



Project: Coordinacion de Protecciones
 Location: PDVSA INTEVEP
 Contract:
 Engineer: German Hernandez
 Filename: nortel

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INTERRUPTING DUTY Summary Report

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
Bus2	12.470	Fuse12	Fuse	8.491	3.5	1.000	8.491	13.800	5.00	25.000	25.000
	12.470	Fuse11	Fuse	8.491	3.5	1.000	8.491	13.800	5.00	25.000	25.000
Bus5	12.470	Fuse3	Fuse	11.561	11.2	1.000	11.561	15.500	3.95	50.000	50.000
Bus6	0.480	DS632	PowerUnfuse	34.604	5.3	1.000	34.604	0.480	15.00	65.000	65.000
	0.480	DS416	PowerUnfuse	34.604	5.3	1.000	34.604	0.480	15.00	50.000	50.000
Bus21	0.208			22.177	3.9						
FASE E	0.480	Fuse8	Fuse	34.604	5.3	1.000	34.604	15.500	5.00	55.000	55.000
	0.480	Fuse9	Fuse	34.604	5.3	1.000	34.604	15.500	5.00	55.000	55.000
	0.480	DS632	PowerUnfuse	34.604	5.3	1.000	34.604	0.480	15.00	65.000	65.000
SP	0.208	CB18 LA	Molded Case	16.006	2.5	1.000	16.006	0.240	20.00	42.000	42.000
ST3	0.208	CB7 EHB	Molded Case	9.495	0.9	1.000	9.495	0.240	30.00	18.000	18.000
ST-1	0.208	CB16 LA	Molded Case	14.614	2.3	1.000	14.614	0.240	20.00	42.000	42.000
T1CH	0.208	CB22 MC	Molded Case	10.249	3.2	1.000	10.249	0.240	20.00	42.000	42.000
TF1T	0.208	CB27 CA	Molded Case	10.633	1.0	1.000	10.633	0.240	30.00	14.000	14.000
TF2T	0.208	KA	Molded Case	22.177	2.3	1.000	22.177	0.240	20.00	25.000	25.000
TF3T	0.208	CB28 KA	Molded Case	14.701	1.8	1.000	14.701	0.240	20.00	25.000	25.000
TF4T	0.208	CB29 JD	Molded Case	14.336	2.1	1.000	14.336	0.240	20.00	42.000	42.000
TF4T 480V	0.480	CB26 JD	Molded Case	14.488	3.3	1.000	14.488	0.480	20.00	30.000	30.000
THP 480/277V	0.480	CB1 DS416	PowerUnfuse	17.797	6.1	1.000	17.797	0.480	15.00	50.000	50.000
	0.480	Fuse4	Fuse	17.797	6.1	1.000	17.797	15.500	5.00	34.000	34.000
	0.480	CB8 DS206S	PowerUnfuse	17.797	6.1	1.000	17.797	0.480	15.00	42.000	42.000
	0.480	CB22 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
	0.480	CB23 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
	0.480	CB24 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
	0.480	CB27 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
	0.480	CB31 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
THPB	0.480	CB1 LA	Molded Case	17.797	6.1	1.050	18.680	0.480	20.00	30.000	30.000
THPB	0.480	CB22 EHB	Molded Case	13.107	1.7	1.000	13.107	0.480	30.00	14.000	14.000
THS	0.480	CB23 EB	Molded Case	13.107	1.7	1.000	13.107	0.480	50.00	10.000	10.000*
TLAC	0.208	CB26 Fi225	Molded Case	10.130	0.8	1.000	10.130	0.240	30.00	18.000	18.000
TLAEM	0.208	CB22 EB	Molded Case	4.505	0.4	1.000	4.505	0.240	50.00	10.000	10.000
TLP 208/120V	0.208	CB5 DS420	PowerUnfuse	25.277	5.4	1.000	25.277	0.240	15.00	65.000	65.000
	0.208	LA1	Molded Case	25.277	5.4	1.000	25.277	0.240	15.00	42.000	42.000
	0.208	LA2	Molded Case	25.277	5.4	1.022	25.834	0.240	20.00	42.000	42.000
	0.208	LA3	Molded Case	25.277	5.4	1.000	25.277	0.240	15.00	42.000	42.000

