ask Anne, and revise the document accordingly, and recirculate.

Result:

Ted Olsen said in the comment that this is not a valid disposition. Helmut said this error was addressed in the latest draft but was an error in some of the first drafts. The WG said this should be revised and add a note to correct and clarify the disposition status for the comment.

- Comment R02-7

Disposition for comment R01-45 says "rejected" and detail says "No Comment found". You are not trying very hard at all. Comment i-655 is available in the comments listing on MyProject for the recirculation ballot, and is still valid and still needs resolution. Rephrased in the context of Draft 11 (clean version without markups),

Proposed Change by balloter:

In this case, the offending text was deleted as a result of other comments.

Result:

Change status of comment R02-7 to revised and explain what happened. The Chair said we corrected a mistake and examples were deleted over several drafts....

- Comment R02-6

Disposition for comment R01-52 says "rejected" and detail says "Comment not found". You are not trying very hard at all. Both comment R01-52 and comment i-641 are available in the comments listing on MyProject for the initial ballot and the recirculation ballot.

Proposed Change by balloter:

In this case, the text was modified even though the comment dispositions are wrong.

Result:

The WG agreed to mark as revised and the WG chair should clearly explain what happened.

- Comment R02-5

Disposition detail for comment R01-99 is "#NAME?", not a valid response for disposition detail.

Proposed Change by balloter:

No response necessary.

Result:

The WG agreed to mark as revised and the WG chair should clearly explain what happened.

There was also additional discussion about comment R02-5 in relation to sub-clause 5.4.4.2.

Gilbert Carmona asked about the thermal time constant and why it is 4 hr and 8 hr. Is there any justification for this and where does it come from? Is this the correct place where this capability should be put in the document? Some of the WG said this was from old oil breakers and has been in the document for a very long time. There was no justification to remove it and replaced it with something different without a study group. This is not a rating and implied. Should the thermal procedure be discussed in .09 for thermal time constants? The WG believed a procedure to show values for thermal time constants would be very difficult to develop. There are many different time constants with many different critical points within the circuit breaker. If the equipment has an overload it must be clear and we have no justification to change it to something else at this point. This discussion took place between the working groups. Xi Zhu said that the time constants for SF6 or vacuum breaker would be very different than oil breakers. A heating and cooling time constant will not be the same. The equipment may also have solar effect too. (E.g. Roy Alexander, Gilbert Carmona, Sushil Shinde, John Webb, Ken Edwards, Ben Bufi, Helmut, and many others discussed these points).

John Webb said he will review 5.4.4.4.2 and maybe add a note to better clarify this issue. He will discuss with Helmut.

- Comment R02-2

Comment R01-130 has disposition "revised" but no explanation. A disposition of "revised" requires explanation as to what was revised.

Proposed Change by balloter:

What was changed?

Result:

The WG agreed to mark as revised and the WG chair should explain what happened and why there was an error.

- Comment R02-1

Dispositions to comments R01-174, R01-173, R01-172, R01-170, and R01-169 are all "accepted" but in each case the proposed change involved multiple choices. So, "accepted" is incorrect, even though the changes made to the document are valid.

Proposed Change by balloter:

No response necessary.

Result:

The WG chair agreed to mark comment to revised and explain what happened and why there was an error.

8.) The chair hopes to resolve all comments by the end of October 2015

9.) Preparation for next ballot. The chair hopes to have another ballot recirculation by November of 2015.

10.) Gilbert Carmona asked that the document be checked for references again. The WG chair said this was already done but someone should review again. The WG chair asked if Gilbert could help.

11.) The working group committee agreed to adjourn meeting.

12.) All slides provided at the meeting are included as attachments.

Meeting Roster – San Diego, CA

First Name	Last Name	Role	Company	9/21/2015
Mehmet	Adanur	Guest	Southern Company Services	
Syed Shahab Uddin	Ahmed	Member	Siemens Energy Inc	
Roy	Alexander	Member	RWA Engineering	X
Michael	Anderson	Member	Retired	
Mauricio	Aristizabal	Member	ABB	
Aasim	Atiq	Guest	Siemens Energy	X
Roy	Ayers	Guest	Nashville Electric Service	
William	Bane	Guest	Nashville Electric Service	
Amildo	Barrio	Guest	Parsons	
George	Becker	Member	Electric Power Research Institute	X
Robert	Behl	Member	ABB	
W.J. (Bill)	Bergman	Member	PowerNex Associates Inc.	
Stan	Billings	Member	Mitsubishi Electric PP	X
Anne	Bosma	Member	ABB AB	
Cody	Brehm	Member		

