S25_HVCB_WG_PC37.010_REV00 - Minutes of Meeting
Working Group C37.010 – Application Guide for AC High-Voltage Circuit Breakers > 1000 VAC Rated on a Symmetrical Basis

Location: Wyndham Grand Orlando Resort Bonnet Creek (Orlando, Florida)
Date: Tuesday April 8, 2025 (4:15PM - 6:00PM EDT)
Quorum: Membership Count: 40 (2 excused) Members Present: 26

Agenda
WG Chair Andy Keels called the meeting to order and presented the agenda.

Introduction of Members and Guests
Introductions and attendance gathered in-person
64 Total in Attendance (26 Members, 38 Guests)

Review of Attendance Logging via IEEE Attendance Tool
See meeting slides for details

Review of IEEE Patent and Copyright Policies
Chair showed location of patent and copyright policy material on the iMeet workspace for review. WG Chair made a call for any known essential patents. No Patent claims identified.

Quorum Check by Show of Hands: Quorum Achieved

Review of Schedule and Future Meetings
Chair pointed out the PAR expires at the end of this year.
Next meeting is June 6th 2025 (Virtual).
The meeting schedule that was reviewed during the meeting is included in the attached presentation.

Motion to the WG to request a 2 year PAR Extension: Michael Crawford
2nd to the Motion: Dave Mitchell
Vote: Approved without objection/abstention

Motion to approve previous MOM (F24): Chris Jarnigan
2nd to the Motion: Mike Skidmore
Vote: Approved without objection/abstention

Proposed Changes to Clause 4.2 were Reviewed
No comments on proposed language. Proposed language presented as follows:

"The operating voltage should not exceed the rated maximum voltage of the circuit breaker. The rated maximum voltage is the voltage on which all the corresponding type tests have been based. The type tests include short circuit interruption, capacitive, inductive, load switching and other

applicable switching duties.

NOTE
If system voltage operation above rated maximum voltage is experienced, the system TRV must remain within the circuit breaker capability as demonstrated in the type test reports. These system recovery voltage values should be confirmed on a case-by-case basis performed by system study, calculation, or some other means. For such cases where system TRV exceeds the circuit breaker capability or when transient voltages exceed tested dielectric capability, it is recommended that the user consults the manufacturer to verify the dielectric withstand and recovery voltage capabilities of selected circuit breaker."

Reviewed Work on IBR Contribution to Short-Circuit Current
Approach and plan to finish work presented. No comments or questions received from the WG.

Request for Additional Changes
Chair made a request for others who have proposed changes.

Proposal:
Subclause 4.28 "Circuit breakers equipped with resistors"
Figures 20 and 21 are out of date based on recent technology. CIGRE WG A3.35 has recently published documents on this topic. Urmil Parikh volunteered to provide proposed changes to this section.

Schedule
06/06/2025 – 11th working group meeting VIRTUAL WebEx (Draft the Document)
10/06/2025 – 12th working group meeting Reno, NV (Request creation of Ballot Pool)
01/27/2026 – 13th working group meeting VIRTUAL WebEx (Send 1st Draft out to Ballot)
04/27/2026 – 14th working group meeting Clearwater, FL (Start Comment Resolution Process)

Motion to Adjourn: Marcus Young
2nd to Motion: Craig Polchinski
Vote: Approved without objection/abstention

Meeting adjourned at 5:05PM (EDT) on 10/8/2025

Reported by: Jeremy Hensberger, Lucas Collette & Andy Keels

Count	Committee	Name	Affiliation	Timestamp
1	C37.010 HVCB Applications WG Meeting	Bartels, Alexander	Powell Electrical Systems Inc.	4/8/2025 16:31
2	C37.010 HVCB Applications WG Meeting	Beecher, Zachary	Southern States LLC	4/8/2025 16:28
3	C37.010 HVCB Applications WG Meeting	Benedict, Dan	PPL Corporation	4/8/2025 16:18
4	C37.010 HVCB Applications WG Meeting	Bornuat, Albane	General Electric Company (GE); GRID SOLUTIONS	4/8/2025 16:27
5	C37.010 HVCB Applications WG Meeting	Brogdon, Jeffrey	Georgia Transmission Corporation	4/8/2025 16:27
6	C37.010 HVCB Applications WG Meeting	Bronsveld, Arjan	Hitachi Energy Sweden AB	4/8/2025 16:28
7	C37.010 HVCB Applications WG Meeting	Bufi, Arben	Meiden America Switchgear	4/8/2025 16:32
8	C37.010 HVCB Applications WG Meeting	byreddy, sudarshan reddy	Burns & McDonnell	4/8/2025 16:29
9	C37.010 HVCB Applications WG Meeting	Cantu, Jared	OMICRON electronics Corp. USA	4/8/2025 16:27
10	C37.010 HVCB Applications WG Meeting	Chovanec, Andrew	Power Grid Components	4/8/2025 16:26
11	C37.010 HVCB Applications WG Meeting	Collette, Lucas	Duquesne Light Co.	4/8/2025 16:03
12	C37.010 HVCB Applications WG Meeting	Crawford, Michael	Mitsubishi Electric Power Products, Inc. (MEPPI)	4/8/2025 16:02
13	C37.010 HVCB Applications WG Meeting	Cunningham, Jason	Southern States LLC	4/8/2025 16:27
14	C37.010 HVCB Applications WG Meeting	Cuppett, Matthew	Hitachi Energy	4/8/2025 16:27
15	C37.010 HVCB Applications WG Meeting	Door, Jeffrey	The H-J Family of Companies	4/8/2025 16:29
16	C37.010 HVCB Applications WG Meeting	Eastman, Maxwell	Black and Veatch	4/8/2025 16:26
17	C37.010 HVCB Applications WG Meeting	Flores, Sergio	Schneider Electric USA Inc.	4/8/2025 16:27
18	C37.010 HVCB Applications WG Meeting	HASNAOUI, nadia	GE Vernova; Non-voting	4/8/2025 16:30
19	C37.010 HVCB Applications WG Meeting	Hermosillo, Victor	GE Grid Solutions	4/8/2025 16:15
20	C37.010 HVCB Applications WG Meeting	Hunter, Jennifer	MEPPI-Warrendale Pa	4/8/2025 16:28
21	C37.010 HVCB Applications WG Meeting	Jarnigan, Christopher	southern company/ southern nuclear	4/8/2025 16:19
22	C37.010 HVCB Applications WG Meeting	Keels, Thomas	kEElectric Engineering, PLLC	4/8/2025 16:09
23	C37.010 HVCB Applications WG Meeting	Kurinko, Carl	Hitachi Energy	4/8/2025 16:28
24	C37.010 HVCB Applications WG Meeting	Livshitz, Albert	Schneider Electric	4/8/2025 16:28
25	C37.010 HVCB Applications WG Meeting	Lyu, Soung Hwan	Federal Pacific	4/8/2025 16:40
26	C37.010 HVCB Applications WG Meeting	Ma, Chunming	Burns & McDonnell	4/8/2025 16:27
27	C37.010 HVCB Applications WG Meeting	Marshall, Vincent	southern company/ southern nuclear	4/8/2025 16:27
28	C37.010 HVCB Applications WG Meeting	MARZEC, PETER	S and C Electric Co	4/8/2025 16:28
29	C37.010 HVCB Applications WG Meeting	Mc Cord, Neil	KEC Precision LLC	4/8/2025 16:27
30	C37.010 HVCB Applications WG Meeting	McGlown, Kevin	JST Power Equipment	4/8/2025 16:26
31	C37.010 HVCB Applications WG Meeting	Mitchell, David	Southern States LLC	4/8/2025 16:26
32	C37.010 HVCB Applications WG Meeting	Natale, Anthony	HICO America	4/8/2025 16:27
33	C37.010 HVCB Applications WG Meeting	Palazzo, Mirko	Hitachi Energy	4/8/2025 16:26
34	C37.010 HVCB Applications WG Meeting	PARIKH, URMIL	ABB AB; Hitachi Energy Sweden AB	4/8/2025 16:28
35	C37.010 HVCB Applications WG Meeting	Pecile, Conrad	Myers Power Products, Inc,	4/8/2025 16:30
36	C37.010 HVCB Applications WG Meeting	Peterson, Mark	Xcel Energy	4/8/2025 16:28
37	C37.010 HVCB Applications WG Meeting	Polchinski, Craig	Mitsubishi Electric Corporation	4/8/2025 16:27
38	C37.010 HVCB Applications WG Meeting	Pounders, Isaac	Meiden America Switchgear	4/8/2025 16:14
39	C37.010 HVCB Applications WG Meeting	Rebovich, Justin	GE Vernova; General Electric Company (GE)	4/8/2025 16:20
40	C37.010 HVCB Applications WG Meeting	Rexroad, Aaron	Meiden America Switchgear inc.	4/8/2025 16:14
41	C37.010 HVCB Applications WG Meeting	Ricciuti, Anthony	Eaton Corporation	4/8/2025 16:09
42	C37.010 HVCB Applications WG Meeting	Roberts, Brian	Southern States LLC	4/8/2025 16:27
43	C37.010 HVCB Applications WG Meeting	Santos, Leonel	Schneider Electric	4/8/2025 16:29
44	C37.010 HVCB Applications WG Meeting	Scott, Jeffrey	Ameren Services	4/8/2025 16:20
45	C37.010 HVCB Applications WG Meeting	Sell, Jason	Switchgear Power Systems	4/8/2025 16:29
46	C37.010 HVCB Applications WG Meeting	Sharma, Devki	Retired	4/8/2025 16:51
47	C37.010 HVCB Applications WG Meeting	Shetty, Sanket	Oncor Electric	4/8/2025 16:22
48	C37.010 HVCB Applications WG Meeting	Sizemore, Josh	WIKA	4/8/2025 16:35
49	C37.010 HVCB Applications WG Meeting	Skidmore, Michael	American Electric Power (AEP)	4/8/2025 16:28

