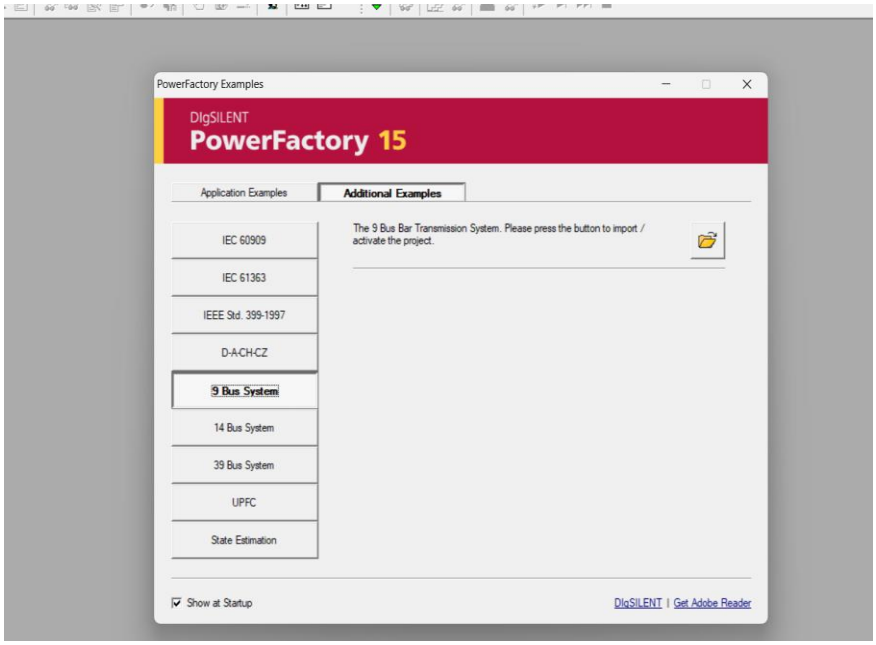
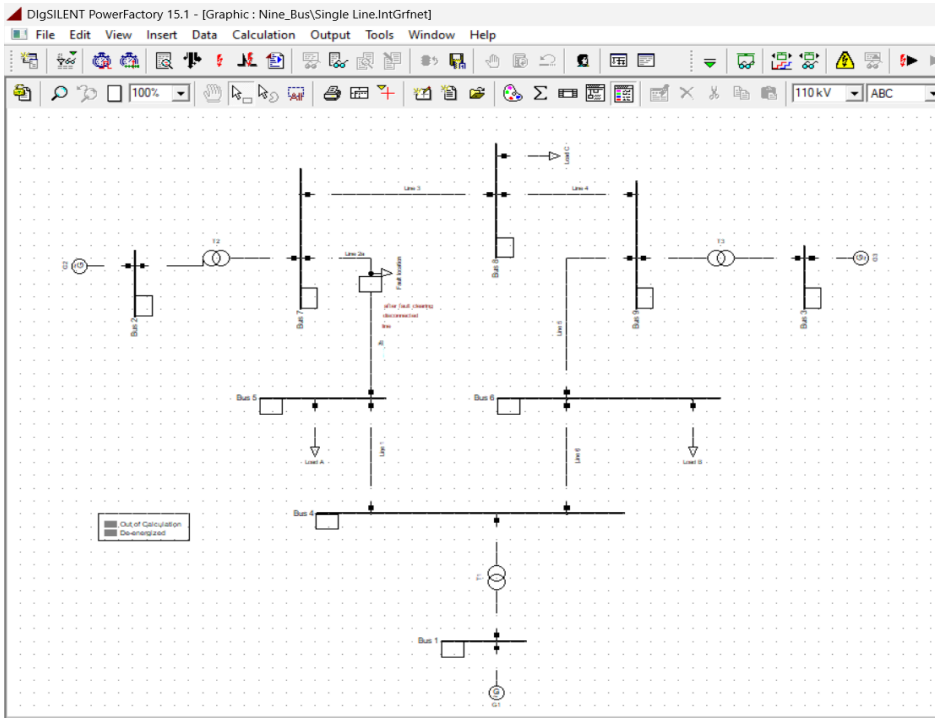
Бие даалт

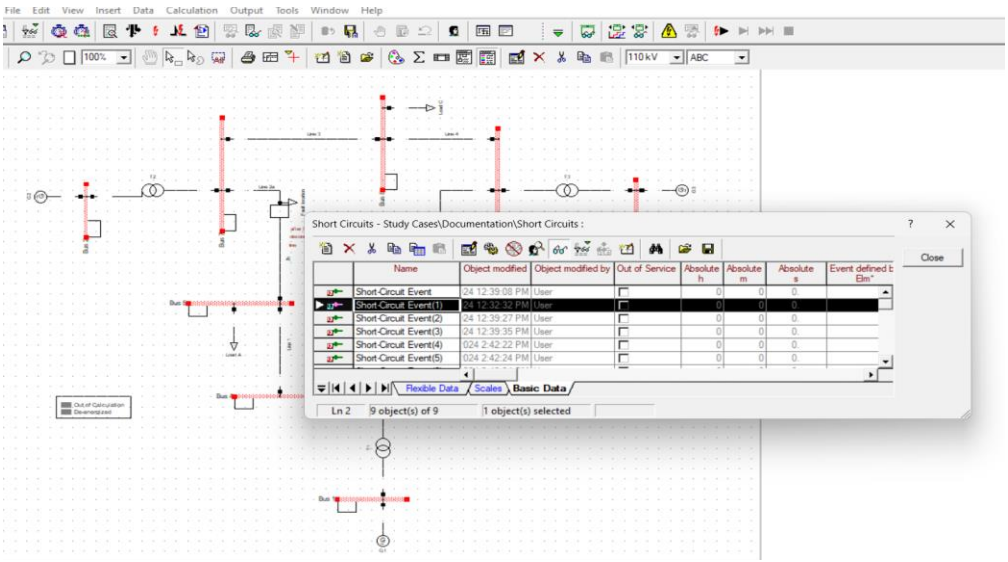


Powerfactory programm нээхэд гарж ирэх цонх



9 bus system систэм нээхэд үед гарж ирэх цонх бөгөөд манай тооцоо хийх

Систэм юм



9bus систэмийн шинүүдийг идэвхжүүлэн бүх шин дээр богино залгаа хийн өөр өөр аргаар богино залгаа хийх бөгөөд эхний хийх арга нь

Complete энэхүү аргийг манай оронд хэрэглэдэг бөгөөд түгээмэл ашигладаг арга юм

Grid: Nine_Bus		System Stage: Nine_Bus								Annex:	/ 1	
		rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
Bus 1	A	16.50	3.45	-58.48	1.00	621.49 MVA	65.24 kA	-58.5	49.40	181.62 kA	50.70	152.81	0.00
	B		3.45	-58.48		621.49 MVA	65.24 kA	121.5	49.40	181.62 kA	50.70	152.81	0.00
	C		6.90	121.52		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
T1		Bus 4			A	209.49 MVA	21.99 kA	-148.5	16.65	61.22 kA			
					B	209.49 MVA	21.99 kA	-148.5	16.65	61.22 kA			
					C	418.98 MVA	43.98 kA	31.5	33.30	122.44 kA			
G1					A	655.84 MVA	68.85 kA	-77.1	52.13	191.66 kA			
					B	655.84 MVA	68.85 kA	140.1	52.13	191.66 kA			
					C	418.98 MVA	43.98 kA	31.5	33.30	122.44 kA			
Bus 2	A	18.00	0.00	0.00	1.00	335.58 MVA	32.29 kA	-70.2	28.22	86.60 kA	28.56	54.55	0.00
	B		0.00	-120.00		335.58 MVA	32.29 kA	169.8	28.22	86.60 kA	28.56	54.55	0.00
	C		0.00	120.00		335.58 MVA	32.29 kA	49.8	28.22	86.60 kA	28.56	54.55	0.00
T2		Bus 7			A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			

Grid: Nine_Bus		System Stage: Nine_Bus								Annex:	/ 2	
		rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
G2					A	335.58 MVA	32.29 kA	-70.2	28.22	86.60 kA			
					B	335.58 MVA	32.29 kA	169.8	28.22	86.60 kA			
					C	335.58 MVA	32.29 kA	49.8	28.22	86.60 kA			
Bus 3	A	13.80	1.55	-49.77	1.00	197.40 MVA	24.78 kA	-35.2	22.10	67.02 kA	22.32	52.50	0.00
	B		1.55	-49.77		197.40 MVA	24.78 kA	144.8	22.10	67.02 kA	22.32	52.50	0.00
	C		3.10	130.23		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
T3		Bus 9			A	110.69 MVA	13.89 kA	-139.8	12.39	37.58 kA			
					B	24.01 MVA	3.01 kA	-123.7	2.69	8.15 kA			
					C	133.93 MVA	16.81 kA	43.1	14.99	45.47 kA			

Bus 4	A	230.00	0.00	0.00	1.00	362.85 MVA	2.73 kA	31.5	2.07	7.37 kA	2.12	5.77	0.00
	B		0.00	-120.00		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
	C		0.00	120.00		362.85 MVA	2.73 kA	-148.5	2.07	7.37 kA	2.12	5.77	0.00
T1		Bus 1			A	362.85 MVA	2.73 kA	-148.5	2.07	7.37 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	362.85 MVA	2.73 kA	31.5	2.07	7.37 kA			
Line 1		Bus 5			A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Line 6		Bus 6			A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Bus 5	A	230.00	0.00	0.00	1.00	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
	B		0.00	-120.00		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
	C		0.00	120.00		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
Line 1		Bus 4			A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Line 2		Bus 7			A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			