Jeffrey	Brogdon	Guest	Georgia Transmission	
Steven	Brown	Member	Allen & Hoshall	
Raymond	Browning	Guest	FirstEnergy Corp.	X
John	Brunke	Guest	Dr. John H. Brunke, P.E.	X
Arben	Bufi	Member	Hitachi HVB, Inc.	X
Eldridge	Byron	Member	Schneider Electric	X
Donald	Cantrelle	Guest	Georgia Power	X
Gilbert	Carmona	Member	Southern California Edison	X
Stephen	Cary	Member	GE Energy Management	X
Steven	Chen	Member	Eaton Corporation	X
Vincent	Chiodo	Guest	HICO	X
Chih	Chow	Member	PEPCO	X
Michael	Christian	Member	ABB	X
Roggero	Ciofani	Guest	Altalink	
Lucas	Collette	Guest	Mitsubishi Electric	X
Dave	Collette	Guest	Mitsubishi Electric	
Lee	Cox, Jr.	Guest	Efacec	
Michael	Crawford	Guest	Mitsubishi Electric	X
Jason	Cunningham	Guest	Hitachi HVB, Inc.	X
David	Dart	Guest	NOJAPower	
Jerod	Day	Guest	Vacuum Interrupters, Inc.	
Patrick	Di Lillo	Member	Consolidated Edison Co. of NY, Inc.	X
Denis	Dufournet	Member	Retired	X
Edgar	Dullni	Member	ABB	
Carolyn	Durham	Guest	Entergy	
Bernie	Dwyer	Guest	PECO	
John	Eastman	Member	INCON	X
Ken	Edwards	Member	Bonneville Power Administration	X
Leslie	Falkingham	Member	Vacuum Interrupters Limited	
Thomas	Field	Member	Engergy	
Lori	Fish	Guest	Entergy	
Sergio	Flores	Guest	Schneider Electric Inc. USA	X
Shane	Ford	Guest	Nashville Electric Service	
Robert	Foster	Guest	Megger	X
Paul	Fox	Guest	Schneider Electric	
Douglas	Giraud	Guest	Powell Electrical Systems	
John	Hall	Guest	Tennessee Valley Authority	X
Daryl	Hallmark	Guest	Southern Company Services	
John	Harley	Guest	FirstPower Group LLC	
Helmut	Heiermeier	Chair	ABB	X
Christian	Heinrich	Guest	Siemens AG	

Charles	Hendrickson	Guest	Arizona Public Service Company	
Jeremy	Hensberger	Guest	Mitsubishi Electric Power Products Inc.	X
Victor	Hermosillo	Member	Alstom Grid	X
Jingxuan (Joanne)	Hu	Guest	RBJ Engineering Corporation	
Roy	Hutchins	Guest	Southern Company Services	X
Todd	Irwin	Member	Alstom Grid Inc	X
Carlos	Isaac	Guest	Oncor Electric Delivery	
Richard	Jackson	Member	Detroit Edison	
Anton	Janssen	Guest	Liander	
Joseph	Jasinski	Guest	ITC Holdings Corp.	X
Cory	Johnson	Member	BPA	
Wolfgang	Jung	Guest	Siemens AG	
Jayamali	Kasige	Guest	Crown Technical Systems	X
Amir	Khosravi	Guest	BC Hydro	X
Carl	Kurinko	Guest	ABB Inc.	
Thomas	Lagerstrom	Guest	Pedersen Power Products	
Stephen	Lambert	Member	Shawnee Power Consulting, LLC	
Carl	LaPlace	Guest	GE Industrial Solutions	X
Matthew	Lawrence	Guest	Doble Engineering	
HaeKyu	Lee	Guest	HICO America	X
David	Lemmerman	Guest	PECO/Exelon	
Werner	Lesse	Guest	Siemens AG	
Wangpei	Li	Guest	Eaton	
Qian	Li	Guest	Powertech Labs INC.	
Hua Ying	Liu	Member	Southern California Edison	X
Li	Liu	Member	Eaton	
Albert	Livshitz	Member	CE Power Solutions	X
Bjorn	Lofgren	Member	Siemens Energy	
Russell	Long	Member	Retired	
Jess	Mains	Guest	ABB Inc	
Antonio	Mannarino	Guest	PSE&G	X
Vincent	Marshall	Guest	Southern Company Services	X
Gary	Martin	Member	Entergy	
Ricardo	Martinez	Guest	CFE-LAPEM	X
Peter	Marzec	Guest	S&C Electric Co.	X
John	Marzula	Guest	Mitsubishi	
Joel	Mathewson	Guest	Siemens	X
Frank	Mayle	Member	Technibus, Inc.	X
Deepak	Mazumdar	Guest	Central Electric Manufacturing Co.	X