50	C37.010 HVCB Applications WG Meeting	Tarleton, John	Southern States LLC	4/8/2025 16:28
51	C37.010 HVCB Applications WG Meeting	Tuthill, Bryan	Volta LLC	4/8/2025 16:28
52	C37.010 HVCB Applications WG Meeting	Usner, Joseph	AEP	4/8/2025 16:27
53	C37.010 HVCB Applications WG Meeting	Vittoz, Marc	GE Vernova; General Electric	4/8/2025 16:28
54	C37.010 HVCB Applications WG Meeting	Webb, John	ABB Ltd.	4/8/2025 16:17
55	C37.010 HVCB Applications WG Meeting	Weisker, Jan	Siemens Energy	4/8/2025 16:14
56	C37.010 HVCB Applications WG Meeting	Wenzel, James	Eaton Corporation	4/8/2025 16:28
57	C37.010 HVCB Applications WG Meeting	Woodyard, Terry	Siemens Industry, Inc.	4/8/2025 16:27
58	C37.010 HVCB Applications WG Meeting	Young, Marcus	Mitsubishi Electric Power Products, Inc.	4/8/2025 16:29
59	C37.010 HVCB Applications WG Meeting	Zaharko, Samuel	Mitsubishi Electric Corporation	4/8/2025 16:26
60	C37.010 HVCB Applications WG Meeting	Zhong, Jim	American Transmission Co., LLC	4/8/2025 16:38
61	C37.010 HVCB Applications WG Meeting	Ordein, Fernando	Dominion Energy	4/9/2025 16:38
62	Excused	Hensberger, Jeremy	Mitsubishi Power Products Inc.	
63	Excused	Shutez, Carl	ATC	

Total Attendance: 61
Member Attendance: 23 of 40

Additional members in attendance not signed in electronically
- Vernon Toups
- Dan Schiffbauer
- Todd Irwin

Member Attendance: 26 of 40

C37.010 Working Group

Application Guide for AC High-Voltage Circuit Breakers >1000Vac Rated on a Symmetrical Basis

Tuesday, April 8th, 2025

16:15 – 18:00 EDT

Chair: T. Andy Keels w/ kEElectric Engineering, PLLC

Secretary: Jeremy Hensberger w/ MEPPI

Vice-Chair: Lucas Collette w/ Duquesne Light Co.

Starting Document: IEEE Std C37.010-2016 (Revision of C37.010-1999)