Grid: Nine_Bus		System Stage: Nine_Bus								Annex:	/ 3	
		rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
Load A					A	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					B	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
					C	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Bus 6	A	230.00	0.00	0.00	1.00	17.04 MVA	0.13 kA	48.8	0.11	0.31 kA	0.12	0.17	0.00
	B		0.00	-120.00		17.04 MVA	0.13 kA	48.8	0.11	0.31 kA	0.12	0.17	0.00

Element	Connected	Phase	rtd.V. [kV]	Voltage [kV]	Voltage [deg]	c-Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	Ik" [deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
		B					17.04 MVA	0.13 kA	-131.2	0.11	0.31 kA			
		C					34.09 MVA	0.26 kA	48.8	0.23	0.63 kA			
Line 6	Bus 4	A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Load B		A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Bus 7		A	230.00	0.00	0.00	1.00	0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
		B		0.00	-120.00		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
		C		0.00	120.00		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
Line 2	Bus 5	A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
T2	Bus 2	A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Line 3	Bus 8	A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Bus 8		A	230.00	0.00	0.00	1.00	29.29 MVA	0.22 kA	42.6	0.20	0.57 kA	0.20	0.33	0.00
		B		0.00	-120.00		29.29 MVA	0.22 kA	42.6	0.20	0.57 kA	0.20	0.33	0.00
		C		0.00	120.00		58.58 MVA	0.44 kA	-137.4	0.39	1.14 kA	0.40	0.65	0.00
Line 3	Bus 7	A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			

Grid: Nine_Bus | System Stage: Nine_Bus | Annex: / 4

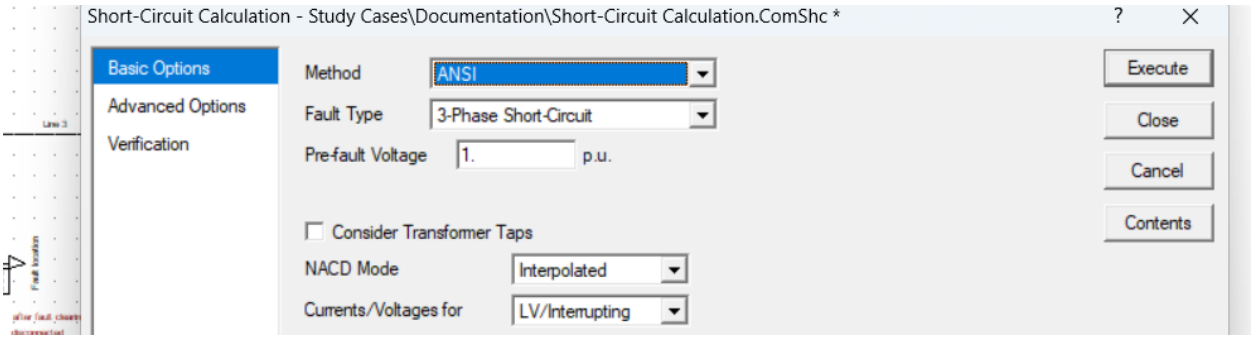
			rtd.V. [kV]	Voltage [kV]	Voltage [deg]	c-Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	Ik" [deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
Line 4	Bus 9	A					29.29 MVA	0.22 kA	-137.4	0.20	0.57 kA			

Grid: Nine_Bus | System Stage: Nine_Bus | Annex: / 4

			rtd.V. [kV]	Voltage [kV]	Voltage [deg]	c-Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	Ik" [deg]	Ik' [kA]	ip [kA/kA]	Ib [kA]	ib [kA]	EFF [-]
Line 4	Bus 9	A					29.29 MVA	0.22 kA	-137.4	0.20	0.57 kA			
		B					29.29 MVA	0.22 kA	-137.4	0.20	0.57 kA			
		C					58.58 MVA	0.44 kA	42.6	0.39	1.14 kA			
Load C		A					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		B					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
		C					0.00 MVA	0.00 kA	0.0	0.00	0.00 kA			
Bus 9		A	230.00	11.84	125.89	1.00	95.86 MVA	0.72 kA	40.2	0.64	1.88 kA	0.65	1.38	0.00
		B		11.84	125.89		95.86 MVA	0.72 kA	-139.8	0.64	1.88 kA	0.65	1.38	0.00
		C		23.69	-54.11		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00
Line 4	Bus 8	A					28.98 MVA	0.22 kA	42.7	0.19	0.57 kA			
		B					28.98 MVA	0.22 kA	42.7	0.19	0.57 kA			
		C					57.96 MVA	0.44 kA	-137.3	0.39	1.14 kA			
T3	Bus 3	A					141.19 MVA	1.06 kA	-138.2	0.95	2.78 kA			
		B					50.73 MVA	0.38 kA	35.9	0.34	1.00 kA			
		C					90.88 MVA	0.68 kA	45.1	0.61	1.79 kA			
Line 5	Bus 6	A					16.53 MVA	0.12 kA	49.2	0.11	0.32 kA			
		B					16.53 MVA	0.12 kA	49.2	0.11	0.32 kA			
		C					33.05 MVA	0.25 kA	-130.8	0.22	0.65 kA			

ANSI STANDART

ANSI стандарт нь гэмтэл гарсан шиний болон богино залгааны гүйдэл болон харьцааг тодорхойлох арга юм энэ арга нь богино залгааны утгийг цахилгаан гүйдэлтэй харьцуулах арга юм



	Rated Voltage [kV]	Equivalent Impedance R[Ohm]	X[Ohm]	Symmetrical Current [kA]	(E/Z) [deg]	Apparent Power [MVA]	X/R ratio	Asym.RMS X/R based [kA]	Asym.Peak X/R based [kA]		Sym.Base [kA]	Tot.Base [kA]
Bus 1	16.50											
	Mom.Duty	0.007	0.171	55.760	-87.73	1593.560	37.056	91.421	151.304			
	Int.Duty	0.007	0.171	55.760	-87.73	1593.560	37.056			2 cycles	61.126	84.181
	30-cycle	0.010	0.237	40.078	-87.60	1145.387				3 cycles	62.664	74.859
										5 cycles	61.599	66.794
										8 cycles	61.935	61.648
T1												
	Mom.Duty			12.499	95.72	357.201	9.979	91.421	151.304			
	Int.Duty			12.499	95.72	357.201	9.979			2 cycles	61.126	84.181
	30-cycle			11.238	95.28	321.156				3 cycles	62.664	74.859
										5 cycles	61.599	66.794
										8 cycles	61.935	61.648
G1												
	Mom.Duty			43.291	-88.72	1237.193	44.893	91.421	151.304			
	Int.Duty			43.291	-88.72	1237.193	44.893			2 cycles	61.126	84.181
	30-cycle			28.860	-88.72	824.795				3 cycles	62.664	74.859
										5 cycles	61.599	66.794
										8 cycles	61.935	61.648
Bus 2	18.00											
	Mom.Duty	0.009	0.239	43.441	-87.74	1354.343	32.448	70.688	117.199			
	Int.Duty	0.009	0.239	43.441	-87.74	1354.343	32.448			2 cycles	46.888	64.894
	30-cycle	0.013	0.325	31.929	-87.64	995.433				3 cycles	48.000	57.238
										5 cycles	47.046	51.011
										8 cycles	47.500	47.248
T2												
	Mom.Duty			12.669	94.28	394.988	13.372	70.688	117.199			
	Int.Duty			12.669	94.28	394.988	13.372			2 cycles	46.888	64.894
	30-cycle			11.414	94.03	355.868				3 cycles	48.000	57.238
										5 cycles	47.046	51.011
										8 cycles	47.500	47.248
G2												
	Mom.Duty			30.782	-88.57	959.700	40.000	70.688	117.199			
	Int.Duty			30.782	-88.57	959.700	40.000			2 cycles	46.888	64.894
	30-cycle			20.522	-88.57	639.800				3 cycles	48.000	57.238
										5 cycles	47.046	51.011
										8 cycles	47.500	47.248