John	McClelland	Guest	Technibus	
Neil	McCord	Guest	Southern States	
Timothy	McGee	Guest	Siemens Energy	
Dave	Mitchell	Member	Dominion	X
Oscar	Montano	Guest	Salt River Project	X
Georges	Montillet	Member	GFM Consulting LLC	
Stephanie	Montoya	Member	Southern California Edison	
Tom	Mulcahy	Member	Dominion Virginia Power	X
Volney	Naranjo	Guest	Megger	
Jeffrey	Nelson	Member	Tennessee Valley Authority	
Joe	Nims	Guest	Allen & Hoshall	
Miklos	Orosz	Guest	Schneider Electric	X
Mirko	Palazzo	Member	ABB	
Amit	Patel	Guest	GE	
Shawn	Patterson	Member	US Bureau of Reclamation	
Thomas	Pellerito	Member	DTE Energy	X
Alan	Peterson	Guest	Utility Service Corporation	X
Lise	Phan	Member	Parcific Gas and Electric Company	
Cornelius	Plath	Guest	Omicron electronics	
Iulian	Profir	Guest	Rockwell Automation	X
Ahmad	Qasem	Guest	Bechtel	X
Reynaldo	Ramos	Member	Southern Company	
Samala Santosh	Reddy	Guest	Powell Industries	X
Frank	Ricard	Guest	FirstPower Group LLC	
Anthony	Ricciuti	Member	Eaton Corporation	X
Dave	Riffe	Guest	Westinghouse Electric Company	
Julian	Rizo	Guest	Xcel Energy	X
Brian	Roberts	Guest	Southern States, LLC	
Jon	Rogers	Member	Siemens Energy, Inc	
Ian	Rokser	Guest	Eaton Corp	
Ben	Rosenkrans	Guest	Eaton Corporation	
Charles	Ross	Member	PGH Wong Engineering	
Roderick	Sauls	Member	Southern Company Services	X
Robert	Sazanowicz	Guest	The United Illuminating Company	
Daniel	Schiffbauer	Guest	Toshiba International Corporation	X
Carl	Schuetz	Member	American Transmission Company (ATC)	X
Jon	Schumann	Member	American Transmission Company	X
Mike	Seabrook	Guest	GE	
Devki	Sharma	Member	Consultant	X

Harish	Sharma	Guest	Southern Company	
Sushil	Shinde	Member	ABB Inc.	X
John	Shullaw	Guest	Retired -GE	
Sunita	Singh	Guest	Bechtel OG&C	
Michael	Skidmore	Secretary	AEP	X
Robert	Smith	Guest	Eaton Corporation	X
Zachary	Smith	Member	Mitsubishi Electric Power Products, Inc.	
Erin	Spiewak	Guest	IEEE	
James	Stacy	Guest	Schneider Electric	X
Kresimir	Starcevic	Guest	DNV GL KEMA Laboratories	X
Don	Steigerwalt	Member	Duke Energy	X
David	Stone	Guest	DTS Technical Services	
Donald	Swing	Guest	Powell Industries	
Chand	Tailor	Guest	Eaton Corporation	X
Humayun	Tariq	Guest	American Electric Power	X
Jey	Thayalan	Guest	Schneider Electric	
Jean-Marc	Torres	Guest	EATON	
Vernon	Toups	Guest	Siemens	X
Stephen	Tyler	Guest	Dominion	
James	van de Ligt	Member	CANA High Voltage Ltd.	X
Steve	Vatterott	Guest	ABB Inc.	
Wes	Wadsworth	Guest	Hitachi HVB, Inc.	
John	Webb	Member	ABB	X
Casey	Weeks	Guest	Siemens Energy	X
Jan	Weisker	Member	Siemens AG	X
Jerry	Wen	Guest	BC Hydro	
Matthew	Williford	Guest	Schneider Electric	X
Terry	Woodyard	Guest	Siemens Industry Inc.	
Oon	Yek	Guest	Pacific Gas & Electric	
Dong Sun	Yoon	Guest	HICO America	
Richard	York	Guest	Mitsubishi Electric Power Products, Inc.	X
Jiong	Zhang	Member	MEPPI	
Wei	Zhang	Guest	Hitachi HVB, Inc.	X
Xi	Zhu	Vice-Chair	GE Energy Management	X

“X” - individual was at the meeting in San Diego