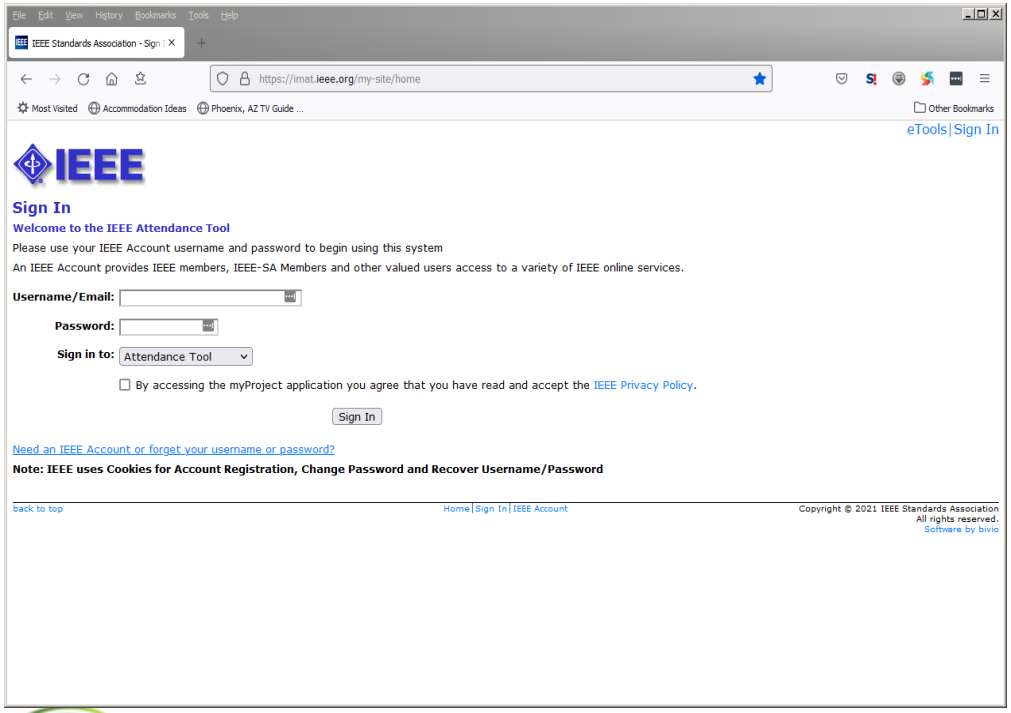
Agenda

1. Chairman's call to order
2. Introduction of attendees:
   Please announce your *Name*, *Affiliation*, *Location*
3. Attendance Logging Instructions
4. Workgroup Required Reading
5. Anticipated Schedule (*Best laid plans*)
6. iMeet Central Workspace
7. Minutes Approval
8. Call for PAR Extension (2-year)
9. Presentation of HVCB operation at 105% Rated Max Voltage
10. Presentation of Effects of IBR on HVCB study group findings
11. Next meeting announcements
12. Adjournment

Logging Your ATTENDANCE To This Meeting

There are three way to get there:

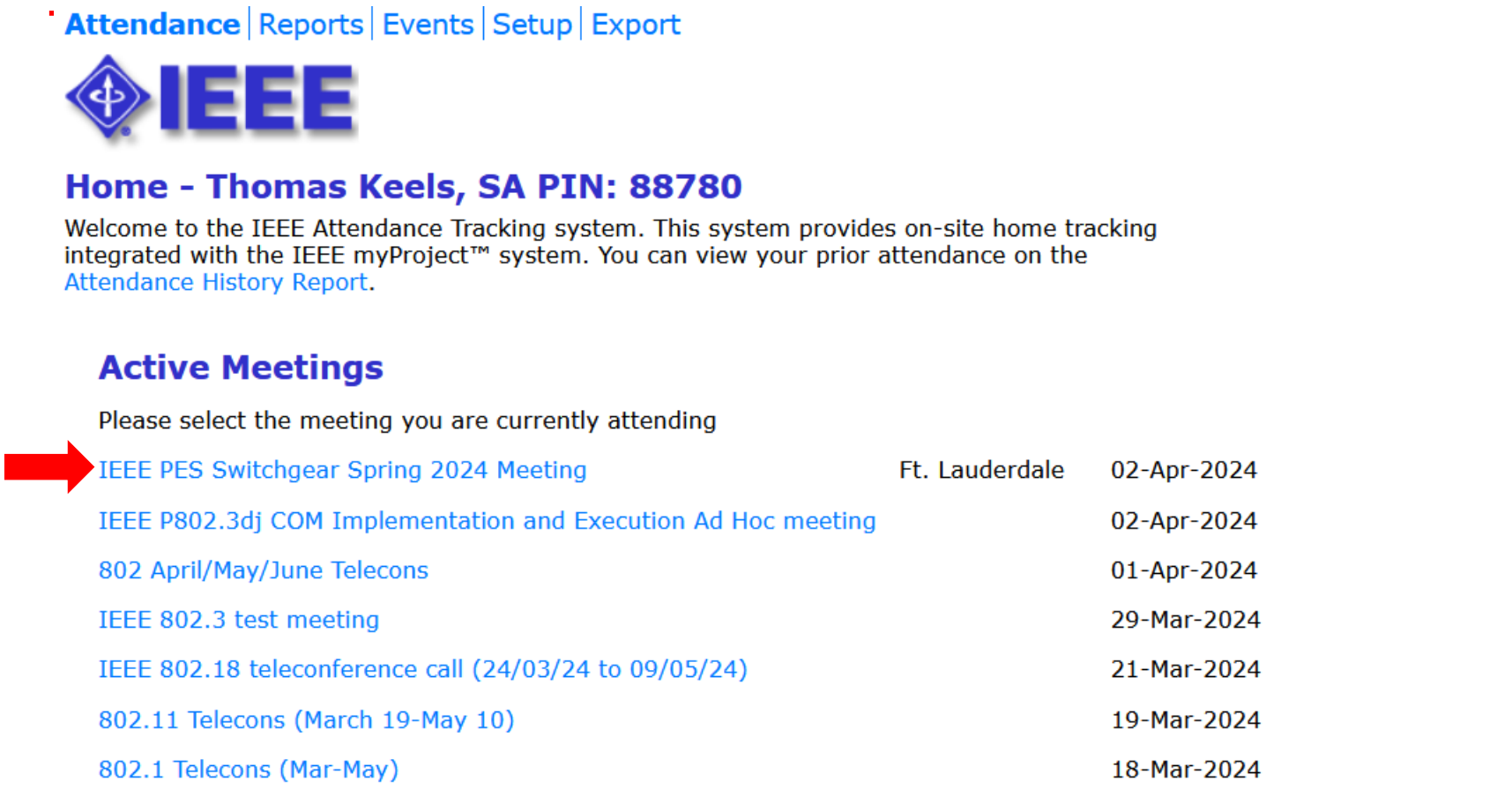
1. Go To: IEEE SA eTools, Then click on **IEEE Attendance Tool**
2. **Google:** IEEE Attendance Tool
3. Go directly to: https://imat.ieee.org/my-site/home