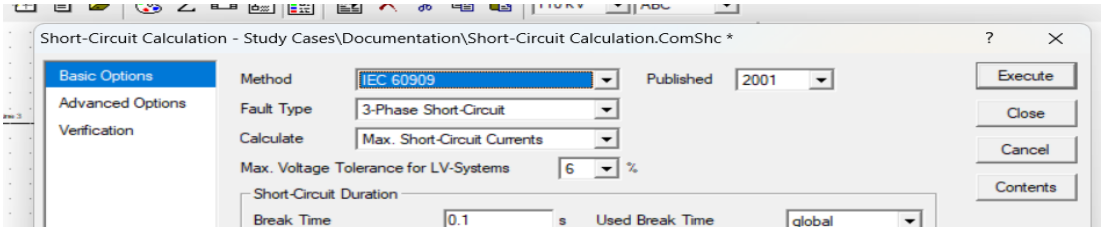
	Rated Voltage [kV]	Equivalent Impedance R[Ohm]	X[Ohm]	Symmetrical Current [kA]	(E/Z) [deg]	Apparent Power [MVA]	X/R ratio	Asym.RMS X/R based [kA]	Asym.Peak X/R based [kA]		Sym.Base [kA]	Tot.Base [kA]
Bus 3	13.80											
	Mom.Duty	0.009	0.181	44.057	-87.30	1053.064	32.223	71.661	118.824			
	Int.Duty	0.009	0.181	44.057	-87.30	1053.064	32.223			2 cycles	47.696	65.978
	30-cycle	0.012	0.237	33.632	-87.15	803.893				3 cycles	48.997	58.348
										5 cycles	48.106	52.192
										8 cycles	48.764	48.441
T3												
	Mom.Duty			17.309	94.90	413.726	11.656	71.661	118.824			
	Int.Duty			17.309	94.90	413.726	11.656			2 cycles	47.696	65.978
	30-cycle			15.801	94.62	377.674				3 cycles	48.997	58.348
										5 cycles	48.106	52.192
										8 cycles	48.764	48.441
G3												
	Mom.Duty			26.769	-88.72	639.841	44.893	71.661	118.824			
	Int.Duty			26.769	-88.72	639.841	44.893			2 cycles	47.696	65.978
	30-cycle			17.846	-88.72	426.561				3 cycles	48.997	58.348
										5 cycles	48.106	52.192
										8 cycles	48.764	48.441
Bus 4	230.00											
	Mom.Duty	2.711	45.116	2.938	-86.56	1170.422	29.911	4.757	7.896			
	Int.Duty	2.711	45.116	2.938	-86.56	1170.422	29.911			2 cycles	3.142	4.361
	30-cycle	3.213	55.467	2.390	-86.69	952.120				3 cycles	3.223	3.832
										5 cycles	3.156	3.424
										8 cycles	3.203	3.180
T1												
	Mom.Duty			1.813	91.32	722.397	43.392	4.757	7.896			
	Int.Duty			1.813	91.32	722.397	43.392			2 cycles	3.142	4.361
	30-cycle			1.404	91.31	559.152				3 cycles	3.223	3.832
										5 cycles	3.156	3.424
										8 cycles	3.203	3.180
Line 1												
	Mom.Duty			0.593	96.01	236.400	9.494	4.757	7.896			
	Int.Duty			0.593	96.01	236.400	9.494			2 cycles	3.142	4.361
	30-cycle			0.523	95.37	208.161				3 cycles	3.223	3.832
										5 cycles	3.156	3.424
										8 cycles	3.203	3.180
Line 6												
	Mom.Duty			0.535	97.77	212.965	7.330	4.757	7.896			
	Int.Duty			0.535	97.77	212.965	7.330			2 cycles	3.142	4.361
	30-cycle			0.466	97.05	185.678				3 cycles	3.223	3.832
										5 cycles	3.156	3.424
										8 cycles	3.203	3.180
Bus 5	230.00											
	Mom.Duty	5.765	62.837	2.104	-84.76	838.338	12.423	3.126	5.287			
	Int.Duty	5.765	62.837	2.104	-84.76	838.338	12.423			2 cycles	2.104	2.722

									8 cycles	2.132	2.104
Bus 6	230.00									Sym.Base	Tot.Base
	Mom.Duty	7.659	65.944	2.000	-83.38	796.844	9.105	2.831	4.832	[kA]	[kA]
	Int.Duty	7.659	65.944	2.000	-83.38	796.844	9.105		2 cycles	2.000	2.416
	30-cycle	7.946	75.642	1.746	-84.00	695.524			3 cycles	2.000	2.094
									5 cycles	2.000	2.000
									8 cycles	2.000	2.000
Line 5		Mom.Duty		0.773	97.83	308.107	7.274	2.831	4.832		
		Int.Duty		0.773	97.83	308.107	7.274		2 cycles	2.000	2.416
		30-cycle		0.676	97.07	269.340			3 cycles	2.000	2.094
									5 cycles	2.000	2.000
									8 cycles	2.000	2.000
Line 6		Mom.Duty		1.227	95.87	488.848	9.732	2.831	4.832		
		Int.Duty		1.227	95.87	488.848	9.732		2 cycles	2.000	2.416
		30-cycle		1.070	95.32	426.261			3 cycles	2.000	2.094
									5 cycles	2.000	2.000
									8 cycles	2.000	2.000
Bus 7	230.00									Sym.Base	Tot.Base
	Mom.Duty	2.624	47.013	2.820	-86.81	1123.468	26.594	4.529	7.532	[kA]	[kA]
	Int.Duty	2.624	47.013	2.820	-86.81	1123.468	26.594		2 cycles	2.959	4.128
	30-cycle	3.133	57.783	2.295	-86.90	914.148			3 cycles	3.046	3.609
									5 cycles	2.977	3.233
									8 cycles	3.041	3.012
Line 2		Mom.Duty		0.610	96.41	242.861	8.897	4.529	7.532		
		Int.Duty		0.610	96.41	242.861	8.897		2 cycles	2.959	4.128
		30-cycle		0.541	95.87	215.697			3 cycles	3.046	3.609
									5 cycles	2.977	3.233
									8 cycles	3.041	3.012
T2		Mom.Duty		1.506	91.44	599.883	39.669	4.529	7.532		
		Int.Duty		1.506	91.44	599.883	39.669		2 cycles	2.959	4.128
		30-cycle		1.147	91.44	457.041			3 cycles	3.046	3.609
									5 cycles	2.977	3.233
									8 cycles	3.041	3.012

									8 cycles	3.041	3.012
Bus 8	230.00									Sym.Base	Tot.Base
	Mom.Duty	4.273	58.988	2.245	-85.86	894.454	15.719	3.435	5.775	[kA]	[kA]
	Int.Duty	4.273	58.988	2.245	-85.86	894.454	15.719		2 cycles	2.245	3.024
	30-cycle	4.695	69.298	1.912	-86.12	761.623			3 cycles	2.245	2.611
									5 cycles	2.250	2.379
									8 cycles	2.318	2.291
Line 3		Mom.Duty		1.270	93.95	505.881	14.485	3.435	5.775		
		Int.Duty		1.270	93.95	505.881	14.485		2 cycles	2.245	3.024
		30-cycle		1.085	93.66	432.230			3 cycles	2.245	2.611
									5 cycles	2.250	2.379
									8 cycles	2.318	2.291
Line 4		Mom.Duty		0.975	94.39	388.580	13.011	3.435	5.775		
		Int.Duty		0.975	94.39	388.580	13.011		2 cycles	2.245	3.024
		30-cycle		0.827	94.16	329.400			3 cycles	2.245	2.611
									5 cycles	2.250	2.379
									8 cycles	2.318	2.291
Bus 9	230.00									Sym.Base	Tot.Base
	Mom.Duty	3.512	52.243	2.536	-86.15	1010.293	25.022	4.054	6.750	[kA]	[kA]
	Int.Duty	3.512	52.243	2.536	-86.15	1010.293	25.022		2 cycles	2.636	3.686
	30-cycle	4.217	63.943	2.072	-86.23	825.500			3 cycles	2.722	3.219
									5 cycles	2.663	2.890
									8 cycles	2.729	2.700
Line 4		Mom.Duty		0.781	94.08	311.194	14.020	4.054	6.750		
		Int.Duty		0.781	94.08	311.194	14.020		2 cycles	2.636	3.686
		30-cycle		0.689	93.65	274.406			3 cycles	2.722	3.219
									5 cycles	2.663	2.890
									8 cycles	2.729	2.700
T3		Mom.Duty		1.168	91.36	465.358	42.138	4.054	6.750		
		Int.Duty		1.168	91.36	465.358	42.138		2 cycles	2.636	3.686
		30-cycle		0.857	91.34	341.259			3 cycles	2.722	3.219
									5 cycles	2.663	2.890
									8 cycles	2.729	2.700
Line 5		Mom.Duty		0.590	98.46	234.943	6.721	4.054	6.750		
		Int.Duty		0.590	98.46	234.943	6.721		2 cycles	2.636	3.686
		30-cycle		0.529	97.88	210.686			3 cycles	2.722	3.219
									5 cycles	2.663	2.890
									8 cycles	2.729	2.700

IEC 60909

Энэ олон улсын стандарт бөгөөд хувьсах гүйдлийг тооцоо хийж гүйцэтгэдэг



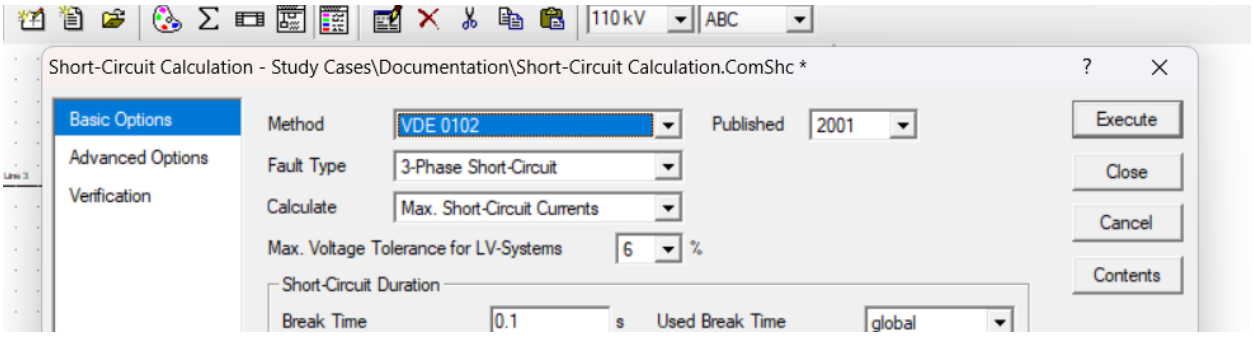
Decaying Aperiodic Component (idc)		Conductor Temperature	
Using Method	B	User Defined	No