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3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
TLP 208/120V	0.208	LA4	Molded Case	25.277	5.4	1.000	25.277	0.240	15.00	42.000	42.000
	0.208	LA5	Molded Case	25.277	5.4	1.000	25.277	0.240	15.00	42.000	42.000
	0.208	LA6	Molded Case	25.277	5.4	1.022	25.834	0.240	20.00	42.000	42.000
	0.208	LA7	Molded Case	25.277	5.4	1.022	25.834	0.240	20.00	42.000	42.000
TLS	0.208	CB23 CA	Molded Case	11.368	1.0	1.000	11.368	0.240	50.00	10.000	10.000*
TLSE	0.208	CB24 EHB	Molded Case	11.368	1.0	1.000	11.368	0.240	30.00	18.000	18.000
TLSM	0.208	CB19 KA	Molded Case	6.351	0.6	1.000	6.351	0.240	20.00	25.000	25.000
TM1	0.208	CB26 FB	Molded Case	2.081	1.7	1.000	2.081	0.480	30.00	14.000	14.000
TM11	0.480	CB26 TED	Molded Case	12.288	2.1	1.000	12.288	0.480	30.00	14.000	14.000
TMD	0.480	CB28 LA	Molded Case	13.229	3.1	1.000	13.229	0.480	20.00	30.000	30.000
	0.480	CB22 KA	Molded Case	13.229	3.1	1.000	13.229	0.480	20.00	22.000	22.000
	0.480	CB23 KA	Molded Case	13.229	3.1	1.000	13.229	0.480	20.00	22.000	22.000
	0.480	CB29 LA	Molded Case	13.229	3.1	1.000	13.229	0.480	20.00	30.000	30.000
TP	0.480	CB26 EHB	Molded Case	12.851	1.4	1.000	12.851	0.480	30.00	14.000	14.000
TPB	0.208	CB22 FB	Molded Case	11.368	1.0	1.000	11.368	0.240	30.00	18.000	18.000
TPF	0.480	CB25 LA	Molded Case	13.155	2.2	1.000	13.155	0.480	20.00	30.000	30.000
TS1	0.208	CB20 EHB	Molded Case	8.188	0.7	1.000	8.188	0.240	30.00	18.000	18.000
TSG	0.208	CB25 EHB	Molded Case	11.368	1.0	1.000	11.368	0.240	30.00	18.000	18.000
TSM 480V	0.480	CB5 LA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	30.000	30.000
	0.480	CB6 LA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	30.000	30.000
	0.480	CB7 LA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	30.000	30.000
	0.480	CB8 KA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	22.000	22.000
	0.480	CB17 LA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	30.000	30.000
	0.480	CB19 LA	Molded Case	14.387	4.7	1.000	14.387	0.480	20.00	30.000	30.000

Method: IEEE - X/R is calculated from separate R & X networks.
 HV CB interrupting capability is adjusted based on bus nominal voltage
 Protective device duty is calculated based on total fault current

* Indicates a device with interrupting duty exceeding the device capability

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Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
THS	0.480	CB23 EB	Molded Case	13.107	1.7	1.000	13.107	0.480	50.00	10.000	10.000*
TLS	0.208	CB23 CA	Molded Case	11.368	1.0	1.000	11.368	0.240	50.00	10.000	10.000*

Method: IEEE - X/R is calculated from separate R & X networks.
 HV CB interrupting capability is adjusted based on bus nominal voltage
 Protective device duty is calculated based on total fault current

* Indicates a device with interrupting duty exceeding the device capability

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INTERRUPTING DUTY Summary Report