Type in the Email address & Password that you use for your IEEE activities

Don't forget to check the box acknowledging the IEEE Privacy Policy

Logging Your ATTENDANCE To This Meeting



Logging Your ATTENDANCE To This Meeting

Then select the Working Group

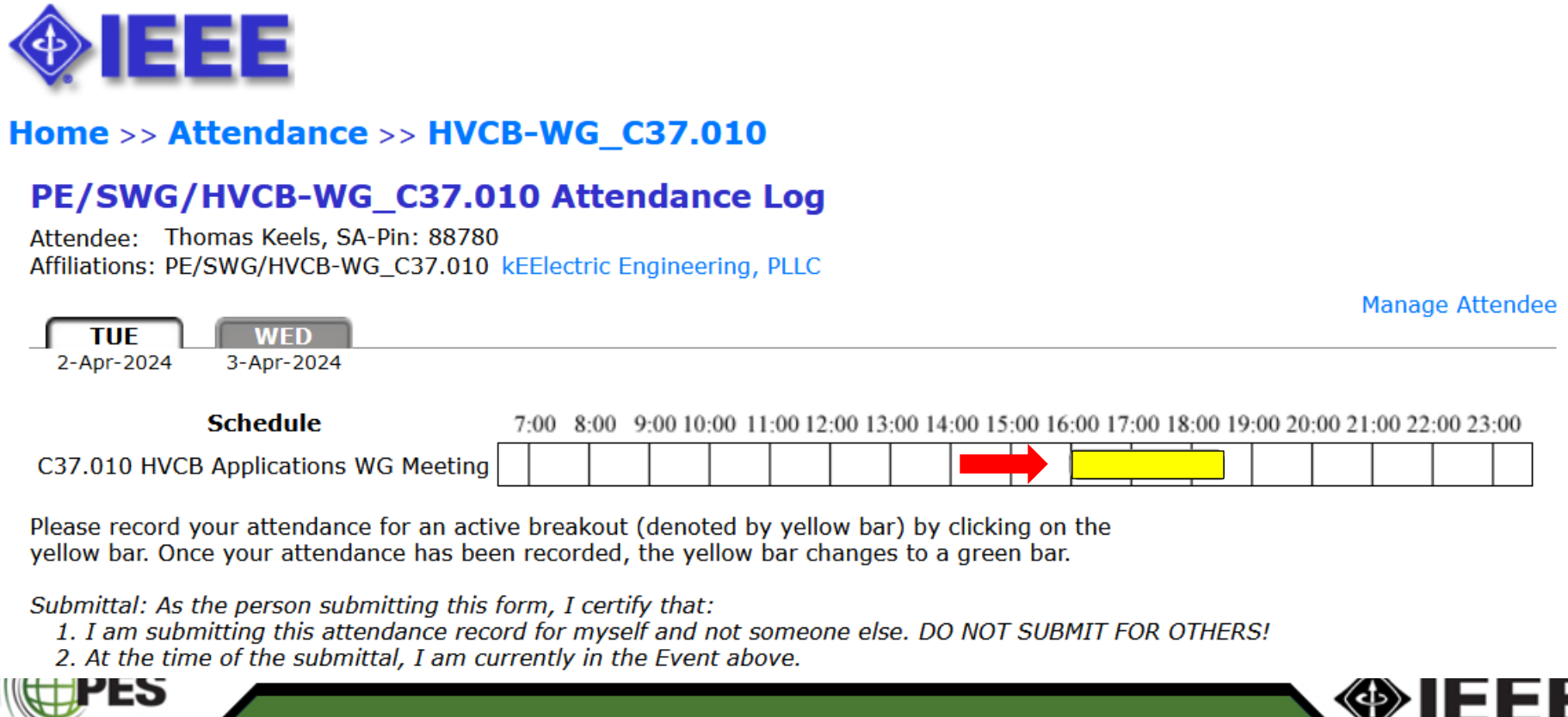
If it is a 'virtual meeting' the WG Chair should have the link listed here

Logging Your ATTENDANCE To This Meeting

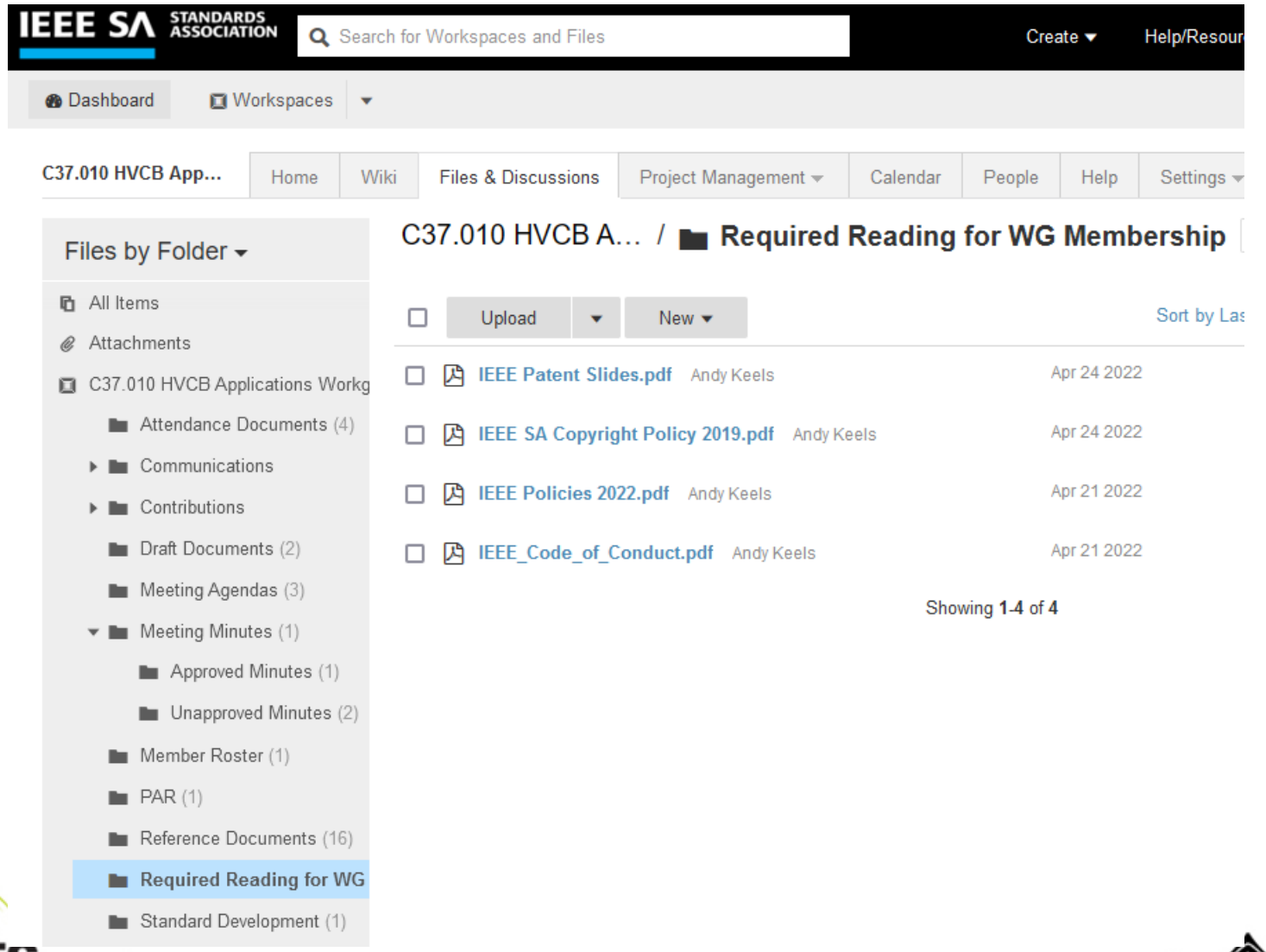
If the meeting is currently in progress then there should be a yellow box here.