Grid: Nine_Bus		System Stage: Nine_Bus								Annex:	/ 1	
	rtd.V. [kV]	Voltage [kV]	[deg]	c-Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	ip [kA/kA]	Ib [kA]	Sb [MVA]	Ik [kA]	Ith [kA]
Bus 1	16.50	0.00	0.00	1.10	1629.33 MVA	57.01 kA	-86.51	147.98 kA	46.90	1340.32	57.01	58.32
T1	Bus 4				393.68 MVA	13.78 kA	95.46	35.76 kA				
G1					1235.96 MVA	43.25 kA	-87.14	112.25 kA				
Bus 2	18.00	0.00	0.00	1.10	1488.65 MVA	47.75 kA	-87.82	124.86 kA	39.00	1216.01	47.75	48.95
T2	Bus 7				428.16 MVA	13.73 kA	94.03	35.91 kA				
G2					1060.81 MVA	34.03 kA	-88.57	88.97 kA				
Bus 3	13.80	0.00	0.00	1.10	1156.02 MVA	48.36 kA	-86.54	125.58 kA	40.79	974.90	48.36	49.48
T3	Bus 9				449.57 MVA	18.81 kA	94.39	48.84 kA				
G3					706.55 MVA	29.56 kA	-87.14	76.75 kA				
Bus 4	230.00	0.00	0.00	1.10	1216.17 MVA	3.05 kA	-86.21	7.88 kA	2.95	1175.29	3.05	3.12
T1	Bus 1				722.19 MVA	1.81 kA	91.67	4.68 kA				
Line 1	Bus 5				260.59 MVA	0.65 kA	95.93	1.69 kA				
Line 6	Bus 6				234.66 MVA	0.59 kA	97.92	1.52 kA				
Bus 5	230.00	0.00	0.00	1.10	898.73 MVA	2.26 kA	-84.69	5.61 kA	2.26	898.73	2.26	2.29
Line 1	Bus 4				528.86 MVA	1.33 kA	94.24	3.30 kA				
Line 2	Bus 7				370.09 MVA	0.93 kA	96.86	2.31 kA				
Bus 6	230.00	0.00	0.00	1.10	854.99 MVA	2.15 kA	-83.28	5.18 kA	2.15	854.99	2.15	2.17
Line 5	Bus 9				338.26 MVA	0.85 kA	97.98	2.05 kA				
Line 6	Bus 4				516.87 MVA	1.30 kA	95.89	3.13 kA				

Bus 6	230.00	0.00	0.00	1.10	854.99 MVA	2.15 kA	-83.28	5.18 kA	2.15	854.99	2.15	2.17
Line 5	Bus 9				338.26 MVA	0.85 kA	97.98	2.05 kA				
Line 6	Bus 4				516.87 MVA	1.30 kA	95.89	3.13 kA				
Bus 7	230.00	0.00	0.00	1.10	1227.43 MVA	3.08 kA	-87.07	8.02 kA	2.93	1167.89	3.08	3.15
Line 2	Bus 5				258.53 MVA	0.65 kA	96.46	1.69 kA				
T2	Bus 2				663.13 MVA	1.66 kA	90.90	4.33 kA				
Line 3	Bus 8				306.77 MVA	0.77 kA	94.37	2.01 kA				

Grid: Nine_Bus		System Stage: Nine_Bus								Annex:	/ 2	
	rtd.V. [kV]	Voltage [kV]	[deg]	c-Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	ip [kA/kA]	Ib [kA]	Sb [MVA]	Ik [kA]	Ith [kA]
Bus 8	230.00	0.00	0.00	1.10	978.18 MVA	2.46 kA	-85.91	6.26 kA	2.43	967.23	2.46	2.50
Line 3	Bus 7				553.56 MVA	1.39 kA	93.67	3.54 kA				
Line 4	Bus 9				424.65 MVA	1.07 kA	94.63	2.72 kA				
Bus 9	230.00	0.00	0.00	1.10	1104.01 MVA	2.77 kA	-85.95	7.10 kA	2.60	1036.42	2.77	2.83
Line 4	Bus 8				339.97 MVA	0.85 kA	93.85	2.19 kA				
T3	Bus 3				514.14 MVA	1.29 kA	92.08	3.31 kA				
Line 5	Bus 6				250.92 MVA	0.63 kA	98.37	1.61 kA				

VDE 0102 энэхүү аргыг германд одоог хүртэл ашигладаг бөгөөд VDE 0102 арга нь аюулгүй стартруу баталгуулах зориготой энэхүү стандарт нь бүх төрлийн богино залгаанд ашигладаггүй



Grid: Nine_Bus	System Stage: Nine_Bus										Annex:	/ 1
	rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	ip [kA/kA]	Ib [kA]	Sb [MVA]	Ik [kA]	Ith [kA]
Bus 1	16.50	0.00	0.00	1.10	1629.33 MVA	57.01 kA	-86.51	147.98 kA	46.90	1340.32	57.01	58.32
T1	Bus 4				393.68 MVA	13.78 kA	95.46	35.76 kA				
G1					1235.96 MVA	43.25 kA	-87.14	112.25 kA				
Bus 2	18.00	0.00	0.00	1.10	1488.65 MVA	47.75 kA	-87.82	124.86 kA	39.00	1216.01	47.75	48.95
T2	Bus 7				428.16 MVA	13.73 kA	94.03	35.91 kA				
G2					1060.81 MVA	34.03 kA	-88.57	88.97 kA				
Bus 3	13.80	0.00	0.00	1.10	1156.02 MVA	48.36 kA	-86.54	125.58 kA	40.79	974.90	48.36	49.48
T3	Bus 9				449.57 MVA	18.81 kA	94.39	48.84 kA				
G3					706.55 MVA	29.56 kA	-87.14	76.75 kA				
Bus 4	230.00	0.00	0.00	1.10	1216.17 MVA	3.05 kA	-86.21	7.88 kA	2.95	1175.29	3.05	3.12
T1	Bus 1				722.19 MVA	1.81 kA	91.67	4.68 kA				
Line 1	Bus 5				260.59 MVA	0.65 kA	95.93	1.69 kA				
Line 6	Bus 6				234.66 MVA	0.59 kA	97.92	1.52 kA				
Bus 5	230.00	0.00	0.00	1.10	898.73 MVA	2.26 kA	-84.69	5.61 kA	2.26	898.73	2.26	2.29
Line 1	Bus 4				528.86 MVA	1.33 kA	94.24	3.30 kA				
Line 2	Bus 7				370.09 MVA	0.93 kA	96.86	2.31 kA				
Bus 6	230.00	0.00	0.00	1.10	854.99 MVA	2.15 kA	-83.28	5.18 kA	2.15	854.99	2.15	2.17
Line 5	Bus 9				338.26 MVA	0.85 kA	97.98	2.05 kA				
Line 6	Bus 4				516.87 MVA	1.30 kA	95.89	3.13 kA				
Bus 7	230.00	0.00	0.00	1.10	1227.43 MVA	3.08 kA	-87.07	8.02 kA	2.93	1167.89	3.08	3.15
Line 2	Bus 5				258.53 MVA	0.65 kA	96.46	1.69 kA				
T2	Bus 2				663.13 MVA	1.66 kA	90.90	4.33 kA				
Line 3	Bus 8				306.77 MVA	0.77 kA	94.37	2.01 kA				

Grid: Nine_Bus	System Stage: Nine_Bus										Annex:	/ 2
	rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	ip [kA/kA]	Ib [kA]	Sb [MVA]	Ik [kA]	Ith [kA]

Line 1 Bus 4 528.86 MVA 1.33 kA 94.24 3.30 kA
Line 2 Bus 7 370.09 MVA 0.93 kA 96.86 2.31 kA
Bus 6 230.00 0.00 0.00 1.10 854.99 MVA 2.15 kA -83.28 5.18 kA 2.15 854.99 2.15 2.17
Line 5 Bus 9 338.26 MVA 0.85 kA 97.98 2.05 kA
Line 6 Bus 4 516.87 MVA 1.30 kA 95.89 3.13 kA
Bus 7 230.00 0.00 0.00 1.10 1227.43 MVA 3.08 kA -87.07 8.02 kA 2.93 1167.89 3.08 3.15
Line 2 Bus 5 258.53 MVA 0.65 kA 96.46 1.69 kA
T2 Bus 2 663.13 MVA 1.66 kA 90.90 4.33 kA
Line 3 Bus 8 306.77 MVA 0.77 kA 94.37 2.01 kA

Grid: Nine_Bus	System Stage: Nine_Bus										Annex:	/ 2
	rtd.V. [kV]	Voltage [kV]	[deg]	c- Factor	Sk" [MVA/MVA]	Ik" [kA/kA]	[deg]	ip [kA/kA]	Ib [kA]	Sb [MVA]	Ik [kA]	Ith [kA]
Bus 8	230.00	0.00	0.00	1.10	978.18 MVA	2.46 kA	-85.91	6.26 kA	2.43	967.23	2.46	2.50

VDE 0102

Bus 1	16.50	0.00	0.00	1.10	1629.33 MVA	57.01 kA	-86.51	147.98 kA	46.90	1340.32	57.01	58.32
T1	Bus 4				393.68 MVA	13.78 kA	95.46	35.76 kA				
G1					1235.96 MVA	43.25 kA	-87.14	112.25 kA				

IEC 60909

Bus 1	16.50	0.00	0.00	1.10	1629.33 MVA	57.01 kA	-86.51	147.98 kA	46.90	1340.32	57.01	58.32
T1	Bus 4				393.68 MVA	13.78 kA	95.46	35.76 kA				

ANSI STANDART

	[kV]	R[Ohm]	X[Ohm]	[kA]	[deg]	[MVA]	[kA]	[kA]		Sym.Base [kA]	Tot.Base [kA]
Bus 1	16.50										
	Mom.Duty	0.007	0.171	55.760	-87.73	1593.560	37.056	91.421	151.304		
	Int.Duty	0.007	0.171	55.760	-87.73	1593.560	37.056		2 cycles	61.126	84.181
	30-cycle	0.010	0.237	40.078	-87.60	1145.387			3 cycles	62.664	74.859
									5 cycles	61.599	66.794
									8 cycles	61.935	61.648

complete

		[kV]	[kV]	[deg]	Factor	[MVA/MVA]	[kA/kA]	[deg]	[kA]	[kA/kA]	[kA]	[kA]	[-]
Bus 1	A	16.50	3.45	-58.48	1.00	621.49 MVA	65.24 kA	-58.5	49.40	181.62 kA	50.70	152.81	0.00
	B		3.45	-58.48		621.49 MVA	65.24 kA	121.5	49.40	181.62 kA	50.70	152.81	0.00
	C		6.90	121.52		0.00 MVA	0.00 kA	0.0	0.00	0.00 kA	0.00	0.00	0.00