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
BARRA DE 1000A 480V	0.480	CB2 LA TPAC	Molded Case	20.593	4.1	1.000	20.593	0.480	20.00	200.000	200.000
	0.480	CB4 LA TPAC	Molded Case	20.593	4.1	1.000	20.593	0.480	20.00	200.000	200.000
	0.480	CB6 HFB	Molded Case	20.593	4.1	1.000	20.593	0.480	20.00	25.000	25.000
	0.480	CB8 HFB	Molded Case	20.593	4.1	1.000	20.593	0.480	20.00	25.000	25.000
BARRA DE 1600 A	0.480	CB22 SPB 100	PowerUnfuse	21.114	4.4	1.000	21.114	0.480	15.00	100.000	100.000
	0.480	CB22 LA TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB1 LA TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB1 MC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	30.000	30.000
BARRA DE 1600A 208V	0.208	CB3 LA TPAC	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	200.000	200.000
	0.480	CB22 SPB 100	PowerUnfuse	21.114	4.4	1.000	21.114	0.480	15.00	100.000	100.000
BARRA DE 2000 A	0.480	CB23 PC	PowerUnfuse	21.114	4.4	1.000	21.114	0.480	15.00	100.000	100.000
	0.480	CB23 PC	PowerUnfuse	21.114	4.4	1.000	21.114	0.480	15.00	100.000	100.000
Bus4	12.470			8.935	3.9						
CSG-11-NE(A)	0.208	CB3 LA TPAC	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	200.000	200.000
	0.208	CB1 Fi225 CH	Molded Case	16.256	4.6	1.087	17.670	0.240	30.00	18.000	18.000
	0.208	CB3 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB4 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB5 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB7 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB1 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	0.208	CB10 HFB	Molded Case	16.256	4.6	1.000	16.256	0.240	20.00	65.000	65.000
	CSG-11-NE(B)	0.208	CB15 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000
0.208		CB17 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
0.208		CB18 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
0.208		CB19 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
0.208		CB20 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
0.208		CB21 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
0.208		CB23 LA TPAC	Molded Case	9.747	4.6	1.000	9.747	0.240	20.00	200.000	200.000
CSG-31 (A)	0.480	CB22 LA TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB21 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB20 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB19 HFB	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	25.000	25.000
	0.480	CB18 FB TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000