Click the Yellow Box, The box will turn GREEN if your attendance is logged

You then just click Sign Out in the upper right corner



Workgroup Required Reading



C37.010 Working Group Member List For Quorum Check

Effective: March 8, 2025

Need 21 Members for Quorum

1 Aaron Rexroad
2 Albert Livishitz
3 Andrew Chovanec
4 Anthony Ricciuti
5 Arben Bufi
6 Carl Kurinko
7 ~~Carl Schuetz excused~~
8 Casey Weeks
9 Chris Jarnigan
10 Craig Bryant *
11 Craig Polchinski
12 Dan Benedict
13 Dan Shiffbauer
14 David Mitchell
15 Devki Sharma
16 Don Steigerwalt *
17 Mikos Orosz
18 George Becker
19 Jake Walgenbach
20 Jan Weisker
21 Jeff Scott
22 Jeff Ward
23 Jennifer Hunter
24 ~~Jeremy Hensberger excused~~
25 Lucas Colette
26 Marcus Young
27 Matt Westerdale
28 Michael Christian
29 Michael Crawford
30 Michael Skidmore
31 Miklos Palazzo
32 R. Kirk Smith
33 Robert Hanna
34 Samuel Zaharko
35 Thomas 'Andy' Keels
36 Todd Irwin
37 Vernon Toups
38 Victor Hermosillo
39 Vincent Marshall
40 Wei Zhang

Meeting Schedule

~~04/11/2022~~	~~1st working group meeting~~
~~10/17/2022~~	~~2nd working group meeting Burlington, VT~~
~~02/03/2023~~	~~3rd working group meeting VIRTUAL Google Meeting~~
~~04/26/2023~~	~~4th working group meeting Virtual WebEx~~
~~07/19/2023~~	~~5th working group meeting VIRTUAL WebEx~~
~~10/10/2023~~	~~6th working group meeting San Diego, CA~~
~~04/02/2024~~	~~7th working group meeting Ft. Lauderdale, FL~~
~~10/14/2024~~	~~8th working group meeting Oklahoma City, OK~~
~~02/07/2025~~	~~9th working group meeting VIRTUAL WebEx~~
04/07/2025	10th working group meeting Orlando, FL (Request PAR Extension)
06/06/2025	11th working group meeting VIRTUAL WebEx (Draft the Document)
10/06/2025	12th working group meeting Reno, NV (Request creation of Ballot Pool)
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IEEE SA STANDARDS ASSOCIATION

IEEE

PC37.010

Type of Project: Revision to IEEE Standard C37.010-2016
Project Request Type: Initiation / Revision
PAR Request Date: 28 Sep 2021
PAR Approval Date: 08 Dec 2021
PAR Expiration Date: 31 Dec 2025
PAR Status: Active
Root Project: C37.010-2016

1.1 Project Number: PC37.010
1.2 Type of Document: Guide
1.3 Life Cycle: Full Use

The working group chair now respectfully proposes that the working group request a 2-year extension of the PAR.

Would one of the working group member please make a motion to request a 2-year PAR extension?

Sub-Group Update
CB Operation at 105% of Rated Maximum Voltage

C37.010 meeting
Orlando, FL-2025

Arben Bufi
Andrew Chovanec
Luke Collette
Craig Polchinski
Carl Schuetz
Markus Young

Goal of the Sub-Group

To provide more detailed guidance in the application guide for users when the power system is operated up to 5% above nameplate voltage value

(10% above system nominal voltage as defined in C84.1)

- No proposition is made to change the rating structure or its values

Update on clause 4.2 revision

- In the F24 WG meeting the WG suggested refinements to the clause 4.2 wording and these have been incorporated as shown on slide five
- The WG was asked to review the T&I report concerning system voltages up to 200% on open switching devices, section 3.2.11, and air-break disconnect switch operation with respect to the capability of a circuit breaker
  - The T&I report has not been published yet
  - Air-break disconnect switch operation at voltages greater than nameplate voltage would impart stresses that have the same concern as when system voltage is within nameplate voltage. Expected voltage values applied to the circuit breaker (phase to ground and longitudinal) would be greater. The revised text includes the air-break switching concern.
- Both concerns are believed to be covered by additional wording "or when transient voltages exceed tested dielectric capability" that appear on the next slide

Update on clause 4.2 revision

- The dielectric test capability defines the stresses that must be withstood by the CB
  - These stresses are determined by magnitude, rise time and duration
  - The dielectric test requirements form envelopes that the user must recognize when evaluating the overvoltage severity imparted by the system onto the CB and that is why the wording “dielectric test” is used

Clause 4.2 revision content

"The operating voltage should not exceed the rated maximum voltage of the circuit breaker. The rated maximum voltage is the voltage on which all the corresponding type tests have been based. The type tests include short circuit interruption, capacitive, inductive, load switching and other applicable switching duties~~. including the short circuit interrupting capability tests. Some values used in the short circuit interrupting type tests include margins in order to accommodate aging and statistical behavior~~.

Informative NOTE

If system voltage operation above rated maximum voltage is experienced, the system TRV must remain within the circuit breaker capability as demonstrated in the type test reports. These system recovery voltage values should be confirmed on a case-by-case basis performed by system study, calculation, or some other means. For ~~such~~ cases where system TRV exceeds the circuit breaker capability or when transient voltages exceed tested dielectric capability, it is recommended that the user consult~~s~~ the manufacturer to verify the dielectric withstand and recovery voltages capabilities of selected circuit breaker."

Impacts of IBR Plants on Fault Currents
Update on Example Case

C37.010
Study Group

Carl Schuetz
Luke Collette
Marcus Young
Craig Polchinski

4/8/2025

Introduction

- The Study Group is developing an example to demonstrate the impact of IBR Plants on system fault currents and to develop a recommended methodology for symmetrical fault current adjustment considering:
  - Asymmetrical current from synchronous machines
  - Symmetrical current from IBRs (sub-cycle and contact parting time).
- The overall objective is to revise the fault current calculation content in clause 5.
- This presentation is an update on the development of the example case provided along with a schedule for progress.

Scope of Work

- Recreate the example case from C37.010-2016 (one-line diagram on next slide) and benchmark 3LG and 1LG faults at location STA A between the 2016 and 2025 cases.
- Add IBR Plants to the 2025 case.
- Apply faults at location STA A and observe the fault current magnitudes and X/R ratios in the 2025 case with and without IBR plants.
- The developed cases will assist the Study Group determining the recommended methodology for symmetrical fault current adjustment.