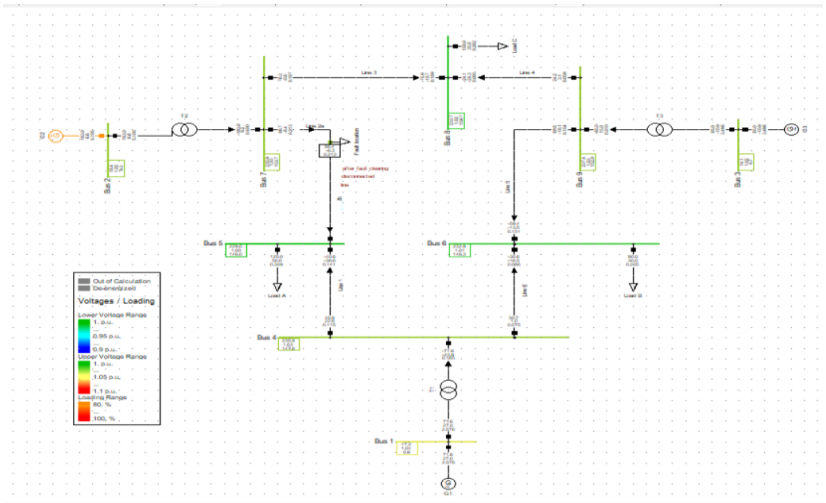
Дүгнэлт

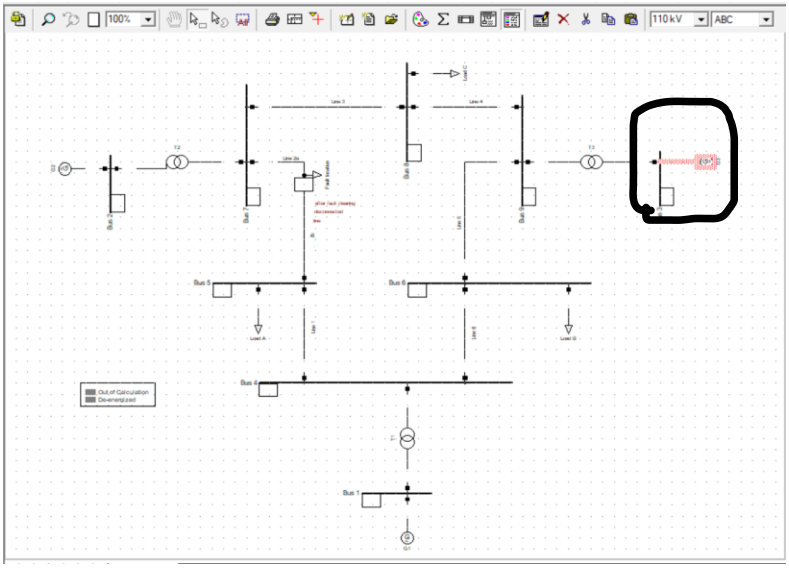
Эндээс хархад VDE 0102 болон ICE 60909 стандартуудын гүйдлийн утга адил бна

Харин ANSI стандарт 2-6 циклийн турш гэмлийн гүйдлүүд нь ижил байна харин complete нэхүү аргийг манай оронд хэрэглэдэг бөгөөд түгээмэл ашигладаг арга юм

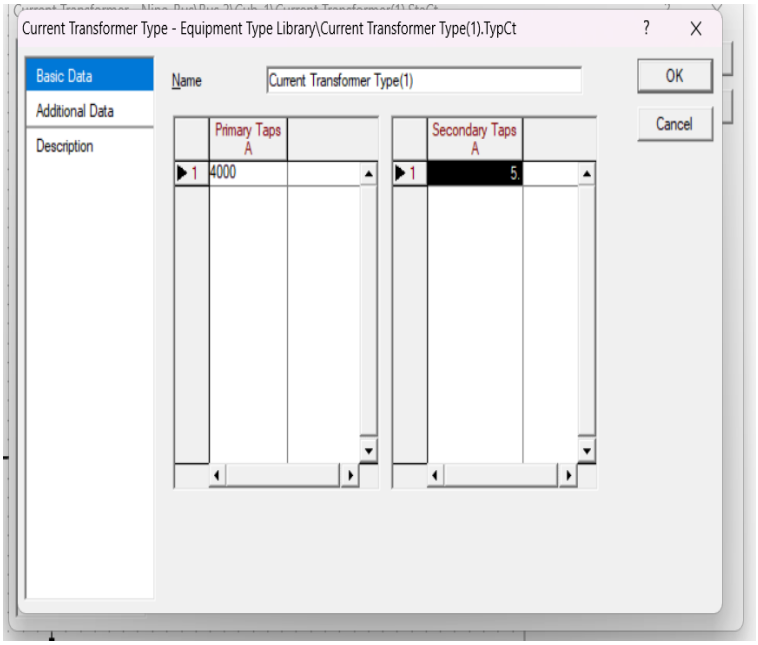
Бөгөөд бүх төрлийн богино залгаанд ажилдгаараа давуу талтай

Чадлын урсгалын тооцоо

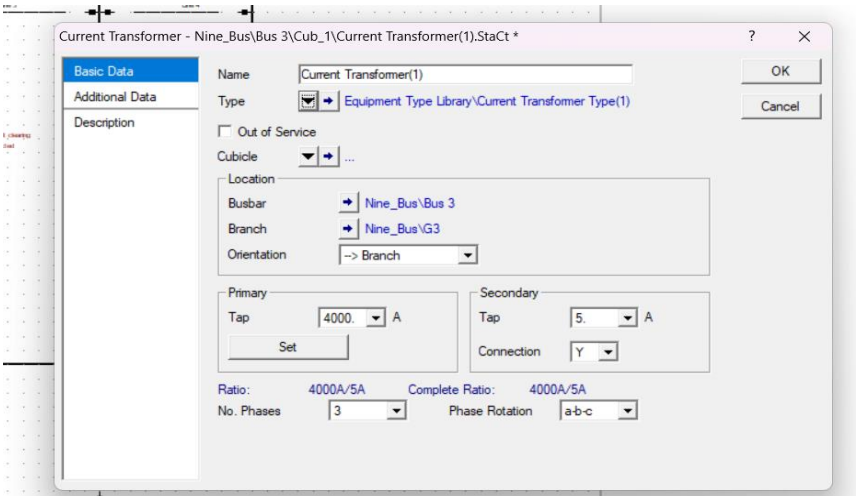


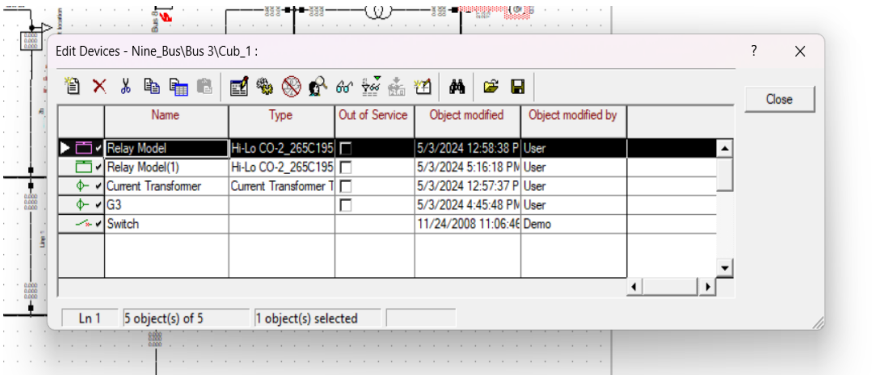


Генератор G3-ийн хувьд хийв

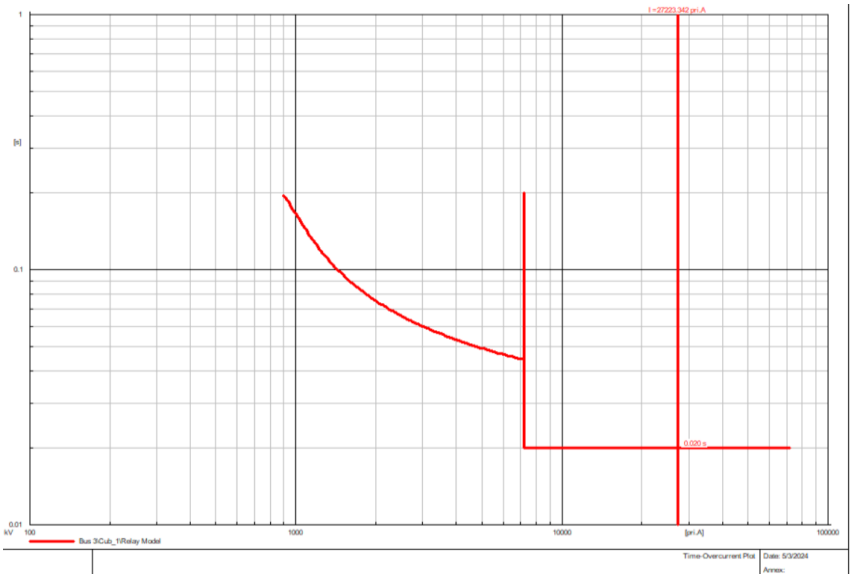


Генератор өгөдлүүд





Сонгосон реле хамгаалалт болон реле модел загвар



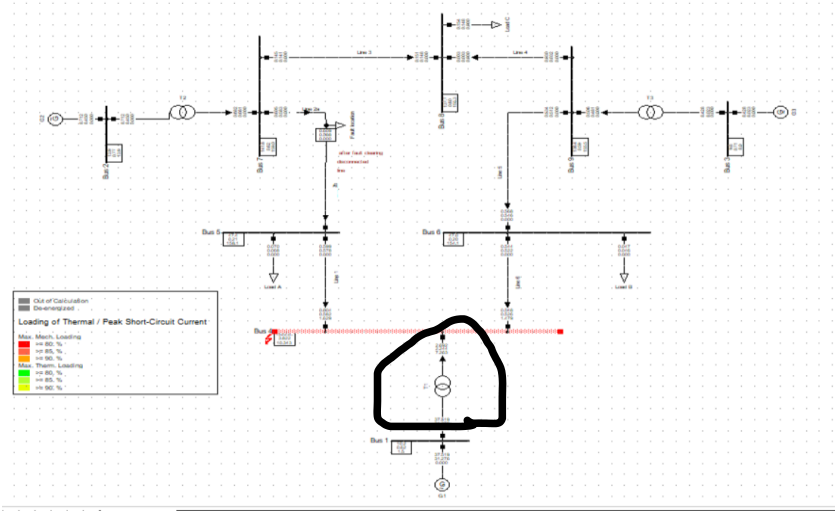
Генераторын хамгаалалт ажилах гүйдэл бөгөөд характристик