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Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
CSG-31 (A)	0.480	CB17 FB TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB16 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
CSG-31(B)	0.480	CB1 LA TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB1 Fi100 CH	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	13.000	13.000*
	0.480	CB2 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB3 FB TPAC	Molded Case	21.114	4.4	1.000	21.114	0.480	20.00	200.000	200.000
	0.480	CB4 TED GE	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
HIDRAULICOS	0.480			19.553	2.3						
NORTE 3	0.480	SPB100	PowerUnfuse	25.082	6.7	1.002	25.142	0.480	15.00	100.000	100.000
SECCIONAMIENTO PPAL	12.470			11.558	15.0						
TAA-PB-480	0.480	CB14 LA	Molded Case	15.178	1.3	1.000	15.178	0.480	20.00	30.000	30.000
TAA-S1-208	0.208	CB8 EHB	Molded Case	3.431	0.3	1.000	3.431	0.240	30.00	18.000	18.000
TA-S2-480	0.480	CB1 KA	Molded Case	14.651	1.2	1.000	14.651	0.480	20.00	22.000	22.000
TERMORREGULADORES	0.208			14.863	2.3						
TI-1-480	0.480	CB13 EHB	Molded Case	5.442	0.3	1.000	5.442	0.480	30.00	14.000	14.000
TI-2-480	0.480	CB12 EHB	Molded Case	8.968	0.6	1.000	8.968	0.480	30.00	14.000	14.000
TI-3-480	0.480	CB11 FB	Molded Case	7.728	0.5	1.000	7.728	0.480	30.00	14.000	14.000
TI-PB-480	0.480	CB1 EHB	Molded Case	9.064	0.6	1.000	9.064	0.480	30.00	14.000	14.000
TI-S1-480	0.480	CB15 EHB	Molded Case	11.740	0.7	1.000	11.740	0.480	30.00	14.000	14.000
TIV-S2-480	0.480	CB3 EHB	Molded Case	15.257	1.2	1.000	15.257	0.480	30.00	14.000	14.000*
TLCC-PB-20	0.208	CB1 HLB	Molded Case	8.369	3.4	1.000	8.369	0.240	20.00	65.000	65.000
TLC-PB-208	0.208	CB5 LA	Molded Case	8.234	3.1	1.000	8.234	0.240	20.00	42.000	42.000
TLDT-PB-208	0.208	CB4 LA	Molded Case	6.696	1.2	1.000	6.696	0.240	20.00	42.000	42.000
TLE1-1-208	0.208	CB8 LA	Molded Case	6.643	1.4	1.000	6.643	0.240	20.00	42.000	42.000
TLE2-1-208	0.208	CB7 LA	Molded Case	6.643	1.4	1.000	6.643	0.240	20.00	42.000	42.000
TLE3-1-208	0.208	CB6 LA	Molded Case	6.514	1.3	1.000	6.514	0.240	20.00	42.000	42.000
TLMT-PB-208	0.208	CB25 LA	Molded Case	8.532	3.5	1.000	8.532	0.240	20.00	42.000	42.000
TMC-S2-480	0.480	CB2 LA	Molded Case	16.467	1.7	1.000	16.467	0.480	20.00	30.000	30.000
TMT-PB-208	0.208	CB9 LA	Molded Case	3.135	0.3	1.000	3.135	0.240	20.00	42.000	42.000
TRANSFER	0.480	CB15	PowerUnfuse	20.586	4.1	1.000	20.586	0.480	15.00	100.000	100.000
TSG-1-208	0.208	CB11 EHB	Molded Case	3.135	0.3	1.000	3.135	0.240	30.00	18.000	18.000
TSG-2-208	0.208	CB14 EHB	Molded Case	4.286	0.4	1.000	4.286	0.240	30.00	18.000	18.000
TSG-3-208	0.208	CB14 KA	Molded Case	3.734	0.4	1.000	3.734	0.240	20.00	25.000	25.000
TSG-PB-208	0.208	CB9 EHB	Molded Case	2.812	0.2	1.000	2.812	0.240	30.00	18.000	18.000
TSG-S1-208	0.208	CB8 KA	Molded Case	3.600	0.3	1.000	3.600	0.240	20.00	25.000	25.000
TSG-S2-208	0.208	CB10 EHB	Molded Case	8.011	0.7	1.000	8.011	0.240	30.00	18.000	18.000
TV-PT-208	0.208	CB10 LA	Molded Case	6.890	2.4	1.000	6.890	0.240	20.00	42.000	42.000

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HV CB interrupting capability is adjusted based on bus nominal voltage
Protective device duty is calculated based on total fault current

* Indicates a device with interrupting duty exceeding the device capability

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Bus		Device		Interrupting Duty				Device Capability			
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
CSG-31 (A)	0.480	CB21 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB20 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB16 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
CSG-31(B)	0.480	CB1 Fi100 CH	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	13.000	13.000*
	0.480	CB2 EHB	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
	0.480	CB4 TED GE	Molded Case	21.114	4.4	1.076	22.713	0.480	30.00	14.000	14.000*
TIV-S2-480	0.480	CB3 EHB	Molded Case	15.257	1.2	1.000	15.257	0.480	30.00	14.000	14.000*

Method: IEEE - X/R is calculated from separate R & X networks.
 HV CB interrupting capability is adjusted based on bus nominal voltage
 Protective device duty is calculated based on total fault current

* Indicates a device with interrupting duty exceeding the device capability