Example Case from C37.010-2016

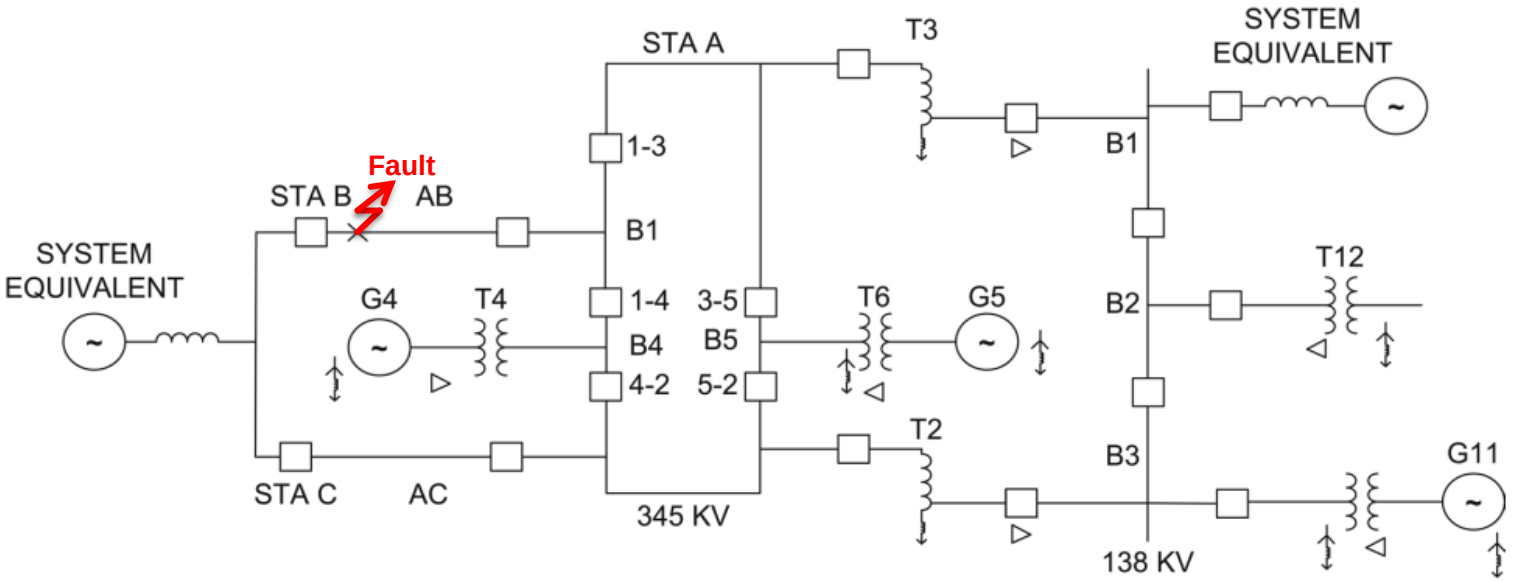


Figure 25—Single line diagram of example power system

Case Development

- Upon review it was observed key parameters from the C37.010-2016 (refer to Figure 25 of the standard) example were missing.
- Missing parameters were supplemented with data based on assumptions.
  - Assumed parameters were based on practical applications.
- Supplemented data will likely prohibit exact replication of the 2016 example case, but the 2025 case will be configured to achieve an approximation.
- Two (2) IBR plants will be added to observe impacts of IBRs on fault current estimations (see next slide for locations).

Missing Data from 2016

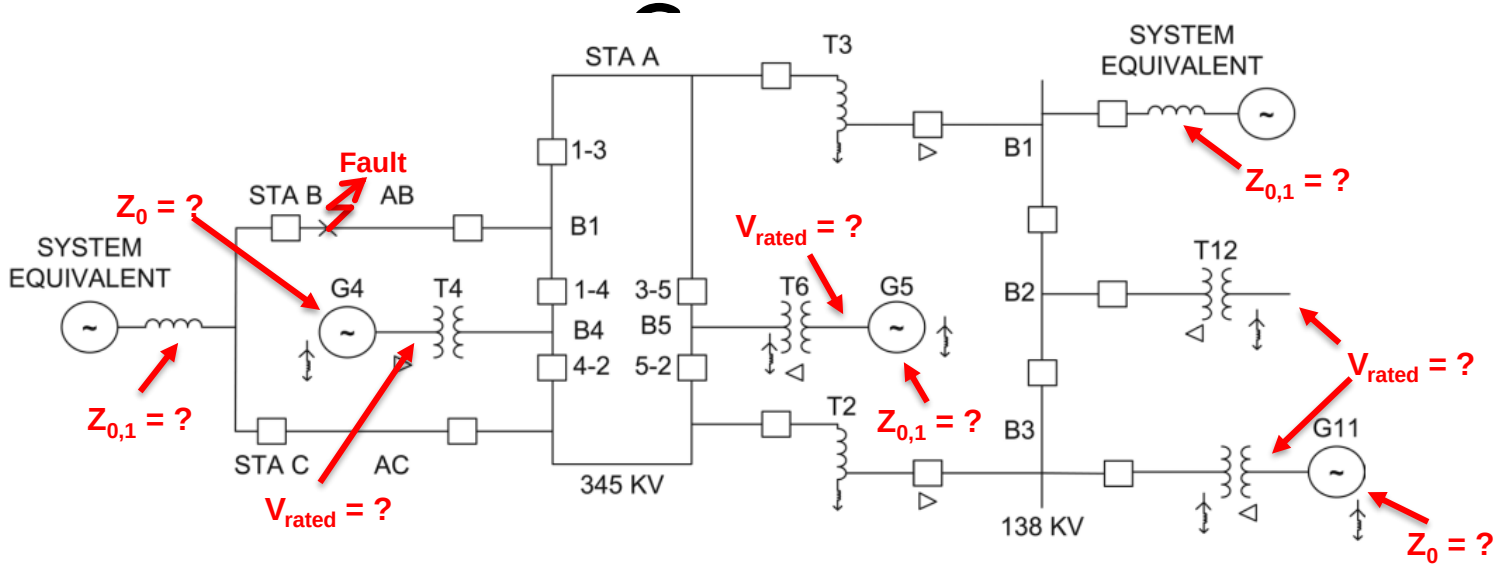


Figure 25—Single line diagram of example power system

- System equivalent impedances, transformer secondary voltages, and generator zero sequence impedances are unknown.
- Missing data was supplemented using assumed values based on practical application.
- Equivalences were adjusted iteratively to achieve faults currents at Line AB that approximate values from the 2016 example.

Assumed Parameters for System Components

Impedance values of a system based on 100 MVA

(Assumed values in red text)

Component	Positive Sequence Reactance X_1	Positive Sequence Resistance R_1	Zero Sequence Reactance X_0	Zero Sequeunce Resistance R_0	Rated Voltage kV
G4[1]	0.0538	0.0010	0.0538	0.0010	18
G5[1]	0.0457	0.0004	0.0457	0.0004	18
G11[1]	0.2120	0.0015	0.2120	0.0015	18
T2[2]	0.0233	0.0004	0.0190	0.0005	345/138/13.8
T3[2]	0.0388	0.0006	0.0200	0.0003	345/138/13.8
T4	0.0334	0.0006	0.0334	0.0006	345/18
T6	0.0172	0.0003	0.0172	0.0003	345/18
T11	0.1117	0.0036	0.1117	0.0036	345/22
T12	0.1117	0.0036	0.1117	0.0036	138/13.8
Line AB	0.0202	0.0020	0.0404	0.0080	345
Line AC	0.0203	0.0014	0.0406	0.0056	345
Sys Equiv STA BC	0.0620	0.0062	0.0400	0.0040	345
Sys Equiv B	0.0265	0.0027	0.0900	0.0090	138

(1) Represents generator subtransient impedances.