Генераторын хамгаалалтын ажилсан хугацаа

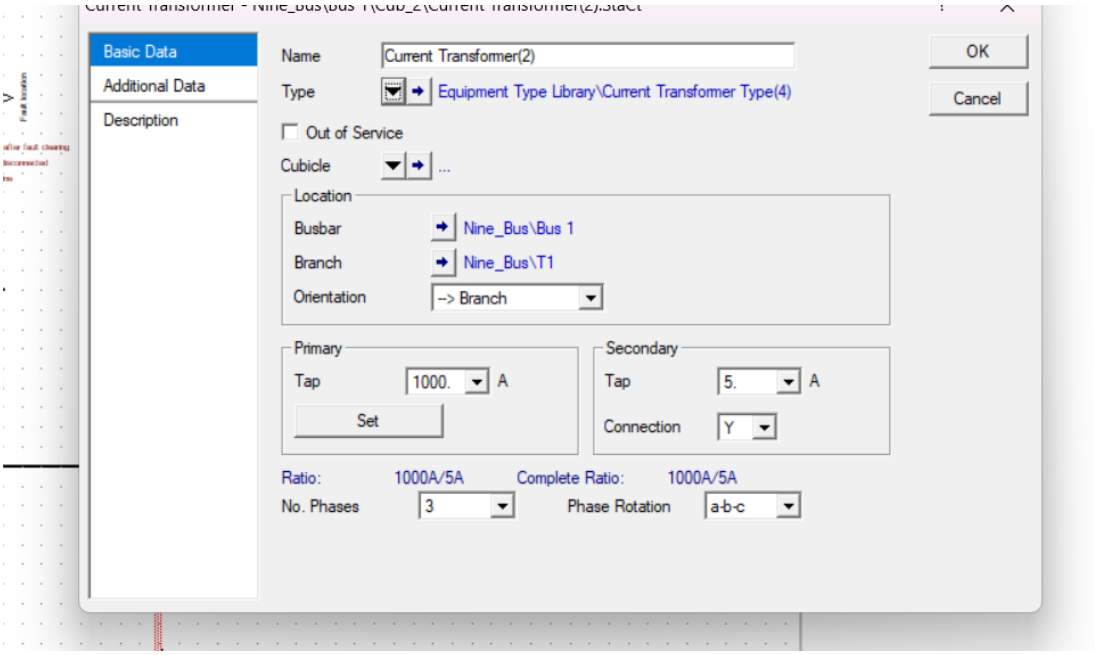
Гэмтлийн гүйдлийн хэмжээ

Трансформаторын хамгаалалт

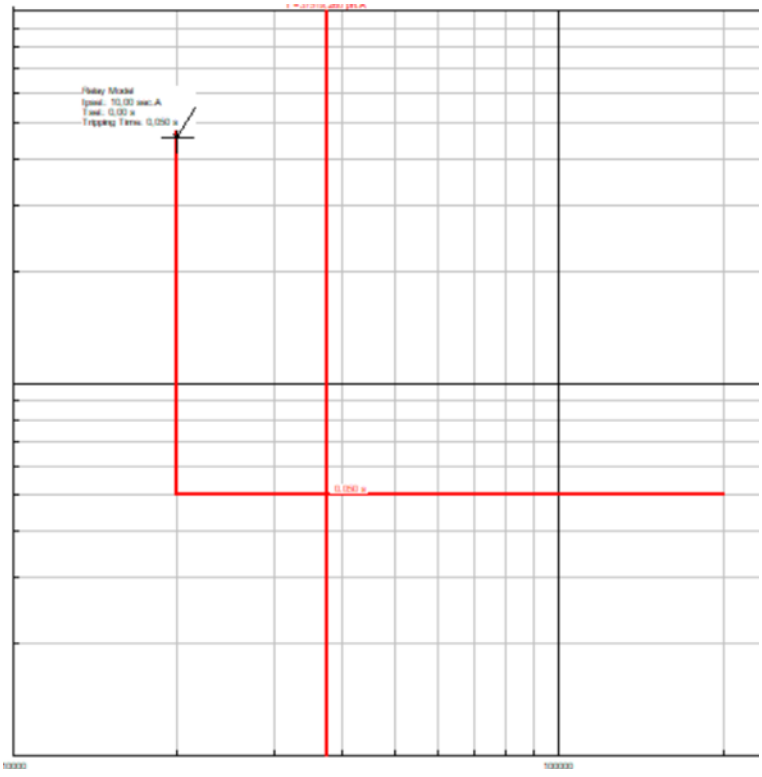
Трансформаторын хамгаалалт нь ГИХ болон зайн хамгаалалт ажилдаг ГИХ хамгаалалт нь трансформаторын гадны богино залгааны үед ажилдаг хамгаалалт юм



Трансформаторын өгөгдлүүд

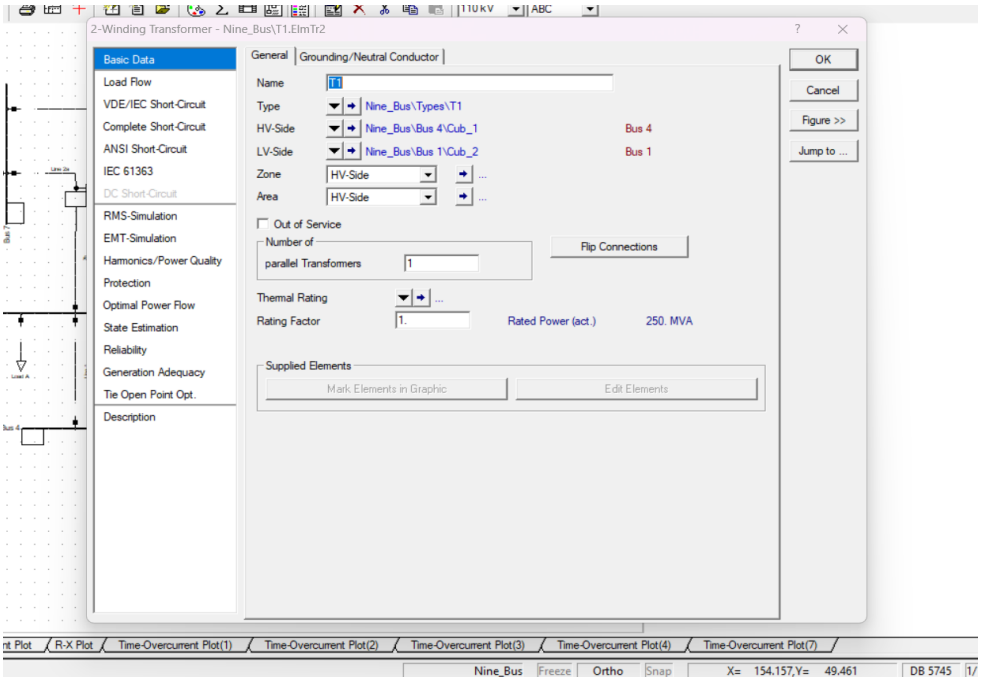


Генераторын характристик

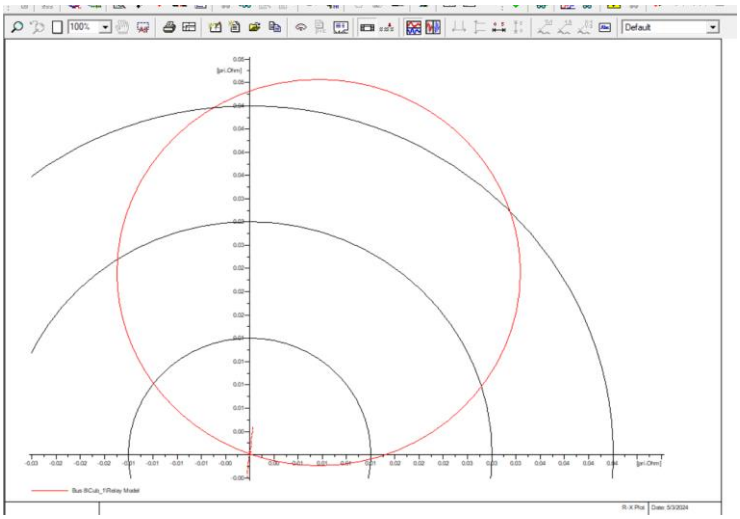


Гэмтэл гарах үед гүйх гүйдлийн хэмжээ

Трансформаторын зайн хамгаалат



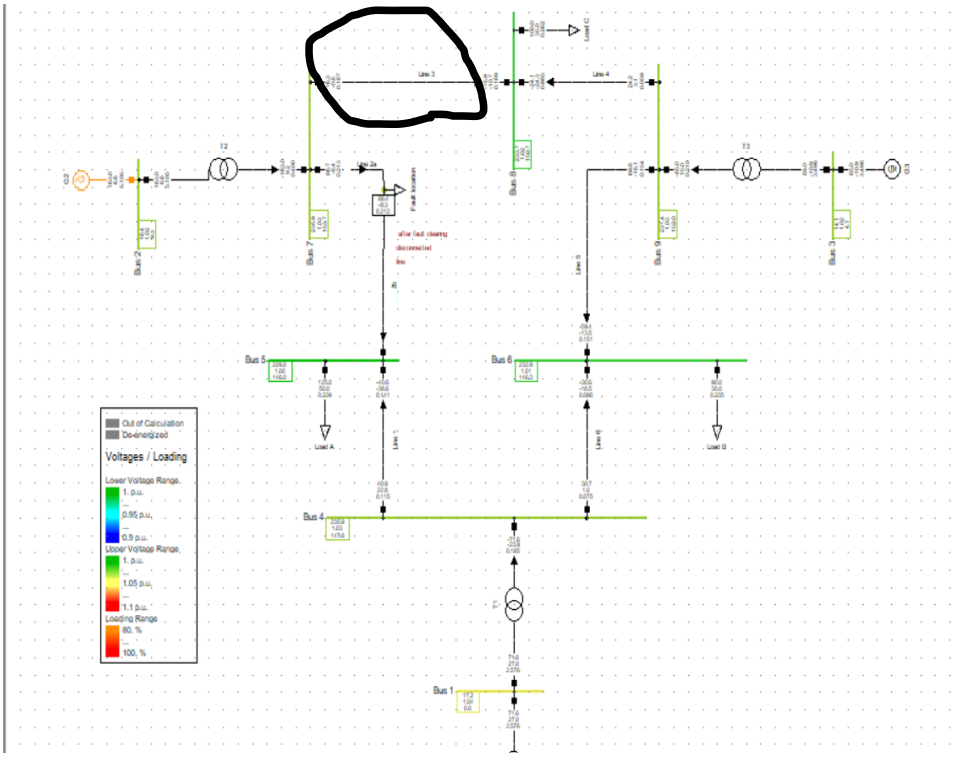
Трансформаторын өгөгдөл

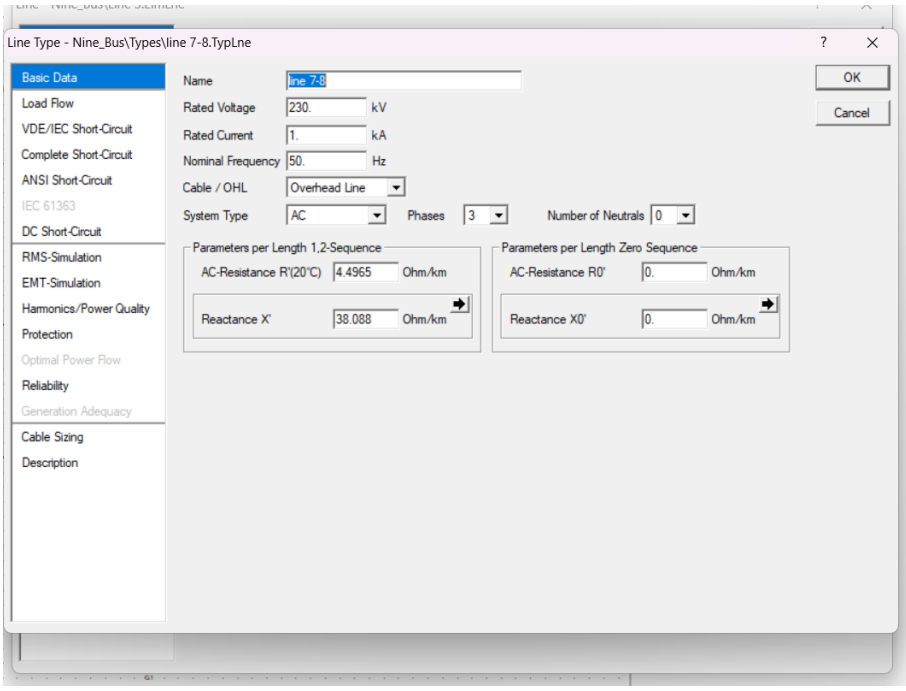


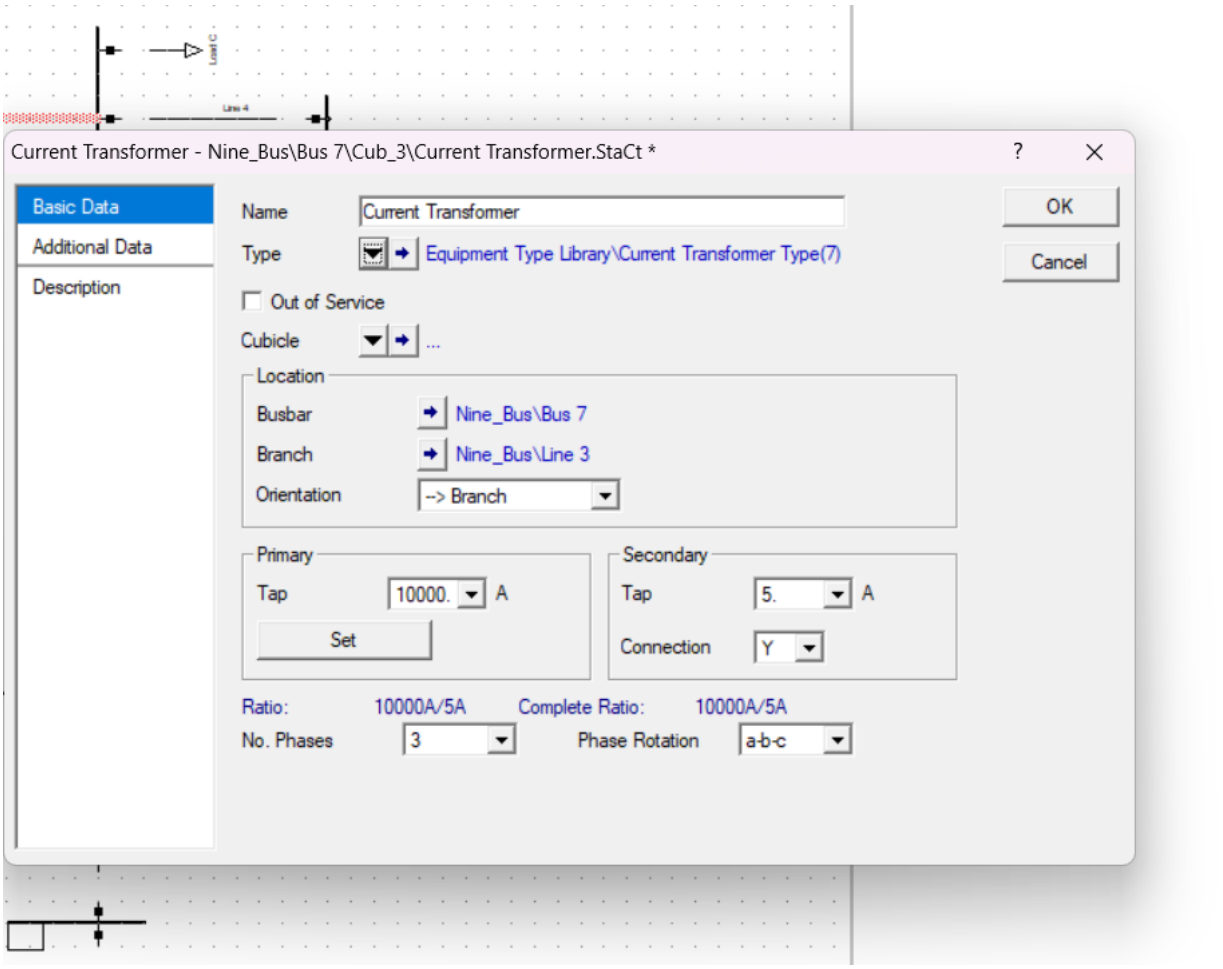
Трансформаторын зайн хамшаалалтын характрыстик

Шугамын хамгаалалт

Шугамын хамгаалалтанд гүйдлийн хамгаалалт болон зайн хамгаалалт тавьж өгсөн болно







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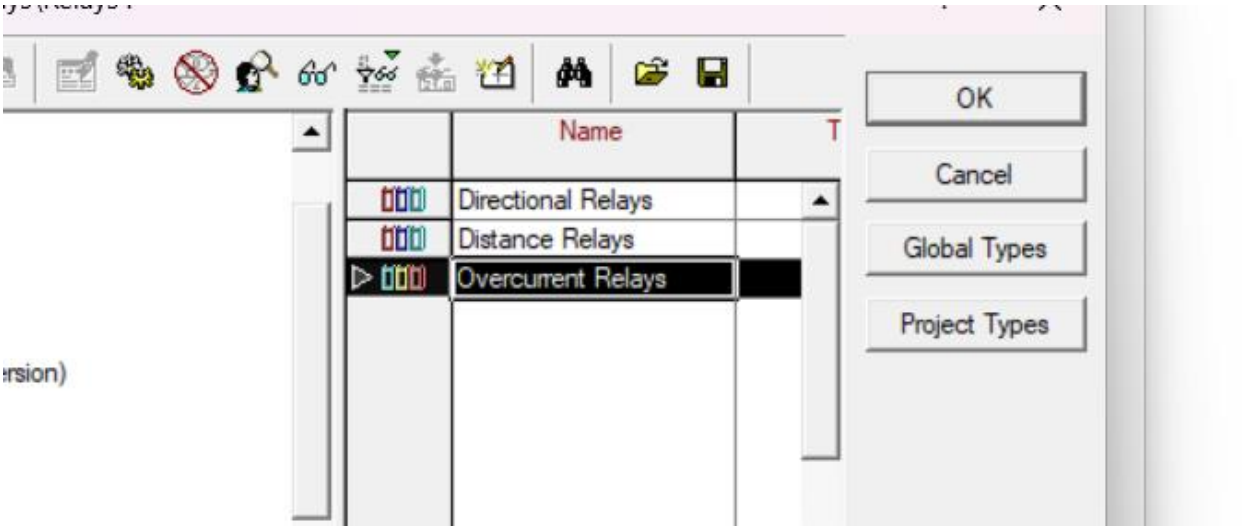