(2) Primary to secondary impedances for autotransformers presented. Refer to second table complete data.

Assumed Parameters for Autotransformers

Positive Sequence Impedance values of a autotransformers based on 100 MVA

(Assumed values in red text)

Component	Primary - Secondary		Primary - Tertiary		Secondary - Tertiary		Rated Voltage kV
	Positive Sequence Reactance X_1	Positive Sequence Resistance R_1	Positive Sequence Reactance X_1	Positive Sequence Resistance R_1	Positive Sequence Reactance X_1	Positive Sequence Resistance R_1	
T2	0.0233	0.0004	0.0900	0.0020	0.0540	0.0020	345/138/13.8
T3	0.0388	0.0006	0.1900	0.0060	0.1600	0.0060	345/138/13.8

Negative Sequence Impedance values of a autotransformers based on 100 MVA

(Assumed values in red text)

Component	Primary - Secondary		Primary - Tertiary		Secondary - Tertiary		Rated Voltage kV
	Negative Sequence Reactance X_0	Negative Sequence Resistance R_0	Negative Sequence Reactance X_0	Negative Sequence Resistance R_0	Negative Sequence Reactance X_0	Negative Sequence Resistance R_0	
T2	0.0190	0.0005	0.0900	0.0020	0.0540	0.0020	345/138/13.8
T3	0.0200	0.0003	0.1800	0.0030	0.1400	0.0030	345/138/13.8

Benchmarking 2025 to 2016

Fault Currents at STA A

Case	Fault Type	Phase Current Magnitude (amperes)			Phase Current Angle (degrees)		
		A	B	C	A	B	C
2016	3LG	10990	10990	10990	-87	153	33
2025		10992	10992	10992	-86	154	34
Difference		2	2	2	1	1	1
2016	1LG	13023	0	0	-87	—	—
2025		13035	0	0	-84	—	—
Difference		12	0	0	3	—	—

Example Case with Proposed Locations of IBRs

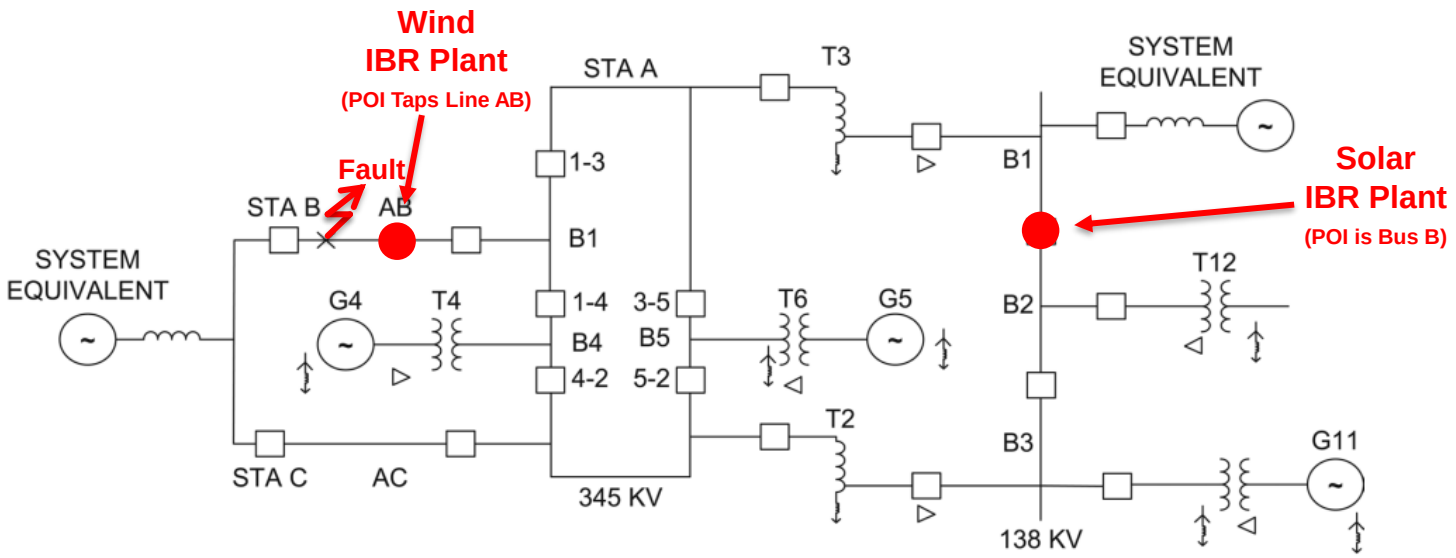
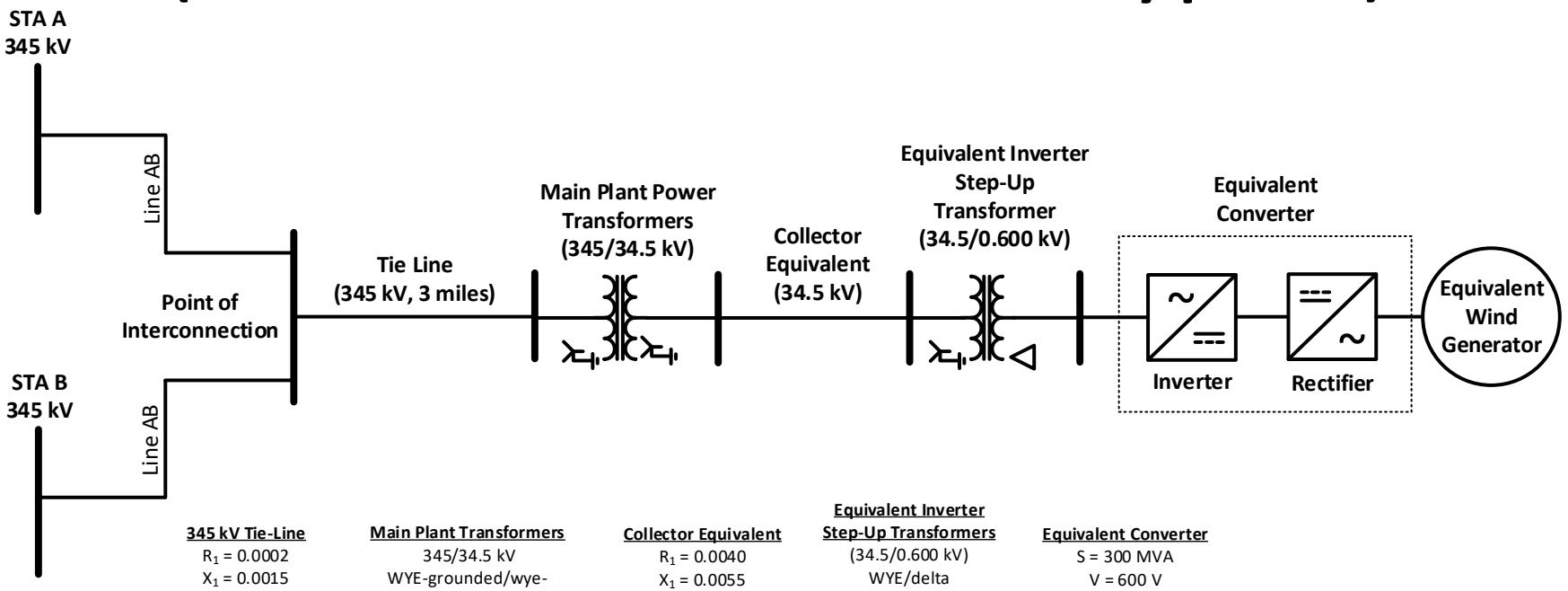