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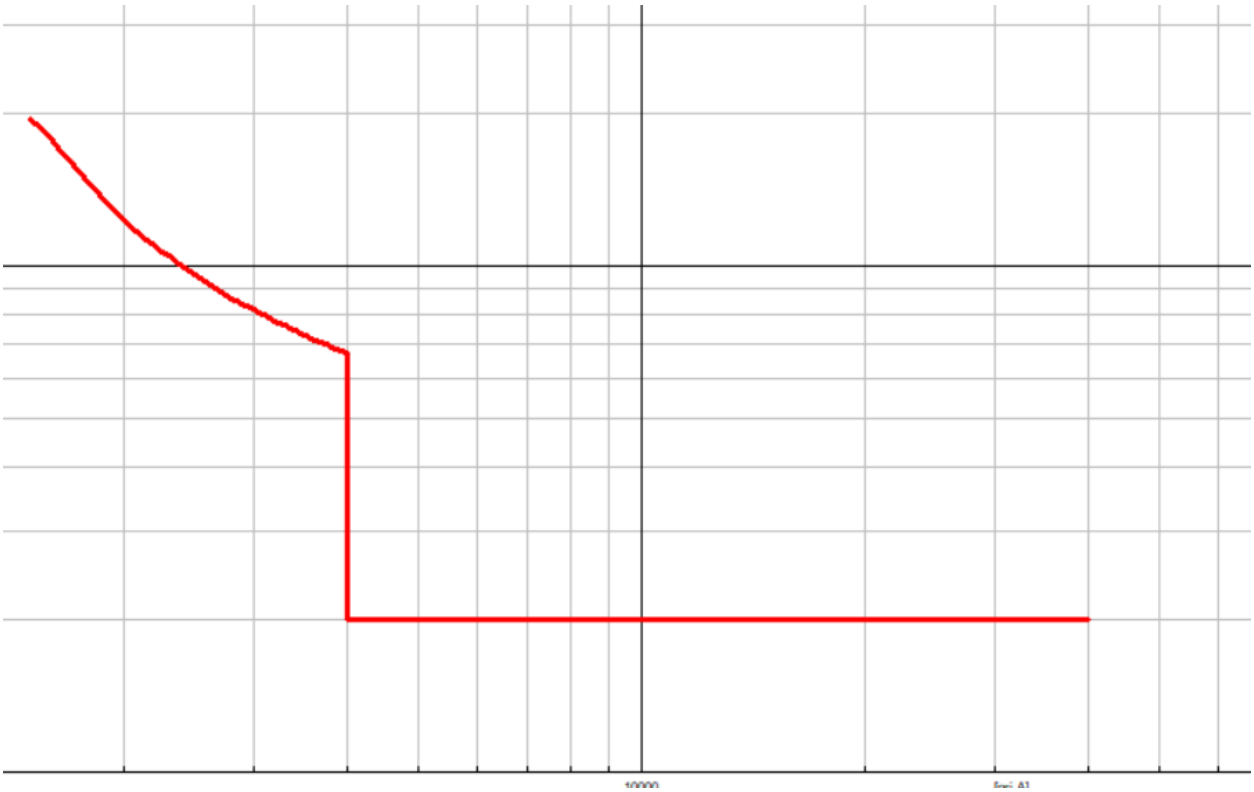

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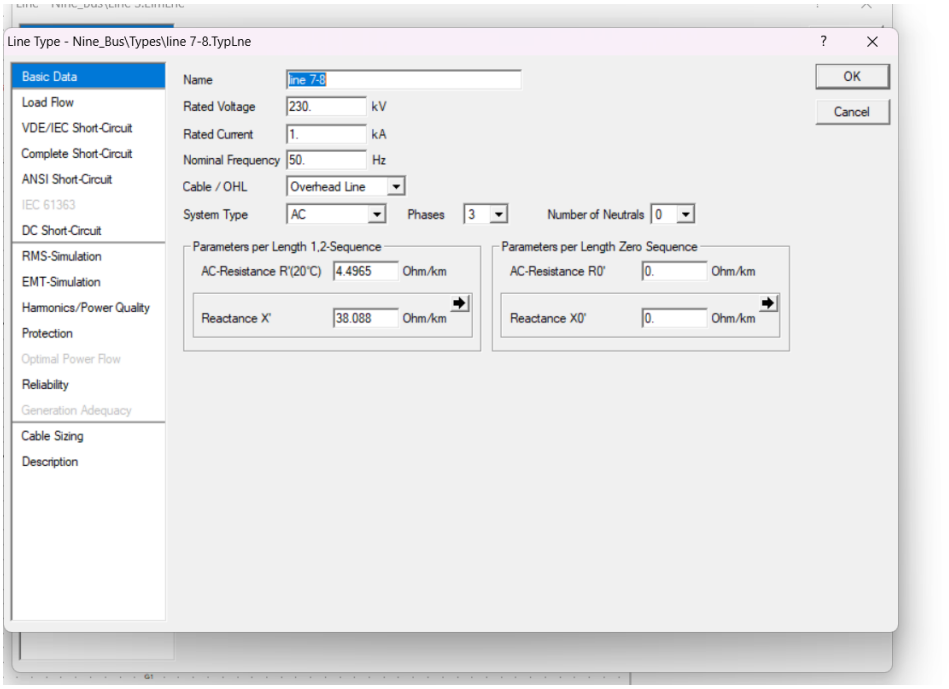

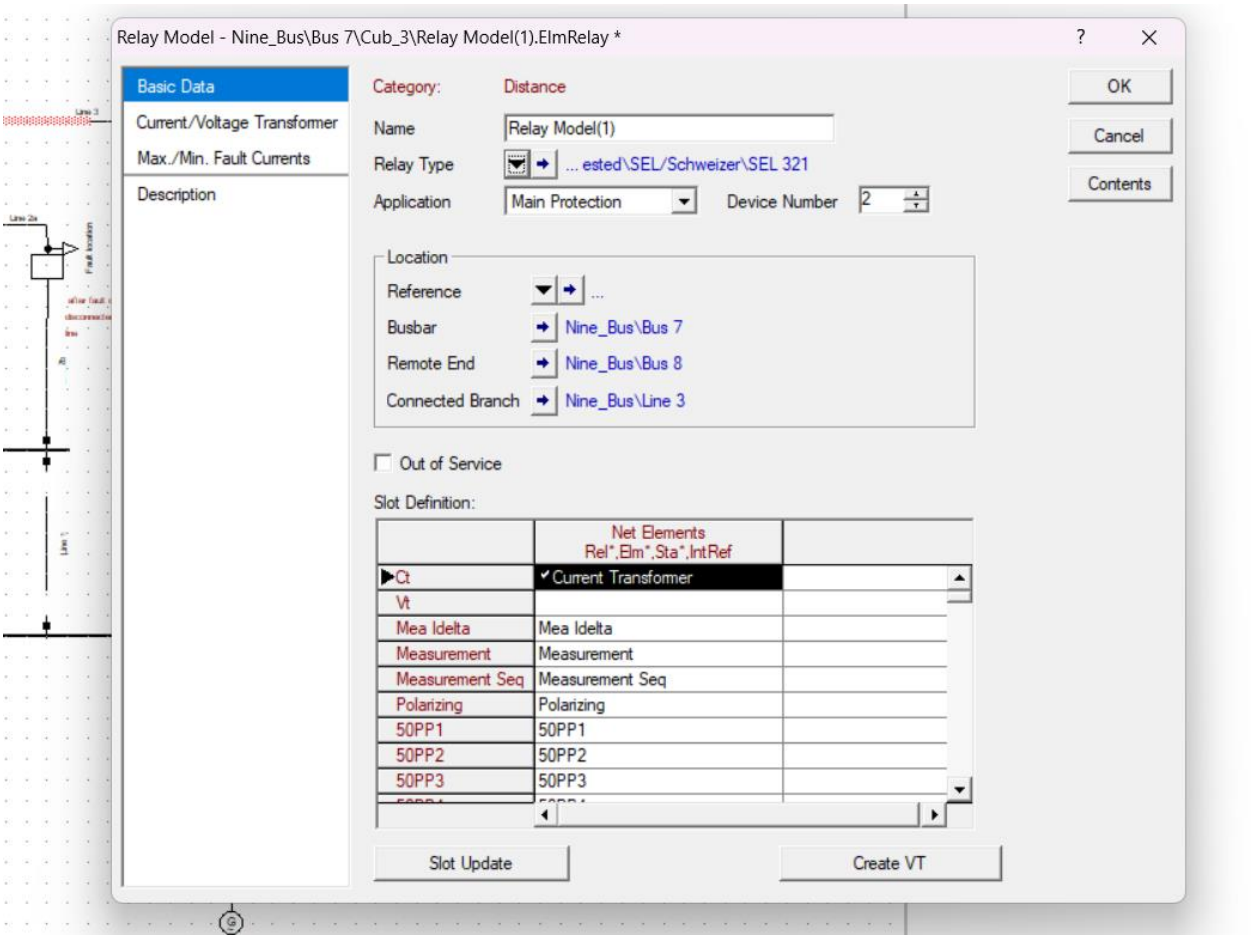

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Зайн хамгаалалтын характристик