Figure 25—Single line diagram of example power system

IBR Plant Parameters (345 kV Wind Plant – Type 4)



345 kV Tie-Line
R_1 = 0.0002
X_1 = 0.0015
B_1 = 0.0120
R_0 = 0.0015
X_0 = 0.0050
B_0 = 0.0010

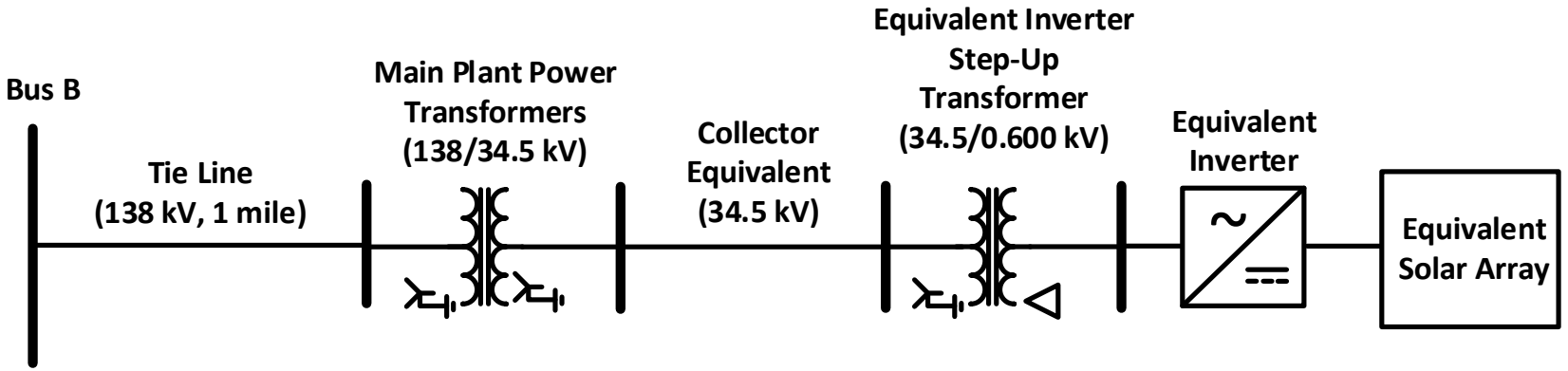
Main Plant Transformers
345/34.5 kV
WYE-grounded/wye-grounded
Z1 = 10% @ 200 MVA
Z0 = 8% @ 200 MVA

Collector Equivalent
R_1 = 0.0040
X_1 = 0.0055
B_1 = 0.0300
R_0 = 0.0110
X_0 = 0.0900
B_0 = 0.0300

Equivalent Inverter Step-Up Transformers
(34.5/0.600 kV)
WYE/delta
R_1 = 0.0026
X_1 = 0.0350
R_0 = 0.0025
X_0 = 0.0300

Equivalent Converter
S = 300 MVA
V = 600 V
Current Limit = 1.20 p.u.

IBR Plant Parameters (138 kV Solar Plant)



138 kV Tie-Line
R_1 = 0.0001
X_1 = 0.0005
B_1 = 0.0040
R_0 = 0.0005
X_0 = 0.0002
B_0 = 0.0004

Main Plant Transformers
138/34.5 kV
WYE-grounded/wye-grounded
Z1 = 10% @ 100 MVA
Z0 = 8% @ 100 MVA

Collector Equivalent
R_1 = 0.0030
X_1 = 0.0040
B_1 = 0.0200
R_0 = 0.0080
X_0 = 0.0700
B_0 = 0.0200

Equivalent Inverter Step-Up Transformers
(34.5/0.60 kV)
WYE/delta
R_1 = 0.0080
X_1 = 0.1000
R_0 = 0.0080
X_0 = 0.080

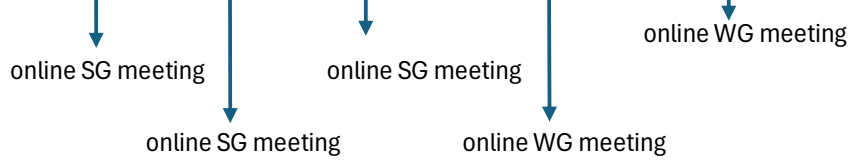
Equivalent Inverter
S = 180 MVA
V = 600 V
Current Limit = 1.15 p.u.

Next Steps

- Add both IBR plants to the 2025 base case.
- Obtain fault current and fault current contributions
- Develop a recommended methodology of symmetrical fault current adjustment.
  - Asymmetrical current from synchronous machines
  - Asymmetrical current from IBRs (sub-cycle and contact parting time).
- Revise clause 5 fault current calculation content

Schedule

Activity	April	May	June	July	August	September
Complete example development						
Run fault study and collect all sceario currents						
Assess impact of IBR facilities on CB interrupting current considering rated interrupting time of 2,3, 5 cycles						
Contact software companies to see if all IBR facilities can be turned off at once (makes it easy for the user to separate IBR contribution from synch machine contribution						
Develop agreeable fault current methodology within SG						
Present methodology to WG						
Determine agreeable methodolgy for fault current determination implementation						
Incorporate approved content into the documents						
Fault current calculation portions of clause 5 complete						



Open Call for Additional Suggestions for Revisions

webex

by CISCO

Next On-Line Meeting will be via IEEE WebEx

Friday, June 6, 2025

01:00pm EDT (10am MST)

Our next in-person meeting is scheduled to be at:

Peppermill Resort; Reno, NV

October 5 - 9, 2025

Would someone like to make a motion to adjourn?